

**AVI**  
**LOEB**  
**PART TWO**

**THEY'RE**  
**WATCHING**  
**ALL OF US**



1  
00:00:03,590 --> 00:00:02,389  
this will be a lengthy introduction as

2  
00:00:04,970 --> 00:00:03,600  
there are several announcements that

3  
00:00:07,010 --> 00:00:04,980  
I've been holding on to and I can

4  
00:00:09,350 --> 00:00:07,020  
finally publicize them as usual you can

5  
00:00:11,030 --> 00:00:09,360  
click on the timestamp over here or in

6  
00:00:12,830 --> 00:00:11,040  
the description to skip this longish

7  
00:00:14,930 --> 00:00:12,840  
preface firstly you should know about

8  
00:00:17,750 --> 00:00:14,940  
today's guest and that is Professor of

9  
00:00:20,570 --> 00:00:17,760  
Harvard Avi Loeb now obvious an

10  
00:00:23,090 --> 00:00:20,580  
astrophysicist and a cosmologist with

11  
00:00:25,370 --> 00:00:23,100  
such a multitude of accolades that I

12  
00:00:27,529 --> 00:00:25,380  
could barely I can't memorize them so

13  
00:00:29,029 --> 00:00:27,539

I'm simply going to read them so for one

14

00:00:31,130 --> 00:00:29,039

he's the longest serving chair of

15

00:00:32,870 --> 00:00:31,140

Harvard's Department of astronomy he's

16

00:00:34,490 --> 00:00:32,880

the founding director of Harvard's black

17

00:00:36,170 --> 00:00:34,500

hole initiative he's the director of The

18

00:00:38,389 --> 00:00:36,180

Institute for Theory and computation

19

00:00:39,830 --> 00:00:38,399

he's a fellow at the American Academy of

20

00:00:41,690 --> 00:00:39,840

Arts and Science and the American

21

00:00:44,209 --> 00:00:41,700

physical society and the international

22

00:00:45,650 --> 00:00:44,219

academy for astronautics he's the

23

00:00:46,970 --> 00:00:45,660

science theory director for the

24

00:00:48,830 --> 00:00:46,980

Breakthrough initiatives of the

25

00:00:50,690 --> 00:00:48,840

Breakthrough prize foundation and again

26

00:00:52,670 --> 00:00:50,700

he's won so many awards that I'll just

27

00:00:54,110 --> 00:00:52,680

list them on screen in the past year or

28

00:00:56,209 --> 00:00:54,120

so AVI has headed What's called the

29

00:00:58,189 --> 00:00:56,219

Galileo project which is dedicated to

30

00:00:59,930 --> 00:00:58,199

the systematic scientific search for

31

00:01:02,270 --> 00:00:59,940

evidence of extraterrestrial technology

32

00:01:04,310 --> 00:01:02,280

logical artifacts we're also announcing

33

00:01:06,950 --> 00:01:04,320

here that the Galileo project will have

34

00:01:09,010 --> 00:01:06,960

its first results in the summer of 2023.

35

00:01:11,149 --> 00:01:09,020

today we talk about Consciousness God

36

00:01:13,010 --> 00:01:11,159

uaps and the problem with current

37

00:01:15,050 --> 00:01:13,020

theoretical physics you should know that

38

00:01:16,910 --> 00:01:15,060

I've spoken to Avi lobe one year ago on

39

00:01:18,890 --> 00:01:16,920

this channel asking him about wormholes

40

00:01:21,109 --> 00:01:18,900

and the physics that Bob Lazar suggests

41

00:01:22,850 --> 00:01:21,119

Propel the UFO crafts link to that

42

00:01:24,410 --> 00:01:22,860

podcast is in the description for those

43

00:01:26,570 --> 00:01:24,420

of you who are unfamiliar my name is

44

00:01:28,130 --> 00:01:26,580

Kurt J mungle I'm a torontonian

45

00:01:30,350 --> 00:01:28,140

filmmaker with a background in

46

00:01:32,570 --> 00:01:30,360

mathematical physics dedicated to the

47

00:01:35,210 --> 00:01:32,580

explication of the variegated terrain of

48

00:01:37,190 --> 00:01:35,220

theories of everything mainly from a

49

00:01:39,170 --> 00:01:37,200

theoretical physics perspective but as

50

00:01:41,030 --> 00:01:39,180

well as analyzing and exploring what the

51  
00:01:42,890 --> 00:01:41,040  
heck is consciousness and what is its

52  
00:01:45,050 --> 00:01:42,900  
role related to fundamental laws if

53  
00:01:46,490 --> 00:01:45,060  
fundamental laws even exist in the sense

54  
00:01:48,109 --> 00:01:46,500  
that there's a bottom to it perhaps

55  
00:01:49,910 --> 00:01:48,119  
reductionism isn't the correct Paradigm

56  
00:01:51,950 --> 00:01:49,920  
but regardless you now have a flavor of

57  
00:01:54,910 --> 00:01:51,960  
what this podcast is about now on to

58  
00:01:57,530 --> 00:01:54,920  
some announcements the URL theories of

59  
00:01:59,149 --> 00:01:57,540  
everything.org is active the reasons for

60  
00:02:00,410 --> 00:01:59,159  
which I'll get to shortly one of the

61  
00:02:02,389 --> 00:02:00,420  
advantages is that I'm going going to be

62  
00:02:04,730 --> 00:02:02,399  
announcing what are the upcoming guests

63  
00:02:06,649 --> 00:02:04,740

to members there either first or at

64

00:02:08,690 --> 00:02:06,659

least simultaneously as I don't like to

65

00:02:11,330 --> 00:02:08,700

provide many exclusives so for example

66

00:02:12,890 --> 00:02:11,340

Salvatore Pious is coming on the

67

00:02:15,710 --> 00:02:12,900

theories of everything podcast in the

68

00:02:18,110 --> 00:02:15,720

middle of October he will be joined with

69

00:02:20,930 --> 00:02:18,120

theoretical physicist Stefan Alexander

70

00:02:22,790 --> 00:02:20,940

now both Stefan and Salvatore Pius have

71

00:02:24,589 --> 00:02:22,800

been on the podcast before Stefan

72

00:02:26,750 --> 00:02:24,599

specializes he's one of the few that's

73

00:02:28,430 --> 00:02:26,760

an expert in both Loop quantum gravity

74

00:02:30,890 --> 00:02:28,440

and string theory in the previous

75

00:02:33,110 --> 00:02:30,900

podcast with Stefan we talk about String

76

00:02:34,790 --> 00:02:33,120

Theory particularly a new Theory of

77

00:02:36,710 --> 00:02:34,800

Everything called the autodidactic

78

00:02:38,930 --> 00:02:36,720

universe which is a universe that learns

79

00:02:41,809 --> 00:02:38,940

its own laws that will be in the

80

00:02:43,550 --> 00:02:41,819

description as for Salvatore Pius he has

81

00:02:45,470 --> 00:02:43,560

only given one interview and that's

82

00:02:47,210 --> 00:02:45,480

luckily been on theories of everything

83

00:02:48,949 --> 00:02:47,220

that will be in the description as well

84

00:02:50,809 --> 00:02:48,959

and it's about quantum gravity for those

85

00:02:52,850 --> 00:02:50,819

of you who don't know Salvatore Pious is

86

00:02:55,070 --> 00:02:52,860

the man who's behind the UFO patents

87

00:02:57,110 --> 00:02:55,080

also coming up is Ian mcgilchrist and

88

00:02:59,449 --> 00:02:57,120

John vervaki being joined as a

89

00:03:01,430 --> 00:02:59,459  
theologian again John has been on the

90

00:03:03,229 --> 00:03:01,440  
theories of everything podcast before

91

00:03:05,509 --> 00:03:03,239  
solo and that will be in the description

92

00:03:07,369 --> 00:03:05,519  
as well as Ian McGillchrist in fact the

93

00:03:09,589 --> 00:03:07,379  
one with Ian is one of the highest

94

00:03:11,410 --> 00:03:09,599  
quality podcasts on toe okay now let's

95

00:03:12,890 --> 00:03:11,420  
talk about the website so

96

00:03:14,990 --> 00:03:12,900  
theoriesofeverything.org is a place

97

00:03:16,729 --> 00:03:15,000  
where you can go to support toe because

98

00:03:19,070 --> 00:03:16,739  
many people choose to not support the

99

00:03:22,309 --> 00:03:19,080  
platform of patreon because of at least

100

00:03:23,809 --> 00:03:22,319  
reportedly there's some unscrupulous

101

00:03:25,190 --> 00:03:23,819

business practices or at least

102

00:03:27,050 --> 00:03:25,200

questionable what their future is so

103

00:03:29,149 --> 00:03:27,060

that's one reason and secondly patreon

104

00:03:30,530 --> 00:03:29,159

takes a huge cut many people don't know

105

00:03:32,690 --> 00:03:30,540

this but their credit card transaction

106

00:03:34,850 --> 00:03:32,700

fees Plus patreon on top of that takes a

107

00:03:36,350 --> 00:03:34,860

percentage theoriesofeverything.org is a

108

00:03:38,330 --> 00:03:36,360

vehicle that I have control over so if

109

00:03:40,009 --> 00:03:38,340

you like you can donate there directly

110

00:03:42,649 --> 00:03:40,019

as I imagine the reason you're

111

00:03:44,930 --> 00:03:42,659

supporting toe is to support toe not to

112

00:03:46,430 --> 00:03:44,940

support Kurt plus patreon there are also

113

00:03:48,830 --> 00:03:46,440

several benefits to being a member on

114

00:03:51,050 --> 00:03:48,840

the website number one you'll get an ads

115

00:03:52,550 --> 00:03:51,060

free audio version keep in mind that all

116

00:03:54,289 --> 00:03:52,560

ads whether they're in the introduction

117

00:03:56,149 --> 00:03:54,299

or in the middle those are called

118

00:03:57,890 --> 00:03:56,159

mid-rolls they're skippable by clicking

119

00:03:59,210 --> 00:03:57,900

on the next time stamp I ensure this

120

00:04:01,070 --> 00:03:59,220

because I'm the one that time stamps

121

00:04:03,050 --> 00:04:01,080

each episode regardless if you'd like an

122

00:04:04,850 --> 00:04:03,060

ad free audio version that comes to you

123

00:04:06,470 --> 00:04:04,860

as a benefit for being a member on the

124

00:04:07,910 --> 00:04:06,480

theories of everything.org website

125

00:04:09,710 --> 00:04:07,920

Additionally the way that it works on

126  
00:04:11,809 --> 00:04:09,720  
toe's end is that I render out an

127  
00:04:13,970 --> 00:04:11,819  
episode and then I wait approximately

128  
00:04:16,069 --> 00:04:13,980  
two days or so between once it's

129  
00:04:17,689 --> 00:04:16,079  
uploaded to YouTube and once it finally

130  
00:04:20,030 --> 00:04:17,699  
premieres and one of the reasons for

131  
00:04:21,229 --> 00:04:20,040  
that is to build an audience Etc however

132  
00:04:23,930 --> 00:04:21,239  
what that means is that I actually have

133  
00:04:25,550 --> 00:04:23,940  
the episode completed 12 to 48 hours

134  
00:04:27,590 --> 00:04:25,560  
prior to you seeing it so what will

135  
00:04:30,770 --> 00:04:27,600  
happen is if you're a member you'll get

136  
00:04:32,510 --> 00:04:30,780  
an uploaded ads free version 12 to 48

137  
00:04:34,189 --> 00:04:32,520  
hours before anyone else again nothing

138  
00:04:35,870 --> 00:04:34,199

changes for those of you who are on

139

00:04:38,270 --> 00:04:35,880

YouTube and want to stay there and don't

140

00:04:40,129 --> 00:04:38,280

want to be a toll member Etc that's fine

141

00:04:41,810 --> 00:04:40,139

it's the same way that it's been

142

00:04:43,490 --> 00:04:41,820

nothing's going to change there another

143

00:04:45,350 --> 00:04:43,500

benefit of being a member on the website

144

00:04:47,330 --> 00:04:45,360

rather than on patreon or any other

145

00:04:50,030 --> 00:04:47,340

platform is that there will be discounts

146

00:04:51,950 --> 00:04:50,040

or even free tickets offered whenever we

147

00:04:53,210 --> 00:04:51,960

have Live Events additionally okay this

148

00:04:55,249 --> 00:04:53,220

is another benefit you'll get a

149

00:04:58,070 --> 00:04:55,259

personalized number to text me if you

150

00:04:59,689 --> 00:04:58,080

like that yes this goes to my phone it's

151  
00:05:01,490 --> 00:04:59,699  
not someone else answering for instance

152  
00:05:03,170 --> 00:05:01,500  
instance you can say Kurt you said that

153  
00:05:04,490 --> 00:05:03,180  
so-and-so episode was coming out I was

154  
00:05:07,010 --> 00:05:04,500  
wondering what the progress is on that

155  
00:05:08,810 --> 00:05:07,020  
Kurt have you seen the finale of Better

156  
00:05:10,909 --> 00:05:08,820  
Call Saul Kurt when are you going to be

157  
00:05:13,189 --> 00:05:10,919  
speaking to Stephen Greer by the way

158  
00:05:16,129 --> 00:05:13,199  
Stephen Greer will be coming on the toe

159  
00:05:17,510 --> 00:05:16,139  
podcast mid-october the specific date is

160  
00:05:19,490 --> 00:05:17,520  
not here yet and there's a high

161  
00:05:21,110 --> 00:05:19,500  
likelihood that it will be live and

162  
00:05:22,610 --> 00:05:21,120  
that's whether you remember or not it's

163  
00:05:24,710 --> 00:05:22,620

going to be live on YouTube public

164

00:05:26,450 --> 00:05:24,720

another benefit to being a member on the

165

00:05:29,029 --> 00:05:26,460

website is that if you have Ama

166

00:05:30,950 --> 00:05:29,039

questions to ask for myself my amas that

167

00:05:32,210 --> 00:05:30,960

is the questions and answers with Kurt

168

00:05:34,790 --> 00:05:32,220

and then you can submit them there and

169

00:05:36,290 --> 00:05:34,800

I'll be doing amas for the members keep

170

00:05:38,990 --> 00:05:36,300

in mind that if you have a question for

171

00:05:41,749 --> 00:05:39,000

example Greer or Salvador Pious or any

172

00:05:43,670 --> 00:05:41,759

other guest there is no exclusive to

173

00:05:45,409 --> 00:05:43,680

being a member or to being on patreon or

174

00:05:47,029 --> 00:05:45,419

to being on Twitter a quality question

175

00:05:48,770 --> 00:05:47,039

is a quality question wherever it comes

176

00:05:51,290 --> 00:05:48,780

from I don't prioritize questions based

177

00:05:53,330 --> 00:05:51,300

on if someone donates let's say 200 in a

178

00:05:54,469 --> 00:05:53,340

super chat or if they donate zero

179

00:05:56,510 --> 00:05:54,479

they're just simply asking a question

180

00:05:58,490 --> 00:05:56,520

like anyone else there are no plans for

181

00:06:00,730 --> 00:05:58,500

the live streams to be member specific

182

00:06:03,230 --> 00:06:00,740

though if I ever do do an in-person

183

00:06:05,570 --> 00:06:03,240

meeting like for example I'm thinking of

184

00:06:08,330 --> 00:06:05,580

filming with an audience and Carl

185

00:06:09,770 --> 00:06:08,340

friston in person in London then that

186

00:06:11,930 --> 00:06:09,780

may be streamed to website members

187

00:06:13,790 --> 00:06:11,940

another benefit is that certain merch

188

00:06:15,350 --> 00:06:13,800

will be exclusive to being a member so

189

00:06:17,810 --> 00:06:15,360

for example one that I'm working on now

190

00:06:20,090 --> 00:06:17,820

is a notebook where at the top of each

191

00:06:22,129 --> 00:06:20,100

page is a quotation from a different

192

00:06:23,629 --> 00:06:22,139

mathematician or a physicist or even a

193

00:06:25,070 --> 00:06:23,639

spiritual leader and that will hopefully

194

00:06:27,050 --> 00:06:25,080

serve as inspiration for whatever you're

195

00:06:29,050 --> 00:06:27,060

writing on the page okay so there are

196

00:06:30,830 --> 00:06:29,060

manifold benefits to being a

197

00:06:32,570 --> 00:06:30,840

theoriesofeverything.org remember don't

198

00:06:35,029 --> 00:06:32,580

go to theoriesofeverything.com some

199

00:06:37,309 --> 00:06:35,039

cyber squatters has that domain so dot

200

00:06:39,650 --> 00:06:37,319

org toe is supported by you and the

201  
00:06:42,469 --> 00:06:39,660  
sponsors thank you thank you so much I

202  
00:06:44,150 --> 00:06:42,479  
wouldn't be able to do toe without you

203  
00:06:45,409 --> 00:06:44,160  
whether it's full-time or part-time I

204  
00:06:47,749 --> 00:06:45,419  
wouldn't be able to do this without you

205  
00:06:49,490 --> 00:06:47,759  
there are so many many plans for the

206  
00:06:51,230 --> 00:06:49,500  
future again I wouldn't be able to do it

207  
00:06:52,610 --> 00:06:51,240  
without you so thank you thank you

208  
00:06:55,010 --> 00:06:52,620  
whether you're just watching or whether

209  
00:06:56,809 --> 00:06:55,020  
you donate that's it okay now on to the

210  
00:06:58,370 --> 00:06:56,819  
sponsors if you're familiar with toe

211  
00:07:00,290 --> 00:06:58,380  
you're familiar with Brilliance but for

212  
00:07:02,270 --> 00:07:00,300  
those who don't know brilliant is a

213  
00:07:04,430 --> 00:07:02,280

place where you go to learn math science

214

00:07:06,350 --> 00:07:04,440

and engineering through these bite-sized

215

00:07:07,969 --> 00:07:06,360

Interactive Learning experiences for

216

00:07:09,469 --> 00:07:07,979

example and I keep saying this I would

217

00:07:12,350 --> 00:07:09,479

like to do a podcast on information

218

00:07:14,570 --> 00:07:12,360

Theory particularly Chiara marletto

219

00:07:15,950 --> 00:07:14,580

which is David Deutsch's student has a

220

00:07:18,050 --> 00:07:15,960

theory of everything that she puts

221

00:07:19,730 --> 00:07:18,060

forward called Constructor Theory which

222

00:07:22,129 --> 00:07:19,740

is heavily contingent on information

223

00:07:24,110 --> 00:07:22,139

Theory so I took their course on random

224

00:07:26,270 --> 00:07:24,120

variable distributions and knowledge and

225

00:07:28,189 --> 00:07:26,280

uncertainty in order to learn a bit more

226

00:07:29,990 --> 00:07:28,199

about entropy now there's this formula

227

00:07:31,969 --> 00:07:30,000

for entropy essentially hammered into

228

00:07:33,890 --> 00:07:31,979

you as an undergraduate which seems to

229

00:07:35,689 --> 00:07:33,900

have fallen from the sky however when

230

00:07:37,189 --> 00:07:35,699

you take Brilliance course it was the

231

00:07:39,950 --> 00:07:37,199

first time that I could see that it's an

232

00:07:42,230 --> 00:07:39,960

extremely clear and intuitive formula

233

00:07:43,969 --> 00:07:42,240

that is to say that it would be

234

00:07:46,969 --> 00:07:43,979

unnatural to Define it in any other

235

00:07:49,129 --> 00:07:46,979

manner visit [brilliant.org](http://brilliant.org) toe that is

236

00:07:50,990 --> 00:07:49,139

t-o-e to get 20 off the annual

237

00:07:53,570 --> 00:07:51,000

subscription and I recommend that you

238

00:07:55,249 --> 00:07:53,580

don't stop before four lessons I think

239

00:07:56,870 --> 00:07:55,259

you'll be greatly surprised that the

240

00:07:59,029 --> 00:07:56,880

ease at which you can now comprehend

241

00:08:01,070 --> 00:07:59,039

subjects you previously had a difficult

242

00:08:02,270 --> 00:08:01,080

time growing at some point I'll also go

243

00:08:04,490 --> 00:08:02,280

through the courses and give a

244

00:08:06,409 --> 00:08:04,500

recommendation in order okay wow thank

245

00:08:08,689 --> 00:08:06,419

you for sitting through that prodigious

246

00:08:11,390 --> 00:08:08,699

introduction now on to the episode with

247

00:08:12,409 --> 00:08:11,400

Avi Loeb enjoy thank you for coming out

248

00:08:13,790 --> 00:08:12,419

Avi

249

00:08:14,990 --> 00:08:13,800

thanks for having me it's a great

250

00:08:17,029 --> 00:08:15,000

pleasure

251  
00:08:18,589 --> 00:08:17,039  
let's just lay some groundwork for the

252  
00:08:21,710 --> 00:08:18,599  
audience who's unacquainted with you

253  
00:08:23,390 --> 00:08:21,720  
what is the Galileo project and what has

254  
00:08:25,189 --> 00:08:23,400  
it been up to in the past year

255  
00:08:28,850 --> 00:08:25,199  
the Galileo project is called after

256  
00:08:31,790 --> 00:08:28,860  
Galileo Galilei that a physicist that

257  
00:08:34,490 --> 00:08:31,800  
founded modern science four centuries

258  
00:08:36,649 --> 00:08:34,500  
ago he was put in house arrest because

259  
00:08:38,870 --> 00:08:36,659  
he suggested that maybe the Earth is not

260  
00:08:41,149 --> 00:08:38,880  
at the center of the universe and at the

261  
00:08:42,490 --> 00:08:41,159  
time people thought that it is and the

262  
00:08:45,650 --> 00:08:42,500  
philosophers

263  
00:08:47,030 --> 00:08:45,660

uh said that that makes no sense we

264

00:08:49,970 --> 00:08:47,040

don't even want to look through our

265

00:08:52,370 --> 00:08:49,980

telescopes and The Innovation that he

266

00:08:54,769 --> 00:08:52,380

brought forward is that we should look

267

00:08:57,050 --> 00:08:54,779

for evidence before we assert something

268

00:09:00,350 --> 00:08:57,060

rather than just make a statement

269

00:09:02,090 --> 00:09:00,360

because it flutters our ego and today he

270

00:09:04,009 --> 00:09:02,100

would have been canceled on social media

271

00:09:06,170 --> 00:09:04,019

because his view was not popular at the

272

00:09:08,150 --> 00:09:06,180

time but if you were to ask those

273

00:09:10,370 --> 00:09:08,160

philosophers to design a space mission

274

00:09:12,290 --> 00:09:10,380

that would reach Mars they would never

275

00:09:14,449 --> 00:09:12,300

get to their destination because they

276

00:09:17,150 --> 00:09:14,459

thought that Mars moves around the Earth

277

00:09:19,310 --> 00:09:17,160

so in the Galileo project four centuries

278

00:09:21,769 --> 00:09:19,320

later we say we learned something

279

00:09:24,410 --> 00:09:21,779

important from Galileo which is let's

280

00:09:26,930 --> 00:09:24,420

look for evidence to guide us rather

281

00:09:28,009 --> 00:09:26,940

than Prejudice and we apply it in the

282

00:09:32,030 --> 00:09:28,019

context of

283

00:09:34,030 --> 00:09:32,040

is there a smart intelligent neighbor in

284

00:09:36,410 --> 00:09:34,040

our Cosmic

285

00:09:38,630 --> 00:09:36,420

neighborhood you know in our uh our

286

00:09:41,210 --> 00:09:38,640

Cosmic backyard and

287

00:09:44,090 --> 00:09:41,220

um and in the past people had very

288

00:09:46,009 --> 00:09:44,100

strong opinions on this and people also

289

00:09:47,690 --> 00:09:46,019

after we developed radio communication

290

00:09:51,070 --> 00:09:47,700

people said oh let's look for radio

291

00:09:54,590 --> 00:09:51,080

signals but you know it's quite

292

00:09:56,870 --> 00:09:54,600

narrow-minded to think that just because

293

00:10:00,530 --> 00:09:56,880

we just develop radio communication that

294

00:10:02,870 --> 00:10:00,540

will be the main uh Way by which we will

295

00:10:04,670 --> 00:10:02,880

detect extraterrestrial civilization

296

00:10:07,250 --> 00:10:04,680

because we ourselves are moving away

297

00:10:10,910 --> 00:10:07,260

from radio right now we have the cable

298

00:10:11,949 --> 00:10:10,920

and fiber optics and in space we are

299

00:10:14,990 --> 00:10:11,959

developing

300

00:10:18,350 --> 00:10:15,000

laser communication so why would you

301  
00:10:20,710 --> 00:10:18,360  
assume that such a communication method

302  
00:10:24,170 --> 00:10:20,720  
applies for more than a century or two

303  
00:10:26,030 --> 00:10:24,180  
for any advanced civilization and so um

304  
00:10:28,070 --> 00:10:26,040  
it's just like trying to say let's have

305  
00:10:30,410 --> 00:10:28,080  
a phone conversation with Wharf gangama

306  
00:10:32,389 --> 00:10:30,420  
de OS Mozart and you will never find

307  
00:10:35,389 --> 00:10:32,399  
Mozart if you try to dial all the phone

308  
00:10:38,630 --> 00:10:35,399  
numbers available level because he died

309  
00:10:41,630 --> 00:10:38,640  
and so to have a radio signal

310  
00:10:43,550 --> 00:10:41,640  
approaching us now would imply that

311  
00:10:45,710 --> 00:10:43,560  
there is someone transmitting just at

312  
00:10:47,630 --> 00:10:45,720  
the time that we're listening which is

313  
00:10:49,430 --> 00:10:47,640

probably not the case because most stars

314

00:10:51,650 --> 00:10:49,440

from billions of years before the Sun so

315

00:10:53,090 --> 00:10:51,660

they're radius any radio signal from

316

00:10:55,850 --> 00:10:53,100

there is billions of light years away

317

00:10:58,490 --> 00:10:55,860

anyway so the approach we are taking

318

00:11:01,310 --> 00:10:58,500

within the gorilla project is to search

319

00:11:04,730 --> 00:11:01,320

for relics because we sent out five

320

00:11:06,710 --> 00:11:04,740

spacecraft over half a century which is

321

00:11:08,509 --> 00:11:06,720

pretty much one part in 100 million of

322

00:11:10,670 --> 00:11:08,519

the age of the Earth just over that

323

00:11:13,370 --> 00:11:10,680

short period of time we sent five

324

00:11:16,069 --> 00:11:13,380

spacecraft that will leave the solar

325

00:11:17,930 --> 00:11:16,079

system and uh it's quite likely that if

326

00:11:21,110 --> 00:11:17,940

there was another Advanced civilization

327

00:11:23,329 --> 00:11:21,120

a billion years ago they sent some

328

00:11:26,090 --> 00:11:23,339

equipment out of their planetary system

329

00:11:28,069 --> 00:11:26,100

and if they were more advanced than we

330

00:11:31,130 --> 00:11:28,079

are then you know they could have sent

331

00:11:32,870 --> 00:11:31,140

probes that after a billion years fill

332

00:11:35,750 --> 00:11:32,880

up the entire Milky Way galaxy because

333

00:11:38,090 --> 00:11:35,760

if they are self-replicating if they

334

00:11:40,130 --> 00:11:38,100

have 3D printers you know if they have

335

00:11:42,530 --> 00:11:40,140

artificial intelligence so that they can

336

00:11:45,470 --> 00:11:42,540

continue to be functioning for a long

337

00:11:47,569 --> 00:11:45,480

period of time then they might as well

338

00:11:50,509 --> 00:11:47,579

fill up all the habitable regions around

339

00:11:52,790 --> 00:11:50,519

stars in the Milky Way so we say you

340

00:11:55,370 --> 00:11:52,800

know if you launch systems with chemical

341

00:11:57,350 --> 00:11:55,380

Rockets they will remain gravitational

342

00:12:00,170 --> 00:11:57,360

bound to the military way they cannot

343

00:12:01,850 --> 00:12:00,180

Escape like light signals radio signals

344

00:12:04,670 --> 00:12:01,860

leave the Milky Way and they're gone

345

00:12:06,829 --> 00:12:04,680

forever however if you send equipment

346

00:12:09,110 --> 00:12:06,839

that tens of kilometers per second the

347

00:12:11,329 --> 00:12:09,120

way we sent our spacecraft they will

348

00:12:13,550 --> 00:12:11,339

still be bound gravitationally they

349

00:12:15,230 --> 00:12:13,560

cannot escape from the Milky Way galaxy

350

00:12:18,170 --> 00:12:15,240

so you think of the Milky Way galaxy as

351

00:12:20,329 --> 00:12:18,180

a basket collecting all the pieces of

352

00:12:23,030 --> 00:12:20,339

equipment all the devices that were ever

353

00:12:25,670 --> 00:12:23,040

created since the Big Bang

354

00:12:27,530 --> 00:12:25,680

within this volume

355

00:12:29,329 --> 00:12:27,540

um and and were launched by chemical

356

00:12:32,030 --> 00:12:29,339

Rockets or things that are not faster

357

00:12:34,430 --> 00:12:32,040

than uh hundreds of kilometers per

358

00:12:36,650 --> 00:12:34,440

second all of these things are now

359

00:12:38,990 --> 00:12:36,660

sitting inside the Milky Way galaxy and

360

00:12:41,630 --> 00:12:39,000

some of them may be functional some of

361

00:12:43,730 --> 00:12:41,640

them may be space trash but we should

362

00:12:46,430 --> 00:12:43,740

look around us to look for those objects

363

00:12:47,690 --> 00:12:46,440

okay so that's I call that Interstellar

364

00:12:52,550 --> 00:12:47,700

archeology

365

00:12:56,269 --> 00:12:52,560

relics of things that existed in the

366

00:12:58,069 --> 00:12:56,279

past the whoever produced them need not

367

00:13:00,470 --> 00:12:58,079

be alive anymore that those

368

00:13:02,090 --> 00:13:00,480

civilizations may be dead by now maybe

369

00:13:04,970 --> 00:13:02,100

they didn't take care of their climate

370

00:13:06,710 --> 00:13:04,980

maybe they went into a nuclear war you

371

00:13:09,290 --> 00:13:06,720

know we don't care as long as they

372

00:13:11,329 --> 00:13:09,300

launch things out of their planet that

373

00:13:13,910 --> 00:13:11,339

could reach us by now we just search

374

00:13:15,949 --> 00:13:13,920

around for anything they left and then

375

00:13:19,490 --> 00:13:15,959

this intestinal archeology is something

376

00:13:22,670 --> 00:13:19,500

that was never pursued despite 70 years

377

00:13:24,889 --> 00:13:22,680

of City activity so if you ask how does

378

00:13:28,009 --> 00:13:24,899

the seti community regard this endeavor

379

00:13:30,710 --> 00:13:28,019

they dismiss it they ridicule they say

380

00:13:33,949 --> 00:13:30,720

no no no way this is ridiculous there is

381

00:13:36,250 --> 00:13:33,959

nothing around us and I you know I say

382

00:13:39,769 --> 00:13:36,260

well let's look because

383

00:13:41,750 --> 00:13:39,779

only over the past five years we

384

00:13:44,269 --> 00:13:41,760

discovered the first

385

00:13:46,490 --> 00:13:44,279

three Interstellar objects objects that

386

00:13:49,069 --> 00:13:46,500

came from outside the solar system in

387

00:13:51,290 --> 00:13:49,079

astronomy astronomers the first one was

388

00:13:52,670 --> 00:13:51,300

actually from 2014 and we will talk more

389

00:13:55,329 --> 00:13:52,680

about it

390

00:13:59,569 --> 00:13:55,339

cneos yes

391

00:14:01,069 --> 00:13:59,579

January 8th 2014 a meteor that collided

392

00:14:04,129 --> 00:14:01,079

with the Earth you can think of the

393

00:14:06,170 --> 00:14:04,139

Earth as a fishing net that collects

394

00:14:08,870 --> 00:14:06,180

objects along its path around the sun

395

00:14:10,690 --> 00:14:08,880

and the first one identified by

396

00:14:14,329 --> 00:14:10,700

government sensors

397

00:14:16,250 --> 00:14:14,339

with a very high speed that indicated

398

00:14:19,069 --> 00:14:16,260

that it came from outside the sources it

399

00:14:22,370 --> 00:14:19,079

was was found in 2014 and nobody paid

400

00:14:24,949 --> 00:14:22,380

attention to it until in 2019 I was

401  
00:14:28,370 --> 00:14:24,959  
interviewed on the radio and about

402  
00:14:30,590 --> 00:14:28,380  
meteors and I I looked online and I

403  
00:14:32,930 --> 00:14:30,600  
found this catalog of meteors the

404  
00:14:35,990 --> 00:14:32,940  
government compiled based on Missile

405  
00:14:38,629 --> 00:14:36,000  
Warning Systems data and I asked my

406  
00:14:40,430 --> 00:14:38,639  
student Amir siraj to check if the

407  
00:14:42,590 --> 00:14:40,440  
fastest moving meteors could have been

408  
00:14:44,389 --> 00:14:42,600  
Unbound to the sun okay any of them

409  
00:14:47,509 --> 00:14:44,399  
could have come from outside the solar

410  
00:14:50,569 --> 00:14:47,519  
system and we found that we found that

411  
00:14:53,449 --> 00:14:50,579  
one okay and we wrote a paper and then

412  
00:14:55,970 --> 00:14:53,459  
the reviewers of the paper said we don't

413  
00:14:57,769 --> 00:14:55,980

believe the US government you know we we

414

00:15:01,370 --> 00:14:57,779

don't believe the uncertainties so then

415

00:15:03,110 --> 00:15:01,380

it took it took a few years uh and uh I

416

00:15:04,730 --> 00:15:03,120

got the people

417

00:15:06,410 --> 00:15:04,740

um you know behind the National Security

418

00:15:09,230 --> 00:15:06,420

Fence especially from the White House

419

00:15:10,970 --> 00:15:09,240

from Department of Defense they issued a

420

00:15:14,150 --> 00:15:10,980

letter from the U.S space command to

421

00:15:17,030 --> 00:15:14,160

NASA confirming that indeed this object

422

00:15:19,569 --> 00:15:17,040

that we identified with my student came

423

00:15:23,090 --> 00:15:19,579

from outside the solar system at the

424

00:15:25,730 --> 00:15:23,100

99.99 confidence okay so that's that's

425

00:15:27,889 --> 00:15:25,740

the first Interstellar object it's the

426

00:15:29,449 --> 00:15:27,899

first Interstellar meteor the size of a

427

00:15:33,290 --> 00:15:29,459

basketball

428

00:15:36,590 --> 00:15:33,300

um that was identified uh by humans okay

429

00:15:39,530 --> 00:15:36,600

and the second one was identified in

430

00:15:42,410 --> 00:15:39,540

2017 that was that my book

431

00:15:45,769 --> 00:15:42,420

extraterrestrial talks about and the

432

00:15:48,230 --> 00:15:45,779

third one was a comet just just like any

433

00:15:51,050 --> 00:15:48,240

other Comet it came from outside the

434

00:15:54,949 --> 00:15:51,060

solar system but the first two are

435

00:15:57,370 --> 00:15:54,959

complete outliers uh the meteor has

436

00:15:59,810 --> 00:15:57,380

material strength tougher than iron

437

00:16:03,230 --> 00:15:59,820

tougher than all other meteors in the

438

00:16:05,030 --> 00:16:03,240

catalog 273 of them by a factor of two

439

00:16:08,090 --> 00:16:05,040

or more how do you measure toughness by

440

00:16:09,769 --> 00:16:08,100

the way oh it's very easy because when

441

00:16:12,110 --> 00:16:09,779

it collides with the Earth it basically

442

00:16:14,449 --> 00:16:12,120

goes through the atmosphere and the

443

00:16:16,970 --> 00:16:14,459

atmosphere gets denser as you go to

444

00:16:18,889 --> 00:16:16,980

lower and lower in the atmosphere so the

445

00:16:22,310 --> 00:16:18,899

density of the atmosphere gets diluted

446

00:16:25,069 --> 00:16:22,320

As you move up and so you can we can

447

00:16:29,269 --> 00:16:25,079

tell where the explosion took place it

448

00:16:31,790 --> 00:16:29,279

was 18.7 kilometers above the ocean's

449

00:16:34,009 --> 00:16:31,800

surface a hundred miles off the the

450

00:16:36,889 --> 00:16:34,019

coast of Papua New Guinea that's where

451  
00:16:40,430 --> 00:16:36,899  
the government identified the fireball

452  
00:16:42,769 --> 00:16:40,440  
that was created from the object burning

453  
00:16:44,710 --> 00:16:42,779  
up in the atmosphere and it released a

454  
00:16:48,050 --> 00:16:44,720  
few percent of the energy

455  
00:16:50,629 --> 00:16:48,060  
of the Hiroshima atomic bomb okay when

456  
00:16:52,970 --> 00:16:50,639  
it exploded so from that you can you can

457  
00:16:54,829 --> 00:16:52,980  
measure the speed of the object by how

458  
00:16:57,410 --> 00:16:54,839  
fast this Fireball was moving at the

459  
00:17:00,470 --> 00:16:57,420  
time that the explosion took place it's

460  
00:17:02,930 --> 00:17:00,480  
a ball of light and it's a very

461  
00:17:05,510 --> 00:17:02,940  
different detection method then looking

462  
00:17:08,210 --> 00:17:05,520  
at which was just reflection of sunlight

463  
00:17:10,990 --> 00:17:08,220

so muamua was roughly the size of a

464

00:17:13,789 --> 00:17:11,000

football field in order for us to see it

465

00:17:17,090 --> 00:17:13,799

and this one was half a meter you know

466

00:17:19,970 --> 00:17:17,100

like 200 times smaller and the reason we

467

00:17:22,309 --> 00:17:19,980

could see an object so small half a

468

00:17:25,370 --> 00:17:22,319

meter in size is because it burned up It

469

00:17:27,490 --> 00:17:25,380

produced its own light and so you can

470

00:17:31,070 --> 00:17:27,500

tell the speed by which it was moving

471

00:17:32,510 --> 00:17:31,080

which was 45 kilometers per second and

472

00:17:35,090 --> 00:17:32,520

you can tell the density of the

473

00:17:37,970 --> 00:17:35,100

atmosphere in its vicinity when it

474

00:17:40,970 --> 00:17:37,980

exploded so you can tell how much stress

475

00:17:44,150 --> 00:17:40,980

was exerted on this object when it

476  
00:17:45,830 --> 00:17:44,160  
disintegrated so prior to that it was at

477  
00:17:48,770 --> 00:17:45,840  
lower density of air it didn't

478  
00:17:50,510 --> 00:17:48,780  
disintegrate it held together but as it

479  
00:17:52,490 --> 00:17:50,520  
got to a very dense environment

480  
00:17:55,610 --> 00:17:52,500  
eventually disintegrated because the

481  
00:17:57,650 --> 00:17:55,620  
stress the pressure acting on it was too

482  
00:18:00,289 --> 00:17:57,660  
large for its material strength to

483  
00:18:02,210 --> 00:18:00,299  
resist it so you can tell what is the

484  
00:18:05,750 --> 00:18:02,220  
yield strength the material strength of

485  
00:18:08,870 --> 00:18:05,760  
this object based on the you know it's

486  
00:18:10,669 --> 00:18:08,880  
speed and the density of air when it

487  
00:18:13,730 --> 00:18:10,679  
started disintegrating and it turns out

488  
00:18:16,669 --> 00:18:13,740

to be twice tougher than iron

489

00:18:19,190 --> 00:18:16,679

and that's very unusual because iron

490

00:18:21,770 --> 00:18:19,200

meteorites are only five percent of all

491

00:18:23,510 --> 00:18:21,780

space rocks that hit the earth only five

492

00:18:26,750 --> 00:18:23,520

percent and this was

493

00:18:29,990 --> 00:18:26,760

two times tougher than iron just think

494

00:18:32,870 --> 00:18:30,000

about it and moreover if we go back in

495

00:18:35,270 --> 00:18:32,880

time it actually moved faster than 95

496

00:18:38,210 --> 00:18:35,280

percent of all the stars in the vicinity

497

00:18:40,970 --> 00:18:38,220

of the Sun so it was an outlier both in

498

00:18:43,190 --> 00:18:40,980

terms of its speed and in terms of its

499

00:18:46,850 --> 00:18:43,200

composition and I say you know if it's

500

00:18:48,529 --> 00:18:46,860

such an outlier you know faster than 95

501  
00:18:52,310 --> 00:18:48,539  
percent of the stars in the vicinity of

502  
00:18:54,409 --> 00:18:52,320  
the sun and the moving and having

503  
00:18:56,510 --> 00:18:54,419  
material strength tougher than iron

504  
00:18:59,150 --> 00:18:56,520  
tougher than all the other meteors in

505  
00:19:02,029 --> 00:18:59,160  
the catalog we better check whether it's

506  
00:19:04,370 --> 00:19:02,039  
an artifact whether it's artificially

507  
00:19:07,610 --> 00:19:04,380  
made and the way to check is to collect

508  
00:19:09,710 --> 00:19:07,620  
the fragments from the ocean floor and

509  
00:19:12,289 --> 00:19:09,720  
and check their composition whether it's

510  
00:19:14,570 --> 00:19:12,299  
an alloy that was artificially produced

511  
00:19:16,990 --> 00:19:14,580  
or whether it's an iron meteorite

512  
00:19:20,029 --> 00:19:17,000  
produced by nature but even if it's iron

513  
00:19:22,669 --> 00:19:20,039

it it's rare it's unusual and the

514

00:19:25,190 --> 00:19:22,679

question arises why the first meteor is

515

00:19:28,190 --> 00:19:25,200

of that composition so anyway this was

516

00:19:29,570 --> 00:19:28,200

an outlier definitely omuamua was an

517

00:19:33,230 --> 00:19:29,580

outlier for a completely different

518

00:19:34,850 --> 00:19:33,240

reason it was flat in shape based on the

519

00:19:37,130 --> 00:19:34,860

reflection of sunlight that was

520

00:19:39,169 --> 00:19:37,140

published as a scientific paper not by

521

00:19:41,750 --> 00:19:39,179

me by someone actually the first

522

00:19:44,029 --> 00:19:41,760

discovery paper argued that it's flat

523

00:19:46,310 --> 00:19:44,039

most likely pancake shaped the first

524

00:19:48,350 --> 00:19:46,320

discovery paper quick message from a

525

00:19:50,210 --> 00:19:48,360

sponsor when I do eat meat I care about

526

00:19:52,070 --> 00:19:50,220

the source of it both in terms of the

527

00:19:53,630 --> 00:19:52,080

quality of the food itself and about the

528

00:19:55,250 --> 00:19:53,640

standards that the place has with regard

529

00:19:57,350 --> 00:19:55,260

to animal welfare and Humane Animal

530

00:19:59,029 --> 00:19:57,360

treatment butcherbox takes the guesswork

531

00:20:01,330 --> 00:19:59,039

out of finding high quality Meat and

532

00:20:04,190 --> 00:20:01,340

seafood that you can trust given its 100

533

00:20:06,110 --> 00:20:04,200

grass-fed beef free-range chicken pork

534

00:20:08,150 --> 00:20:06,120

raised crate free and wild caught

535

00:20:10,549 --> 00:20:08,160

Seafood they're humanely raised no

536

00:20:12,169 --> 00:20:10,559

antibiotics no added hormones given that

537

00:20:13,850 --> 00:20:12,179

I'm a hermit one of my favorite features

538

00:20:15,289 --> 00:20:13,860

is that it's delivered straight to you

539

00:20:17,090 --> 00:20:15,299

straight to your door if you're in the

540

00:20:19,190 --> 00:20:17,100

US you get free shipping convenience

541

00:20:20,930 --> 00:20:19,200

with no surprise fees the search for

542

00:20:23,029 --> 00:20:20,940

outstanding deals on high quality

543

00:20:25,549 --> 00:20:23,039

protein ends here butcher box is

544

00:20:27,169 --> 00:20:25,559

offering listeners free New York strips

545

00:20:29,270 --> 00:20:27,179

and lobster so you can bring that

546

00:20:32,450 --> 00:20:29,280

Steakhouse quality to your house sign up

547

00:20:34,970 --> 00:20:32,460

today at [butcherbox.com](https://butcherbox.com) theories and get

548

00:20:36,890 --> 00:20:34,980

two 10 ounce New York strip steaks and

549

00:20:38,990 --> 00:20:36,900

eight ounces of Lobster Claw and knuckle

550

00:20:42,169 --> 00:20:39,000

meat free in your first order again

551  
00:20:43,850 --> 00:20:42,179  
that's butcherbox.com theories to claim

552  
00:20:45,409 --> 00:20:43,860  
this deal and then when I started

553  
00:20:47,330 --> 00:20:45,419  
suggesting that it may be artificial

554  
00:20:49,850 --> 00:20:47,340  
then people backed off and said no no no

555  
00:20:52,610 --> 00:20:49,860  
it's just a Flat Rock you know but then

556  
00:20:55,070 --> 00:20:52,620  
it turns out it's not a comet because

557  
00:20:57,590 --> 00:20:55,080  
there was no commentary tale it was

558  
00:20:59,090 --> 00:20:57,600  
pushed away from the Sun despite the

559  
00:21:01,430 --> 00:20:59,100  
fact that there was no rocket effect

560  
00:21:04,070 --> 00:21:01,440  
from commentary tale it came from a

561  
00:21:06,350 --> 00:21:04,080  
special frame of reference all kinds of

562  
00:21:07,850 --> 00:21:06,360  
weird properties can you explain that

563  
00:21:10,610 --> 00:21:07,860

last part that it came from a special

564

00:21:12,950 --> 00:21:10,620

frame of reference yeah so there is this

565

00:21:15,830 --> 00:21:12,960

local stand up of rest

566

00:21:18,049 --> 00:21:15,840

which is the frame that you get to when

567

00:21:20,270 --> 00:21:18,059

you average over the random motions of

568

00:21:22,190 --> 00:21:20,280

the stars in the vicinity of the Sun

569

00:21:25,490 --> 00:21:22,200

it's sort of like the you can think of

570

00:21:27,409 --> 00:21:25,500

it as the local parking lot the galactic

571

00:21:30,590 --> 00:21:27,419

frame of reference and stars move

572

00:21:33,230 --> 00:21:30,600

relative to it because stars get kicks

573

00:21:35,630 --> 00:21:33,240

when they are born they are not born

574

00:21:37,789 --> 00:21:35,640

exactly at the frame of the Galaxy they

575

00:21:40,730 --> 00:21:37,799

are born in some Cloud that is moving

576  
00:21:43,010 --> 00:21:40,740  
rapidly to that frame uh or they get

577  
00:21:46,010 --> 00:21:43,020  
kicked afterwards so they develop a

578  
00:21:47,390 --> 00:21:46,020  
characteristic speed of 20 30 kilometers

579  
00:21:49,730 --> 00:21:47,400  
per second relative to the local

580  
00:21:52,430 --> 00:21:49,740  
standard of rest but you can take the

581  
00:21:54,890 --> 00:21:52,440  
average of the local stars and just get

582  
00:21:57,470 --> 00:21:54,900  
that frame of reference okay so some

583  
00:21:59,510 --> 00:21:57,480  
stars are moving to the right some sums

584  
00:22:02,330 --> 00:21:59,520  
to the left and you take the average you

585  
00:22:05,750 --> 00:22:02,340  
get to that frame of reference now turns

586  
00:22:07,190 --> 00:22:05,760  
out that was at rest in the local

587  
00:22:10,850 --> 00:22:07,200  
standard of rest

588  
00:22:14,930 --> 00:22:10,860

and only one part one part in a in 500

589

00:22:16,909 --> 00:22:14,940

of all stars are so much at rest in that

590

00:22:18,470 --> 00:22:16,919

frame as

591

00:22:20,390 --> 00:22:18,480

so you ask yourself

592

00:22:23,390 --> 00:22:20,400

you know what's the chance that it came

593

00:22:25,909 --> 00:22:23,400

from a star it's one in 500.

594

00:22:28,669 --> 00:22:25,919

so that was very unusual about it then

595

00:22:31,430 --> 00:22:28,679

you ask what's the chance that it's flat

596

00:22:33,409 --> 00:22:31,440

you know we don't see objects that are

597

00:22:35,210 --> 00:22:33,419

10 times longer than they are thick and

598

00:22:36,890 --> 00:22:35,220

they're flat we don't see rocks like

599

00:22:38,510 --> 00:22:36,900

that very you know we don't see such

600

00:22:40,490 --> 00:22:38,520

things at most it's factor of three

601  
00:22:43,430 --> 00:22:40,500  
between the long axis and the short axis

602  
00:22:45,590 --> 00:22:43,440  
and here it was at least 10 times longer

603  
00:22:48,049 --> 00:22:45,600  
than it was wide projected on the sky

604  
00:22:50,390 --> 00:22:48,059  
based on the variation of reflected

605  
00:22:52,130 --> 00:22:50,400  
sunlight and then it didn't have a

606  
00:22:54,649 --> 00:22:52,140  
cometary tale but it was pushed away

607  
00:22:57,529 --> 00:22:54,659  
from the Sun so I suggest that it's a

608  
00:23:00,590 --> 00:22:57,539  
thin object just like a light sail or

609  
00:23:02,990 --> 00:23:00,600  
you know a surface layer of a you know a

610  
00:23:05,330 --> 00:23:03,000  
spacecraft that was torn apart or you

611  
00:23:07,850 --> 00:23:05,340  
know something artificial because we've

612  
00:23:10,370 --> 00:23:07,860  
never seen anything like it and then

613  
00:23:12,110 --> 00:23:10,380

people said no way you know the

614

00:23:14,149 --> 00:23:12,120

mainstream of astronomy there was a

615

00:23:17,950 --> 00:23:14,159

paper in nature magazine nature

616

00:23:21,230 --> 00:23:17,960

astronomy magazine a review paper saying

617

00:23:23,690 --> 00:23:21,240

is natural period explanation

618

00:23:25,570 --> 00:23:23,700

exclamation mark it's natural that's it

619

00:23:28,610 --> 00:23:25,580

there is no reason to consider other

620

00:23:30,830 --> 00:23:28,620

Alternatives and then a few months later

621

00:23:32,990 --> 00:23:30,840

there was a paper by a group of people

622

00:23:34,789 --> 00:23:33,000

saying actually to explain the

623

00:23:38,510 --> 00:23:34,799

properties of a muamua like it was

624

00:23:40,490 --> 00:23:38,520

pushed away from the Sun maybe we need a

625

00:23:42,890 --> 00:23:40,500

cloud of dust particles like a Dust

626  
00:23:45,470 --> 00:23:42,900  
Bunny that is a hundred times less dense

627  
00:23:47,390 --> 00:23:45,480  
than air and it reflects sunlight

628  
00:23:49,610 --> 00:23:47,400  
therefore it's being pushed it's very

629  
00:23:52,789 --> 00:23:49,620  
lightweight a hundred times less dense

630  
00:23:55,430 --> 00:23:52,799  
than air and here the problem is if it

631  
00:23:57,169 --> 00:23:55,440  
comes close to the sun such a cloud of

632  
00:23:58,549 --> 00:23:57,179  
dust particles will get heated by

633  
00:24:01,190 --> 00:23:58,559  
hundreds of degrees will not maintain

634  
00:24:03,830 --> 00:24:01,200  
its Integrity okay so then another team

635  
00:24:06,890 --> 00:24:03,840  
a few months later and just to remind

636  
00:24:08,690 --> 00:24:06,900  
you all of this happened after the

637  
00:24:11,930 --> 00:24:08,700  
people who were on the review paper

638  
00:24:13,970 --> 00:24:11,940

declared it must be natural period let's

639

00:24:17,450 --> 00:24:13,980

not discuss it anymore so then other

640

00:24:20,390 --> 00:24:17,460

groups of mainstream astronomers said

641

00:24:22,430 --> 00:24:20,400

yeah yeah it is natural but it has to be

642

00:24:26,450 --> 00:24:22,440

a Dust Bunny no no that doesn't make

643

00:24:29,149 --> 00:24:26,460

sense okay so it has to be a hydrogen

644

00:24:30,890 --> 00:24:29,159

Iceberg a chunk of Frozen hydrogen so

645

00:24:33,049 --> 00:24:30,900

that when it evaporates just like a

646

00:24:35,930 --> 00:24:33,059

comet we can't see the hydrogen because

647

00:24:38,270 --> 00:24:35,940

it's transparent and therefore it is a

648

00:24:41,690 --> 00:24:38,280

comet but the comet made of material

649

00:24:44,270 --> 00:24:41,700

that we can't see when it evaporates uh

650

00:24:47,210 --> 00:24:44,280

so the problem with that is hydrogen

651  
00:24:49,370 --> 00:24:47,220  
evaporates very easily so it will not

652  
00:24:50,870 --> 00:24:49,380  
survive the journey we wrote a

653  
00:24:53,330 --> 00:24:50,880  
scientific paper about it with my

654  
00:24:55,730 --> 00:24:53,340  
colleague Sim Juan so the people who

655  
00:24:57,770 --> 00:24:55,740  
advocated for hydrogen Iceberg said yes

656  
00:24:59,870 --> 00:24:57,780  
that's correct there is a problem here

657  
00:25:02,270 --> 00:24:59,880  
it wouldn't survive very long distances

658  
00:25:05,210 --> 00:25:02,280  
in interstellar space so then another

659  
00:25:07,730 --> 00:25:05,220  
team came along and said oh yeah now we

660  
00:25:10,190 --> 00:25:07,740  
have the answer it's a nitrogen Iceberg

661  
00:25:12,590 --> 00:25:10,200  
so everyone's cheered and said yeah yeah

662  
00:25:14,630 --> 00:25:12,600  
yeah and nitrogen Iceberg why nitrogen

663  
00:25:16,250 --> 00:25:14,640

nitrogen is transparent so just like

664

00:25:19,070 --> 00:25:16,260

hydrogen evaporates hydrogen can

665

00:25:21,590 --> 00:25:19,080

evaporate where do you find chunks of

666

00:25:26,090 --> 00:25:21,600

Frozen nitrogen well the surface of

667

00:25:29,510 --> 00:25:26,100

Pluto has solid nitrogen so maybe there

668

00:25:32,870 --> 00:25:29,520

are all these exoplutus out there and

669

00:25:35,750 --> 00:25:32,880

they get bombarded all the time by rocks

670

00:25:39,230 --> 00:25:35,760

and then you get chips of those surfaces

671

00:25:42,230 --> 00:25:39,240

and those chips are representing of the

672

00:25:44,149 --> 00:25:42,240

population of objects like okay the

673

00:25:46,310 --> 00:25:44,159

problem with that we showed with in a

674

00:25:48,830 --> 00:25:46,320

paper with my student there is just not

675

00:25:51,710 --> 00:25:48,840

enough material in solid hydrogen to a

676  
00:25:53,690 --> 00:25:51,720  
in solid nitrogen to explain a large

677  
00:25:56,269 --> 00:25:53,700  
enough population such that you would

678  
00:25:58,970 --> 00:25:56,279  
see or more so it just doesn't work out

679  
00:26:01,370 --> 00:25:58,980  
the mass budget so I say there are

680  
00:26:03,909 --> 00:26:01,380  
problems with each of these mainstream

681  
00:26:06,769 --> 00:26:03,919  
explanations but moreover each of them

682  
00:26:10,130 --> 00:26:06,779  
advocates for something that we've never

683  
00:26:13,070 --> 00:26:10,140  
seen before so how can you say it must

684  
00:26:14,029 --> 00:26:13,080  
be natural period explain exclamation

685  
00:26:17,690 --> 00:26:14,039  
mark

686  
00:26:19,789 --> 00:26:17,700  
in a review paper and then come back and

687  
00:26:21,710 --> 00:26:19,799  
say ah yeah yeah it was this that or

688  
00:26:23,690 --> 00:26:21,720

that things that we've never seen before

689

00:26:24,890 --> 00:26:23,700

if it was obvious that it's natural you

690

00:26:26,990 --> 00:26:24,900

wouldn't need to come up with these

691

00:26:28,610 --> 00:26:27,000

three explanations as published papers

692

00:26:32,029 --> 00:26:28,620

these are not just people proposing it

693

00:26:34,010 --> 00:26:32,039

on a blog or on Twitter these are real

694

00:26:36,289 --> 00:26:34,020

papers that took months for people to

695

00:26:37,970 --> 00:26:36,299

write and each of these invokes

696

00:26:41,690 --> 00:26:37,980

something we've never seen before each

697

00:26:43,490 --> 00:26:41,700

of them has problems and I say if it's

698

00:26:45,529 --> 00:26:43,500

something we've never seen before we

699

00:26:47,149 --> 00:26:45,539

should live on the table the possibility

700

00:26:50,510 --> 00:26:47,159

that's artificial

701  
00:26:53,149 --> 00:26:50,520  
but no that is completely moved out of

702  
00:26:54,830 --> 00:26:53,159  
the table and I say well that's not the

703  
00:26:56,810 --> 00:26:54,840  
scientific process the scientific

704  
00:27:00,649 --> 00:26:56,820  
process is collecting evidence so the

705  
00:27:03,049 --> 00:27:00,659  
Galileo project one of the goals is

706  
00:27:05,149 --> 00:27:03,059  
aside from the expedition to scoop the

707  
00:27:07,970 --> 00:27:05,159  
ocean floor to look for the fragments of

708  
00:27:11,149 --> 00:27:07,980  
of the first meteor the first

709  
00:27:14,690 --> 00:27:11,159  
Interstellar meteor we are also planning

710  
00:27:16,190 --> 00:27:14,700  
a rendezvous with the next omuamua so

711  
00:27:18,470 --> 00:27:16,200  
that we can collect more evidence you

712  
00:27:21,350 --> 00:27:18,480  
know just the way Galileo said you know

713  
00:27:23,510 --> 00:27:21,360

let's get data and if you are a

714

00:27:25,190 --> 00:27:23,520

philosopher that knows the answer in

715

00:27:28,130 --> 00:27:25,200

advance like or more must be natural

716

00:27:29,390 --> 00:27:28,140

then you say I don't need any data but

717

00:27:31,010 --> 00:27:29,400

you are behaving just like the

718

00:27:32,630 --> 00:27:31,020

philosophers during the days of Galileo

719

00:27:34,250 --> 00:27:32,640

you don't want to look for a telescope

720

00:27:36,230 --> 00:27:34,260

because you think you know the answer

721

00:27:38,510 --> 00:27:36,240

because you are jealous of the attention

722

00:27:40,909 --> 00:27:38,520

it gets because of all kinds of reasons

723

00:27:42,710 --> 00:27:40,919

I don't care what they are because you

724

00:27:44,450 --> 00:27:42,720

are an expert that worked on rocks all

725

00:27:47,390 --> 00:27:44,460

your life and you want everything in the

726

00:27:49,310 --> 00:27:47,400

sky to be rocks that's your problem we

727

00:27:51,230 --> 00:27:49,320

will try to collect data and figure it

728

00:27:53,990 --> 00:27:51,240

out that's the way science is done

729

00:27:56,690 --> 00:27:54,000

without prejudice and if we take a high

730

00:27:59,630 --> 00:27:56,700

resolution image of the next omuamua and

731

00:28:02,210 --> 00:27:59,640

see that it's a nitrogen iceberg stop it

732

00:28:04,250 --> 00:28:02,220

but let's first see you can't say it

733

00:28:07,190 --> 00:28:04,260

must be natural until you see the

734

00:28:09,230 --> 00:28:07,200

nitrogen iceberg okay so

735

00:28:11,810 --> 00:28:09,240

um the Galileo project is designing a

736

00:28:15,710 --> 00:28:11,820

space mission and then it's sort of like

737

00:28:18,470 --> 00:28:15,720

dating the next tomoamua uh-huh yeah I

738

00:28:21,710 --> 00:28:18,480

saw a blog post on that yeah so dating

739

00:28:24,649 --> 00:28:21,720

you know we have a dating app which is

740

00:28:26,750 --> 00:28:24,659

the Vera Rubin Observatory uh there is

741

00:28:29,149 --> 00:28:26,760

the Legacy survey of space and time and

742

00:28:32,210 --> 00:28:29,159

uh we'll start operations in a year in

743

00:28:36,230 --> 00:28:32,220

Chile that's a a telescope that will

744

00:28:38,870 --> 00:28:36,240

have a camera with 3.2 billion pixels

745

00:28:42,769 --> 00:28:38,880

just think about it your cell phone has

746

00:28:45,649 --> 00:28:42,779

a camera of a few million pixels here

747

00:28:48,590 --> 00:28:45,659

I'm talking 3.2 billion so that's a

748

00:28:51,590 --> 00:28:48,600

factor of a thousand more pixels in a

749

00:28:55,070 --> 00:28:51,600

year on a telescope serving the southern

750

00:28:58,130 --> 00:28:55,080

sky from Chile every four days it will

751

00:28:59,990 --> 00:28:58,140

scan the entire sky so there is a high

752

00:29:02,510 --> 00:29:00,000

likelihood that every few months it will

753

00:29:04,789 --> 00:29:02,520

find another object like omomoa sort of

754

00:29:07,070 --> 00:29:04,799

like a dating app we will look at the

755

00:29:08,630 --> 00:29:07,080

data that comes from the pipeline of

756

00:29:10,370 --> 00:29:08,640

this telescope which will be public

757

00:29:13,430 --> 00:29:10,380

because it's funded by the National

758

00:29:15,710 --> 00:29:13,440

Science Foundation yeah and most of the

759

00:29:17,630 --> 00:29:15,720

time we will swipe to to the left we

760

00:29:19,909 --> 00:29:17,640

will say no this object is Not Unusual

761

00:29:22,850 --> 00:29:19,919

enough but if it finds an Interstellar

762

00:29:25,549 --> 00:29:22,860

object that is as weird as

763

00:29:27,350 --> 00:29:25,559

we might want to invest a billion

764

00:29:29,210 --> 00:29:27,360

dollars in sending a space mission that

765

00:29:31,789 --> 00:29:29,220

will come close to it because you know a

766

00:29:33,889 --> 00:29:31,799

picture is worth a thousand words and in

767

00:29:35,810 --> 00:29:33,899

my case it's worth 66 000 words the

768

00:29:36,950 --> 00:29:35,820

number of words in my book I will need

769

00:29:38,990 --> 00:29:36,960

to write a book if we had a high

770

00:29:41,090 --> 00:29:39,000

resolution image the other thing we have

771

00:29:43,430 --> 00:29:41,100

is the web telescope

772

00:29:46,310 --> 00:29:43,440

the web telescope is about a million

773

00:29:50,690 --> 00:29:46,320

miles away from Earth and it offers a

774

00:29:53,870 --> 00:29:50,700

fantastic vantage point because you look

775

00:29:56,269 --> 00:29:53,880

at the object let's say the next from

776  
00:29:57,769 --> 00:29:56,279  
different directions you look at it from

777  
00:30:00,409 --> 00:29:57,779  
Earth and you look at it from the web

778  
00:30:02,090 --> 00:30:00,419  
telescope and then you can trade it's

779  
00:30:05,269 --> 00:30:02,100  
just like having two eyes you may ask

780  
00:30:07,370 --> 00:30:05,279  
why do we have two eyes we have two eyes

781  
00:30:10,610 --> 00:30:07,380  
because then we get the third dimension

782  
00:30:13,010 --> 00:30:10,620  
because one eye sees an object that

783  
00:30:14,810 --> 00:30:13,020  
could be of a threat for our survival

784  
00:30:16,370 --> 00:30:14,820  
you know this is an object from One

785  
00:30:18,230 --> 00:30:16,380  
Direction and then the second die sees

786  
00:30:20,269 --> 00:30:18,240  
it from another direction from that you

787  
00:30:22,549 --> 00:30:20,279  
can gauge the distance and that helps

788  
00:30:25,010 --> 00:30:22,559

for survival that's why we have two eyes

789

00:30:27,230 --> 00:30:25,020

all those people that existed before us

790

00:30:29,029 --> 00:30:27,240

with one eye could not figure out the

791

00:30:32,029 --> 00:30:29,039

distance and the tiger would eat them

792

00:30:34,130 --> 00:30:32,039

okay so it was important for Survivor to

793

00:30:36,529 --> 00:30:34,140

have two eyes but in the context of the

794

00:30:39,590 --> 00:30:36,539

web telescope you know we look at this

795

00:30:42,350 --> 00:30:39,600

object from the web position which is a

796

00:30:44,570 --> 00:30:42,360

million miles away and from Earth we can

797

00:30:46,909 --> 00:30:44,580

pinpoint the trajectory in three

798

00:30:48,710 --> 00:30:46,919

dimensions of the web telescope so we

799

00:30:51,529 --> 00:30:48,720

can figure out if there are any forces

800

00:30:53,750 --> 00:30:51,539

other than gravity acting on the object

801  
00:30:56,269 --> 00:30:53,760  
if it's propelled by something other

802  
00:30:58,850 --> 00:30:56,279  
than gravity and if there is no cometary

803  
00:31:01,310 --> 00:30:58,860  
tail you know maybe it's something else

804  
00:31:02,990 --> 00:31:01,320  
and also the web telescope can look at

805  
00:31:05,510 --> 00:31:03,000  
it in the infrared and infer the

806  
00:31:08,389 --> 00:31:05,520  
composition so we will get much more

807  
00:31:11,570 --> 00:31:08,399  
data in with the help of the web

808  
00:31:13,010 --> 00:31:11,580  
telescope and then the third branch just

809  
00:31:15,350 --> 00:31:13,020  
to finish the answer to your question

810  
00:31:19,610 --> 00:31:15,360  
the third branch of the Galileo project

811  
00:31:21,169 --> 00:31:19,620  
has to do with the report that came out

812  
00:31:24,470 --> 00:31:21,179  
of the the Director of National

813  
00:31:25,490 --> 00:31:24,480

Intelligence Avril Haynes to the U.S

814

00:31:28,250 --> 00:31:25,500

Congress

815

00:31:32,389 --> 00:31:28,260

a year ago in June on June the June

816

00:31:34,430 --> 00:31:32,399

report yeah the June 2021 and that led

817

00:31:37,370 --> 00:31:34,440

to the establishment of a new office in

818

00:31:40,070 --> 00:31:37,380

government they used to refer to these

819

00:31:44,690 --> 00:31:40,080

objects that they cannot identify as

820

00:31:46,990 --> 00:31:44,700

unidentified aerial phenomena UAP and

821

00:31:49,430 --> 00:31:47,000

now they're talking Congress just

822

00:31:52,130 --> 00:31:49,440

established a new piece of legislation

823

00:31:54,669 --> 00:31:52,140

that they would like to pass and they uh

824

00:31:58,430 --> 00:31:54,679

suggest that these objects are also

825

00:32:02,029 --> 00:31:58,440

transmedium they go from water to air to

826  
00:32:03,889 --> 00:32:02,039  
space so you know it apparently there is

827  
00:32:07,190 --> 00:32:03,899  
some classified data that leads them in

828  
00:32:10,310 --> 00:32:07,200  
that direction but also NASA decided to

829  
00:32:12,350 --> 00:32:10,320  
establish a a committee that will

830  
00:32:15,289 --> 00:32:12,360  
evaluate whether scientific research

831  
00:32:16,730 --> 00:32:15,299  
will be funded on these objects we are

832  
00:32:19,130 --> 00:32:16,740  
already doing it with the Galileo

833  
00:32:22,730 --> 00:32:19,140  
project so what happened was that when

834  
00:32:25,430 --> 00:32:22,740  
this report was delivered to Congress

835  
00:32:27,830 --> 00:32:25,440  
um I suggested to NASA because Bill

836  
00:32:30,710 --> 00:32:27,840  
Nelson said scientists should get

837  
00:32:33,250 --> 00:32:30,720  
engaged so I immediately contacted the

838  
00:32:35,990 --> 00:32:33,260

person under him Thomas

839

00:32:36,950 --> 00:32:36,000

who is responsible for science at Nasa

840

00:32:39,110 --> 00:32:36,960

and I said

841

00:32:41,090 --> 00:32:39,120

that it will be my pleasure and

842

00:32:45,590 --> 00:32:41,100

privilege to help NASA

843

00:32:47,630 --> 00:32:45,600

uh and and make his boss happy and he

844

00:32:49,430 --> 00:32:47,640

said why don't you send a white paper I

845

00:32:50,750 --> 00:32:49,440

submitted a white paper suggesting a

846

00:32:53,870 --> 00:32:50,760

research program

847

00:32:59,330 --> 00:32:53,880

and I never heard back and then a year

848

00:33:02,630 --> 00:32:59,340

later uh in June 2022 they

849

00:33:06,710 --> 00:33:02,640

uh announced without me knowing that

850

00:33:10,789 --> 00:33:06,720

they have a this this committee that so

851

00:33:14,330 --> 00:33:10,799

that was uh triggered by this uh white

852

00:33:16,009 --> 00:33:14,340

paper that they sent but um and now they

853

00:33:17,870 --> 00:33:16,019

regard me as having a conflict of

854

00:33:20,389 --> 00:33:17,880

interest because in the meantime you

855

00:33:23,630 --> 00:33:20,399

know around the same time of June July

856

00:33:25,909 --> 00:33:23,640

2021 a few multi-billionaires came to

857

00:33:28,130 --> 00:33:25,919

the porch of my home they were inspired

858

00:33:29,990 --> 00:33:28,140

by my book extraterrestrial and they

859

00:33:33,110 --> 00:33:30,000

gave me three million dollars

860

00:33:35,330 --> 00:33:33,120

to establish the Galileo project and so

861

00:33:37,970 --> 00:33:35,340

at the end of exactly a month after the

862

00:33:40,730 --> 00:33:37,980

odni report to Congress we announced the

863

00:33:43,130 --> 00:33:40,740

Galileo project and the third branch of

864

00:33:44,750 --> 00:33:43,140

the Galileo project is trying to build a

865

00:33:47,149 --> 00:33:44,760

suite of instruments

866

00:33:49,909 --> 00:33:47,159

uh it's already on the roof of the

867

00:33:51,950 --> 00:33:49,919

Harvard College Observatory right now we

868

00:33:54,529 --> 00:33:51,960

are testing it a suite of instruments

869

00:33:57,590 --> 00:33:54,539

that take video of the sky in the

870

00:34:00,529 --> 00:33:57,600

infrared the optical band audio band

871

00:34:02,690 --> 00:34:00,539

and analyzes it with artificial

872

00:34:04,610 --> 00:34:02,700

intelligence algorithms and we are

873

00:34:07,730 --> 00:34:04,620

testing it in the coming months and

874

00:34:10,849 --> 00:34:07,740

hopefully by 2023 we'll start collecting

875

00:34:13,730 --> 00:34:10,859

data at places where there are reports

876

00:34:15,530 --> 00:34:13,740

on these objects and then you know

877

00:34:17,030 --> 00:34:15,540

that's the third branch of the Galileo

878

00:34:19,430 --> 00:34:17,040

projects we're already doing this

879

00:34:21,349 --> 00:34:19,440

research uh and we should see it's a

880

00:34:22,190 --> 00:34:21,359

phishing Expedition we should see if we

881

00:34:26,810 --> 00:34:22,200

find

882

00:34:30,669 --> 00:34:26,820

natural objects only or maybe some

883

00:34:34,369 --> 00:34:30,679

human-made objects natural or you know

884

00:34:38,570 --> 00:34:34,379

like for example birds or bugs or

885

00:34:41,089 --> 00:34:38,580

meteors or or Lightnings uh human-made

886

00:34:43,369 --> 00:34:41,099

objects or drones airplanes satellites

887

00:34:45,950 --> 00:34:43,379

and so weather balloons but the question

888

00:34:51,950 --> 00:34:45,960

is whether there is something else and

889

00:34:54,409 --> 00:34:51,960

on November 10th 2021 uh I was invited

890

00:34:56,750 --> 00:34:54,419

to a forum The ignacius Forum at the

891

00:35:01,490 --> 00:34:56,760

Washington National Cathedral uh

892

00:35:03,109 --> 00:35:01,500

together with Jeff Bezos Bill Nelson and

893

00:35:05,150 --> 00:35:03,119

Avril Haynes the Director of National

894

00:35:09,109 --> 00:35:05,160

Intelligence so when I was in The Green

895

00:35:11,630 --> 00:35:09,119

Room with evil Haynes I approached her

896

00:35:13,910 --> 00:35:11,640

and said what do you think what is your

897

00:35:16,250 --> 00:35:13,920

gut feeling about the nature of these

898

00:35:19,130 --> 00:35:16,260

objects that you reported about because

899

00:35:20,569 --> 00:35:19,140

she had a bachelor's degree in

900

00:35:22,970 --> 00:35:20,579

theoretical physics from the University

901  
00:35:25,370 --> 00:35:22,980  
of Chicago so you know she understands

902  
00:35:27,950 --> 00:35:25,380  
my language as a physicist and I said

903  
00:35:30,589 --> 00:35:27,960  
what what do you think they are and she

904  
00:35:32,930 --> 00:35:30,599  
said I don't know

905  
00:35:34,849 --> 00:35:32,940  
and I think frankly you know the

906  
00:35:37,790 --> 00:35:34,859  
government the intelligence agencies

907  
00:35:39,890 --> 00:35:37,800  
they are not a scientific organization I

908  
00:35:43,790 --> 00:35:39,900  
think it's time for scientists to engage

909  
00:35:45,890 --> 00:35:43,800  
because the sky is not classified it's

910  
00:35:48,050 --> 00:35:45,900  
only the sensors that the government is

911  
00:35:50,390 --> 00:35:48,060  
using that are classified and that's why

912  
00:35:52,609 --> 00:35:50,400  
the data is classified so the Galileo

913  
00:35:54,970 --> 00:35:52,619

project will try to break this open in

914

00:35:57,109 --> 00:35:54,980

the sense of you have all these

915

00:35:59,990 --> 00:35:57,119

non-professional people reporting about

916

00:36:02,690 --> 00:36:00,000

things where you know the the images are

917

00:36:04,310 --> 00:36:02,700

fuzzy there are anecdotal we don't know

918

00:36:05,930 --> 00:36:04,320

the truth and and then you have the

919

00:36:08,150 --> 00:36:05,940

classified data that we don't have

920

00:36:12,710 --> 00:36:08,160

access to so the gorilla project will

921

00:36:14,569 --> 00:36:12,720

try to establish a data stream that is

922

00:36:16,849 --> 00:36:14,579

open to the public the way science is

923

00:36:19,370 --> 00:36:16,859

done everyone will be able to access the

924

00:36:21,530 --> 00:36:19,380

data and it will be of high quality we

925

00:36:25,730 --> 00:36:21,540

will know exactly what our instruments

926  
00:36:28,870 --> 00:36:25,740  
are doing unlike those cameras on the

927  
00:36:31,430 --> 00:36:28,880  
jittery cockpits of of fighter jet

928  
00:36:32,930 --> 00:36:31,440  
airplanes you know like we we don't know

929  
00:36:35,630 --> 00:36:32,940  
exactly what they were doing at the time

930  
00:36:37,190 --> 00:36:35,640  
so all of this is to bring the subject

931  
00:36:39,410 --> 00:36:37,200  
to the mainstream of science because

932  
00:36:42,109 --> 00:36:39,420  
because you know science should address

933  
00:36:44,089 --> 00:36:42,119  
that the main task of science is to

934  
00:36:47,089 --> 00:36:44,099  
address questions that are of interest

935  
00:36:50,750 --> 00:36:47,099  
to society are of interest to the

936  
00:36:53,450 --> 00:36:50,760  
government and it's just it feels just

937  
00:36:55,609 --> 00:36:53,460  
inappropriate that this subject is

938  
00:36:57,290 --> 00:36:55,619

ridiculed and pushed aside from the

939

00:36:59,630 --> 00:36:57,300

mainstream of science

940

00:37:02,210 --> 00:36:59,640

okay so let me see if I got this correct

941

00:37:04,430 --> 00:37:02,220

there are three branches or three goals

942

00:37:06,890 --> 00:37:04,440

in the near term for the Galileo project

943

00:37:09,290 --> 00:37:06,900

so one is to go and look in the ocean

944

00:37:11,630 --> 00:37:09,300

floor for the meteorite that you

945

00:37:14,510 --> 00:37:11,640

mentioned initially so that's cneos I

946

00:37:17,150 --> 00:37:14,520

believe in 2014. okay then you have the

947

00:37:18,790 --> 00:37:17,160

the search for umuamua like objects and

948

00:37:21,170 --> 00:37:18,800

that I believe you mentioned a Chilean

949

00:37:22,910 --> 00:37:21,180

Observatory yes the Vera Rubin

950

00:37:24,589 --> 00:37:22,920

Observatory yes okay okay so that's not

951  
00:37:26,390 --> 00:37:24,599  
the Galileo projects that's what you

952  
00:37:28,370 --> 00:37:26,400  
would rent out is that how it works well

953  
00:37:30,710 --> 00:37:28,380  
this is yeah the dating app think about

954  
00:37:32,329 --> 00:37:30,720  
it as it will suggest objects of

955  
00:37:34,910 --> 00:37:32,339  
interest that came from outside the

956  
00:37:37,609 --> 00:37:34,920  
solar system that we can follow up on

957  
00:37:39,650 --> 00:37:37,619  
either by using existing telescopes to

958  
00:37:42,109 --> 00:37:39,660  
look at them or sending a space mission

959  
00:37:45,770 --> 00:37:42,119  
that will take a close-up photograph

960  
00:37:48,109 --> 00:37:45,780  
okay and then also you would get some

961  
00:37:50,030 --> 00:37:48,119  
other form of verification from the

962  
00:37:51,530 --> 00:37:50,040  
James Webb Telescope now I don't know

963  
00:37:54,109 --> 00:37:51,540

how that works are you allowed to just

964

00:37:55,670 --> 00:37:54,119

say hey James Webb Telescope people can

965

00:37:57,890 --> 00:37:55,680

you tell me what you saw at this point

966

00:38:00,410 --> 00:37:57,900

or do you tell them hey James Webb

967

00:38:01,790 --> 00:38:00,420

Telescope people can you now look in

968

00:38:04,310 --> 00:38:01,800

this direction like how does that work

969

00:38:08,510 --> 00:38:04,320

do you have to rent it yeah actually

970

00:38:10,250 --> 00:38:08,520

if okay if we announce the discovery of

971

00:38:12,470 --> 00:38:10,260

any another Interstellar object

972

00:38:14,150 --> 00:38:12,480

especially if it looks like or more in

973

00:38:16,069 --> 00:38:14,160

terms of being weird

974

00:38:19,069 --> 00:38:16,079

I will not need to do much because

975

00:38:22,130 --> 00:38:19,079

immediately I mean usually there is some

976  
00:38:24,470 --> 00:38:22,140  
discretionary time that belongs to the

977  
00:38:26,930 --> 00:38:24,480  
director of the Space Telescope Science

978  
00:38:29,569 --> 00:38:26,940  
Institute or other people have some time

979  
00:38:33,470 --> 00:38:29,579  
that they will be happy to donate for

980  
00:38:35,390 --> 00:38:33,480  
this because despite all of all you hear

981  
00:38:38,569 --> 00:38:35,400  
from people who are not practitioners of

982  
00:38:41,690 --> 00:38:38,579  
science you you see them writing tweets

983  
00:38:43,910 --> 00:38:41,700  
or writing blogs basically very

984  
00:38:45,950 --> 00:38:43,920  
aggressively attacking the possibility

985  
00:38:48,230 --> 00:38:45,960  
that such an object is of interest and

986  
00:38:50,329 --> 00:38:48,240  
saying oh it must be natural we've seen

987  
00:38:51,470 --> 00:38:50,339  
a lot of these despite what they say

988  
00:38:53,690 --> 00:38:51,480

these are people that are not

989

00:38:56,569 --> 00:38:53,700

professionals I think the scientific

990

00:38:59,210 --> 00:38:56,579

Community once we find more objects of

991

00:39:01,490 --> 00:38:59,220

this type it will be a very important

992

00:39:04,190 --> 00:39:01,500

question to figure out their nature okay

993

00:39:07,370 --> 00:39:04,200

because just think about it if there are

994

00:39:10,730 --> 00:39:07,380

hydrogen icebergs you know those are not

995

00:39:13,010 --> 00:39:10,740

produced in uh planetary systems that

996

00:39:15,650 --> 00:39:13,020

are those are potentially produced in

997

00:39:18,230 --> 00:39:15,660

molecular clouds we've never ever seen a

998

00:39:20,510 --> 00:39:18,240

chunk of Frozen hydrogen produced by

999

00:39:22,430 --> 00:39:20,520

Nature that would be a great discovery

1000

00:39:25,790 --> 00:39:22,440

we've never seen a chunk of Frozen

1001  
00:39:27,829 --> 00:39:25,800  
nitrogen in the solar system and the

1002  
00:39:29,569 --> 00:39:27,839  
claim is no no you will not find it in

1003  
00:39:31,550 --> 00:39:29,579  
the solar system because these chunks

1004  
00:39:33,109 --> 00:39:31,560  
were produced in the distant past and

1005  
00:39:34,910 --> 00:39:33,119  
none of them survived and therefore

1006  
00:39:36,410 --> 00:39:34,920  
there is nothing in the solar system but

1007  
00:39:38,390 --> 00:39:36,420  
what we find are chunks of Frozen

1008  
00:39:40,790 --> 00:39:38,400  
nitrogen coming into the solar system

1009  
00:39:45,170 --> 00:39:40,800  
from other planeters oh really that's

1010  
00:39:47,630 --> 00:39:45,180  
that's the sort of popular idea by some

1011  
00:39:49,849 --> 00:39:47,640  
people right now for the origin of a

1012  
00:39:51,589 --> 00:39:49,859  
woman okay suppose we find that it's a

1013  
00:39:53,329 --> 00:39:51,599

nitrogen aspect that would also be an

1014

00:39:55,849 --> 00:39:53,339

important Revelation because nobody

1015

00:39:59,329 --> 00:39:55,859

expected it before or more nobody okay

1016

00:40:01,670 --> 00:39:59,339

and I say it may not be either of them

1017

00:40:03,410 --> 00:40:01,680

and it may not be a Dust Bar even if

1018

00:40:05,690 --> 00:40:03,420

okay suppose we see it kind of money

1019

00:40:07,730 --> 00:40:05,700

apart you know imagine those clouds of

1020

00:40:08,930 --> 00:40:07,740

dust particles floating around and that

1021

00:40:10,990 --> 00:40:08,940

would be a revelation it's something

1022

00:40:13,490 --> 00:40:11,000

completely new that we've never expected

1023

00:40:16,970 --> 00:40:13,500

so in any case it will be a major

1024

00:40:19,550 --> 00:40:16,980

Discovery and and therefore I think that

1025

00:40:22,010 --> 00:40:19,560

the web telescope time will be allocated

1026  
00:40:25,130 --> 00:40:22,020  
almost instantly to look at these things

1027  
00:40:26,750 --> 00:40:25,140  
and I will you know in the worst case I

1028  
00:40:28,370 --> 00:40:26,760  
will apply for time together with

1029  
00:40:29,690 --> 00:40:28,380  
colleagues but I don't think it will be

1030  
00:40:32,450 --> 00:40:29,700  
necessary I think there will be enough

1031  
00:40:34,550 --> 00:40:32,460  
curious astronomers that would like to

1032  
00:40:36,230 --> 00:40:34,560  
figure out what these things are and of

1033  
00:40:40,010 --> 00:40:36,240  
course once we observe a few of those

1034  
00:40:41,870 --> 00:40:40,020  
then we would have a better clue and you

1035  
00:40:44,810 --> 00:40:41,880  
know whatever it is it would be fun to

1036  
00:40:47,030 --> 00:40:44,820  
figure it out and I think uh even those

1037  
00:40:50,870 --> 00:40:47,040  
that advocate for natural origin would

1038  
00:40:52,730 --> 00:40:50,880

like to demonstrate it with data so even

1039

00:40:54,950 --> 00:40:52,740

though they are biased you know it's

1040

00:40:56,270 --> 00:40:54,960

just like taking those philosophers at

1041

00:40:58,250 --> 00:40:56,280

the time of Galileo and telling them

1042

00:40:59,690 --> 00:40:58,260

look through the telescope you know we

1043

00:41:01,970 --> 00:40:59,700

are not telling you what you would see

1044

00:41:05,030 --> 00:41:01,980

just look through them they refuse to do

1045

00:41:06,890 --> 00:41:05,040

that back then but now I think we live

1046

00:41:09,410 --> 00:41:06,900

at a different time and once we have the

1047

00:41:11,390 --> 00:41:09,420

data from web that nobody can censor by

1048

00:41:13,970 --> 00:41:11,400

the way it's not as if you can put the

1049

00:41:16,550 --> 00:41:13,980

people that constructed the web in how

1050

00:41:19,970 --> 00:41:16,560

house arrest that is not the data will

1051  
00:41:23,569 --> 00:41:19,980  
be public no matter what so it will make

1052  
00:41:25,190 --> 00:41:23,579  
no sense to ignore the data so as long

1053  
00:41:27,290 --> 00:41:25,200  
as we look at it just to demonstrate

1054  
00:41:29,329 --> 00:41:27,300  
that the objects are natural that's okay

1055  
00:41:31,849 --> 00:41:29,339  
they can be they can think whatever they

1056  
00:41:34,490 --> 00:41:31,859  
want but eventually it will be clear if

1057  
00:41:36,109 --> 00:41:34,500  
it's if it's not natural you know so so

1058  
00:41:38,990 --> 00:41:36,119  
I'm saying I'm not saying all the

1059  
00:41:41,390 --> 00:41:39,000  
objects must be artificial you know it

1060  
00:41:43,970 --> 00:41:41,400  
it will be just like going on the beach

1061  
00:41:45,290 --> 00:41:43,980  
you know most of the time you find rocks

1062  
00:41:47,569 --> 00:41:45,300  
and seashells that are naturally

1063  
00:41:50,510 --> 00:41:47,579

produced the solar system contains a lot

1064

00:41:53,150 --> 00:41:50,520

of those but every now and then you may

1065

00:41:55,730 --> 00:41:53,160

bump into a plastic bottle and that's

1066

00:41:58,670 --> 00:41:55,740

you know those outliers are what we

1067

00:41:59,990 --> 00:41:58,680

should be looking for and checking if

1068

00:42:03,050 --> 00:42:00,000

they exist

1069

00:42:04,970 --> 00:42:03,060

okay so even if another emuamua object

1070

00:42:06,890 --> 00:42:04,980

is found and people think that it's

1071

00:42:08,270 --> 00:42:06,900

natural it's still abnormal and so they

1072

00:42:10,430 --> 00:42:08,280

would have an incentive to look for it

1073

00:42:11,930 --> 00:42:10,440

because nitrogen or a block of nitrogen

1074

00:42:14,930 --> 00:42:11,940

a block of hydrogen a block of a Dust

1075

00:42:17,810 --> 00:42:14,940

Bunny of some sort is aberrant exactly

1076

00:42:22,790 --> 00:42:17,820

I should tell you um that this is the

1077

00:42:25,130 --> 00:42:22,800

third phase of the three stage story uh

1078

00:42:28,510 --> 00:42:25,140

the story started about a century ago

1079

00:42:32,450 --> 00:42:28,520

okay uh around the

1080

00:42:36,050 --> 00:42:32,460

1925 that was when Cecilia Payne

1081

00:42:38,950 --> 00:42:36,060

kapashkin was a young scientist who

1082

00:42:44,230 --> 00:42:38,960

finished that wanted to have the first

1083

00:42:47,630 --> 00:42:44,240

PhD doctoral degree in astronomy at

1084

00:42:50,150 --> 00:42:47,640

Radcliffe Harvard back then how about

1085

00:42:53,510 --> 00:42:50,160

you what you know the the she was at the

1086

00:42:55,970 --> 00:42:53,520

Radcliffe uh Institute but then she

1087

00:42:57,589 --> 00:42:55,980

wanted to get a degree in astronomy uh

1088

00:43:02,270 --> 00:42:57,599

and that was not possible she was the

1089

00:43:05,750 --> 00:43:02,280

first one okay now her PhD back in 19 20

1090

00:43:08,569 --> 00:43:05,760

25 okay was about the Sun

1091

00:43:11,450 --> 00:43:08,579

and that was just around after quantum

1092

00:43:15,349 --> 00:43:11,460

mechanics was invented and so forth and

1093

00:43:17,150 --> 00:43:15,359

she realized that based on the spectrum

1094

00:43:18,829 --> 00:43:17,160

of a mission from the Sun that the

1095

00:43:19,910 --> 00:43:18,839

surface of the Sun is made mostly of

1096

00:43:22,849 --> 00:43:19,920

hydrogen

1097

00:43:25,250 --> 00:43:22,859

now at the time people thought oh you

1098

00:43:27,530 --> 00:43:25,260

know we know what the earth is made of

1099

00:43:28,490 --> 00:43:27,540

so the sun is made of the same stuff as

1100

00:43:31,670 --> 00:43:28,500

the Earth

1101

00:43:34,309 --> 00:43:31,680

okay and that was the prevailing

1102

00:43:37,250 --> 00:43:34,319

Paradigm everyone believed in that so

1103

00:43:39,170 --> 00:43:37,260

she presented her thesis saying actually

1104

00:43:40,790 --> 00:43:39,180

it looks like the Sun at least the

1105

00:43:41,809 --> 00:43:40,800

surface of the Sun is made mostly of

1106

00:43:46,130 --> 00:43:41,819

hydrogen

1107

00:43:48,950 --> 00:43:46,140

and on her PhD thesis committee was the

1108

00:43:52,309 --> 00:43:48,960

most prominent uh astronomer at the time

1109

00:43:53,390 --> 00:43:52,319

that was an expert on Stars he was the

1110

00:43:56,809 --> 00:43:53,400

director of Princeton University

1111

00:43:59,450 --> 00:43:56,819

Observatory Henry Norris Russell okay

1112

00:44:02,390 --> 00:43:59,460

and he said to her

1113

00:44:05,510 --> 00:44:02,400

that's impossible take this statement

1114

00:44:08,030 --> 00:44:05,520

out of your thesis it makes no sense to

1115

00:44:09,890 --> 00:44:08,040

argue that the sun everyone knows that

1116

00:44:10,790 --> 00:44:09,900

the sun has the same composition as the

1117

00:44:13,910 --> 00:44:10,800

Earth

1118

00:44:16,910 --> 00:44:13,920

so she was a young female scientist at

1119

00:44:18,710 --> 00:44:16,920

the time decided okay well if the expert

1120

00:44:21,230 --> 00:44:18,720

tells me that you know otherwise I might

1121

00:44:26,569 --> 00:44:21,240

not get a PhD she took it out he

1122

00:44:30,109 --> 00:44:26,579

dissuaded her and then for four years he

1123

00:44:32,750 --> 00:44:30,119

tried to analyze his own data and

1124

00:44:35,990 --> 00:44:32,760

published the paper four years later

1125

00:44:39,050 --> 00:44:36,000

saying that Cecilia was right

1126

00:44:42,109 --> 00:44:39,060

okay indeed the sun is made mostly of

1127

00:44:43,670 --> 00:44:42,119

hydrogen okay now the funny part of the

1128

00:44:47,390 --> 00:44:43,680

story and that's also an important

1129

00:44:48,650 --> 00:44:47,400

lesson is that about

1130

00:44:51,670 --> 00:44:48,660

um

1131

00:44:54,770 --> 00:44:51,680

80 years later

1132

00:44:57,230 --> 00:44:54,780

there was a visiting committee to the

1133

00:44:59,210 --> 00:44:57,240

Princeton University

1134

00:45:01,630 --> 00:44:59,220

Department of astrophysical Sciences

1135

00:45:04,190 --> 00:45:01,640

okay and

1136

00:45:07,309 --> 00:45:04,200

the chair of that department at

1137

00:45:08,870 --> 00:45:07,319

Princeton said we have a very

1138

00:45:11,470 --> 00:45:08,880

prestigious

1139

00:45:14,990 --> 00:45:11,480

history of the department

1140

00:45:17,510 --> 00:45:15,000

if you go back in time there was the

1141

00:45:20,089 --> 00:45:17,520

famous astronomer Henry Norris Russell

1142

00:45:21,650 --> 00:45:20,099

who discovered that the sun is made of

1143

00:45:23,750 --> 00:45:21,660

hydrogen

1144

00:45:25,910 --> 00:45:23,760

so then there was a member of that

1145

00:45:27,829 --> 00:45:25,920

committee uh

1146

00:45:29,930 --> 00:45:27,839

uh who corrected him and said look it

1147

00:45:32,150 --> 00:45:29,940

was not Henry Norris Russell it was

1148

00:45:34,370 --> 00:45:32,160

actually Cecilia pen kobachi and he

1149

00:45:37,670 --> 00:45:34,380

tried to argue otherwise

1150

00:45:39,530 --> 00:45:37,680

and the lesson of this story is that

1151

00:45:41,630 --> 00:45:39,540

history depends on who you are who

1152

00:45:45,410 --> 00:45:41,640

writes it

1153

00:45:47,569 --> 00:45:45,420

um but anyway so that's step one when we

1154

00:45:50,150 --> 00:45:47,579

realized we thought that we see things

1155

00:45:52,130 --> 00:45:50,160

in in our backyard here on Earth and

1156

00:45:55,430 --> 00:45:52,140

everything else like the sun is made of

1157

00:45:57,170 --> 00:45:55,440

the same stuff well mistake okay so a

1158

00:45:58,670 --> 00:45:57,180

young person named Cecilia pencopason

1159

00:46:00,890 --> 00:45:58,680

who later became the chair of the

1160

00:46:03,650 --> 00:46:00,900

astronomy department at Harvard realized

1161

00:46:06,589 --> 00:46:03,660

it first then the second part of the

1162

00:46:11,930 --> 00:46:06,599

story is in 1933 about a decade later

1163

00:46:14,510 --> 00:46:11,940

Fritz Wiki young in his 30s realized

1164

00:46:16,550 --> 00:46:14,520

that groups are clusters of galaxies are

1165

00:46:19,010 --> 00:46:16,560

made mostly of stuff that we don't find

1166

00:46:19,849 --> 00:46:19,020

in the solar system he called it dark

1167

00:46:21,950 --> 00:46:19,859

matter

1168

00:46:25,069 --> 00:46:21,960

Okay so

1169

00:46:27,650 --> 00:46:25,079

for 40 years this subject was ridiculed

1170

00:46:30,589 --> 00:46:27,660

including by colleagues within his

1171

00:46:33,290 --> 00:46:30,599

department at Caltech Pasadena where he

1172

00:46:35,089 --> 00:46:33,300

was the professor that he was not his

1173

00:46:37,430 --> 00:46:35,099

view was not popular people just

1174

00:46:39,770 --> 00:46:37,440

ridiculed it said doesn't make any sense

1175

00:46:41,569 --> 00:46:39,780

that most of the matter in the universe

1176

00:46:44,150 --> 00:46:41,579

is of a type that you don't find in the

1177

00:46:46,670 --> 00:46:44,160

solar system okay once again the same

1178

00:46:47,870 --> 00:46:46,680

story just like this Earth and the Sun

1179

00:46:50,930 --> 00:46:47,880

now it's we're talking about the

1180

00:46:53,569 --> 00:46:50,940

universe and the solar system and by now

1181

00:46:56,450 --> 00:46:53,579

if you ask any student or postdoc they

1182

00:46:59,329 --> 00:46:56,460

would say of course no question about it

1183

00:47:01,730 --> 00:46:59,339

eighty percent 82 percent of the matter

1184

00:47:03,650 --> 00:47:01,740

in the universe is made of stuff that is

1185

00:47:05,450 --> 00:47:03,660

not ordinary matter that you find in the

1186

00:47:07,690 --> 00:47:05,460

sauce we don't we haven't detected it

1187

00:47:10,490 --> 00:47:07,700

yet we don't find it in the solar system

1188

00:47:14,569 --> 00:47:10,500

uh we don't know what it is

1189

00:47:16,190 --> 00:47:14,579

uh it's dark matter okay we we just gave

1190

00:47:18,589 --> 00:47:16,200

it a label

1191

00:47:22,790 --> 00:47:18,599

so just again the lesson from this is

1192

00:47:26,750 --> 00:47:22,800

for 40 years this was ridicule until the

1193

00:47:28,130 --> 00:47:26,760

1970s and now everyone says yes of

1194

00:47:31,370 --> 00:47:28,140

course but we still don't know what it

1195

00:47:32,690 --> 00:47:31,380

is now I say here is the third part of

1196

00:47:35,210 --> 00:47:32,700

this story

1197

00:47:37,910 --> 00:47:35,220

over the past decade we found the first

1198

00:47:40,390 --> 00:47:37,920

objects that came from outside the solar

1199

00:47:43,670 --> 00:47:40,400

system just like going to your backyard

1200

00:47:46,550 --> 00:47:43,680

and thinking oh yeah anything I find in

1201  
00:47:49,250 --> 00:47:46,560  
my backyard so far I found from my

1202  
00:47:51,290 --> 00:47:49,260  
backyard was rocks therefore if

1203  
00:47:52,550 --> 00:47:51,300  
something comes from the street it will

1204  
00:47:54,770 --> 00:47:52,560  
also be a rock

1205  
00:47:57,410 --> 00:47:54,780  
but then you find the beach ball you

1206  
00:47:59,750 --> 00:47:57,420  
find a tennis ball you say no no no no

1207  
00:48:01,430 --> 00:47:59,760  
it's a rock of a type that we've never

1208  
00:48:03,829 --> 00:48:01,440  
seen before

1209  
00:48:06,109 --> 00:48:03,839  
and my point is just be open-minded

1210  
00:48:08,510 --> 00:48:06,119  
maybe you have a neighbor maybe these

1211  
00:48:12,770 --> 00:48:08,520  
objects are different than rocks why is

1212  
00:48:15,790 --> 00:48:12,780  
that such a a a an extraordinary claim

1213  
00:48:18,309 --> 00:48:15,800

to say that other

1214

00:48:21,770 --> 00:48:18,319

exoplanets may have developed

1215

00:48:24,470 --> 00:48:21,780

intelligence the way Earth did and

1216

00:48:26,390 --> 00:48:24,480

resulted in spaceship or or some

1217

00:48:28,790 --> 00:48:26,400

equipment being thrown into space that

1218

00:48:31,670 --> 00:48:28,800

may visit us why is that so extra Runner

1219

00:48:33,650 --> 00:48:31,680

so my colleagues say extraordinary

1220

00:48:36,230 --> 00:48:33,660

claims require extraordinary evidence

1221

00:48:38,390 --> 00:48:36,240

and I say in response and by the way

1222

00:48:40,970 --> 00:48:38,400

this is a quote of Carl Sagan from the

1223

00:48:42,950 --> 00:48:40,980

70s I say that makes no sense because

1224

00:48:45,050 --> 00:48:42,960

it's a self-fulfilling prophecy if you

1225

00:48:47,210 --> 00:48:45,060

say we don't need to everything is rocks

1226

00:48:49,430 --> 00:48:47,220

everything is natural that just the way

1227

00:48:51,349 --> 00:48:49,440

that this nature astronomy review paper

1228

00:48:53,089 --> 00:48:51,359

said it must be natural period

1229

00:48:55,730 --> 00:48:53,099

explanation mark let's forget about it

1230

00:48:57,910 --> 00:48:55,740

let's move on if you say that you don't

1231

00:49:01,430 --> 00:48:57,920

look for evidence if you don't admit

1232

00:49:02,650 --> 00:49:01,440

that the emperor has no claws if you

1233

00:49:05,750 --> 00:49:02,660

don't say that

1234

00:49:08,809 --> 00:49:05,760

then you don't even search you don't

1235

00:49:11,630 --> 00:49:08,819

check you say well it's a rock of some

1236

00:49:13,010 --> 00:49:11,640

type of a very unusual type forget about

1237

00:49:14,809 --> 00:49:13,020

it there are more important pressing

1238

00:49:17,329 --> 00:49:14,819

items like dark matter

1239

00:49:19,370 --> 00:49:17,339

but fundamentally it may be much more

1240

00:49:21,910 --> 00:49:19,380

important than dark matter because if we

1241

00:49:25,069 --> 00:49:21,920

find the dark matter is super symmetric

1242

00:49:27,410 --> 00:49:25,079

particles it will have zero impact on

1243

00:49:29,630 --> 00:49:27,420

our daily lives if we find that there is

1244

00:49:32,270 --> 00:49:29,640

a smarter kid on our block it will

1245

00:49:34,910 --> 00:49:32,280

change the future of humanity so I say

1246

00:49:38,630 --> 00:49:34,920

how can you ignore that possibility and

1247

00:49:43,010 --> 00:49:38,640

the point is that you know we should be

1248

00:49:46,130 --> 00:49:43,020

guided by evidence that's the key to uh

1249

00:49:49,010 --> 00:49:46,140

being humble being modest be saying you

1250

00:49:51,230 --> 00:49:49,020

know we don't know the answers let's

1251  
00:49:53,150 --> 00:49:51,240  
just figure them out let's allow nature

1252  
00:49:54,770 --> 00:49:53,160  
to educate us that's something else

1253  
00:49:56,329 --> 00:49:54,780  
that's important that I don't think is

1254  
00:49:57,710 --> 00:49:56,339  
talked about much that when someone

1255  
00:50:00,349 --> 00:49:57,720  
dismisses something because it's

1256  
00:50:01,910 --> 00:50:00,359  
quanticore improbable it's not simply a

1257  
00:50:03,890 --> 00:50:01,920  
probabilistic argument there's also a

1258  
00:50:06,230 --> 00:50:03,900  
value judgment there and the reason is

1259  
00:50:09,109 --> 00:50:06,240  
when I'm driving along a country road

1260  
00:50:10,550 --> 00:50:09,119  
and there's a hill I can't see the cars

1261  
00:50:12,650 --> 00:50:10,560  
that are coming up and let's say I've

1262  
00:50:15,349 --> 00:50:12,660  
passed 50 of them and there's no cars

1263  
00:50:16,790 --> 00:50:15,359

it's empty I still slow down and the top

1264

00:50:18,050 --> 00:50:16,800

of the hill even though it's improbable

1265

00:50:20,569 --> 00:50:18,060

there's another car because it's

1266

00:50:23,270 --> 00:50:20,579

important that I don't hit someone or

1267

00:50:25,250 --> 00:50:23,280

that I don't get hit and so even if it's

1268

00:50:26,930 --> 00:50:25,260

improbable that it's life the importance

1269

00:50:28,730 --> 00:50:26,940

of it is so high that

1270

00:50:31,730 --> 00:50:28,740

that needs to be taken into account as

1271

00:50:34,910 --> 00:50:31,740

well exactly exactly that was the Pascal

1272

00:50:37,550 --> 00:50:34,920

bles Pascal's argument why we should

1273

00:50:40,250 --> 00:50:37,560

discuss the possibility of God because

1274

00:50:42,890 --> 00:50:40,260

the implications are so great

1275

00:50:45,530 --> 00:50:42,900

um and my point in response to Carl

1276

00:50:48,309 --> 00:50:45,540

Sagan's quote is that extraordinary

1277

00:50:51,349 --> 00:50:48,319

evidence requires extraordinary funding

1278

00:50:52,849 --> 00:50:51,359

and you know we invested billions of

1279

00:50:56,030 --> 00:50:52,859

dollars in the search for Dark Matter

1280

00:50:58,130 --> 00:50:56,040

over the past several decades the most

1281

00:51:00,410 --> 00:50:58,140

the most recent attempt was using the

1282

00:51:03,349 --> 00:51:00,420

Large Hadron Collider that cost 10

1283

00:51:05,690 --> 00:51:03,359

billion dollars to find the lightest

1284

00:51:07,849 --> 00:51:05,700

supersymmetric particle as a candidate

1285

00:51:09,530 --> 00:51:07,859

for the dark matter and people said you

1286

00:51:12,470 --> 00:51:09,540

know it will be found it's around the

1287

00:51:14,990 --> 00:51:12,480

corner string theory was established on

1288

00:51:16,970 --> 00:51:15,000

the foundation of supersymmetry and

1289

00:51:18,530 --> 00:51:16,980

there are some very natural set of

1290

00:51:21,290 --> 00:51:18,540

parameters for supersymmetry that

1291

00:51:23,930 --> 00:51:21,300

everyone believed in and awards were

1292

00:51:25,790 --> 00:51:23,940

given to people who suggested that and

1293

00:51:27,650 --> 00:51:25,800

so forth and then the Large Hadron

1294

00:51:31,329 --> 00:51:27,660

Collider at the cost of 10 billion

1295

00:51:34,370 --> 00:51:31,339

dollars didn't find it okay there is no

1296

00:51:36,710 --> 00:51:34,380

uh supersymmetry at the natural set of

1297

00:51:39,410 --> 00:51:36,720

parameters there was no Dark Matter

1298

00:51:43,069 --> 00:51:39,420

particle that we discovered so far okay

1299

00:51:45,170 --> 00:51:43,079

and I so I say you know if we were to

1300

00:51:48,770 --> 00:51:45,180

invest billions of dollars in the search

1301  
00:51:52,130 --> 00:51:48,780  
for equipment from other civilizations

1302  
00:51:55,970 --> 00:51:52,140  
in outer space and we would spend

1303  
00:51:57,890 --> 00:51:55,980  
billions of dollars for decades and not

1304  
00:52:00,349 --> 00:51:57,900  
find anything

1305  
00:52:04,370 --> 00:52:00,359  
then we would be exactly the same point

1306  
00:52:06,490 --> 00:52:04,380  
as dark matter searches are right now so

1307  
00:52:09,589 --> 00:52:06,500  
why didn't anyone say

1308  
00:52:12,170 --> 00:52:09,599  
supersymmetry is an extraordinary claim

1309  
00:52:13,069 --> 00:52:12,180  
there is no extraordinary evidence for

1310  
00:52:15,230 --> 00:52:13,079  
it

1311  
00:52:18,049 --> 00:52:15,240  
therefore we should not fund the search

1312  
00:52:20,030 --> 00:52:18,059  
why didn't anyone no it's legitimate to

1313  
00:52:22,670 --> 00:52:20,040

search for supersonic because there was

1314

00:52:25,250 --> 00:52:22,680

a community that agreed that it's a good

1315

00:52:27,410 --> 00:52:25,260

idea okay so we invested the billions of

1316

00:52:29,809 --> 00:52:27,420

dollars we didn't find it does anyone

1317

00:52:31,849 --> 00:52:29,819

take responsibility for that no people

1318

00:52:35,450 --> 00:52:31,859

say well that's the nature of science

1319

00:52:39,829 --> 00:52:35,460

you imagine something you don't find it

1320

00:52:42,770 --> 00:52:39,839

so now why do we block funding

1321

00:52:44,870 --> 00:52:42,780

for something that we as a civilization

1322

00:52:47,809 --> 00:52:44,880

already did in terms of sending

1323

00:52:49,970 --> 00:52:47,819

equipment uh out of the solar system why

1324

00:52:53,030 --> 00:52:49,980

do we block funding for the search for

1325

00:52:55,970 --> 00:52:53,040

something similar that was initiated by

1326  
00:52:59,569 --> 00:52:55,980  
a duplicate of ourselves because you

1327  
00:53:01,190 --> 00:52:59,579  
know the the dice was rolled tens of

1328  
00:53:03,650 --> 00:53:01,200  
billions of times in the Milky Way

1329  
00:53:06,170 --> 00:53:03,660  
galaxy the dice of intelligence we know

1330  
00:53:08,270 --> 00:53:06,180  
that somewhere between a few percent to

1331  
00:53:10,970 --> 00:53:08,280  
a hundred percent of all the sun-like

1332  
00:53:13,130 --> 00:53:10,980  
stars have a planet the size of the

1333  
00:53:14,690 --> 00:53:13,140  
Earth roughly the same separation that's

1334  
00:53:17,630 --> 00:53:14,700  
from the Kepler satellite we already

1335  
00:53:19,549 --> 00:53:17,640  
know that so what we find in the solar

1336  
00:53:21,829 --> 00:53:19,559  
system is not an extremely rare

1337  
00:53:24,470 --> 00:53:21,839  
situation and I say okay you roll the

1338  
00:53:26,390 --> 00:53:24,480

dice of intelligence so many times tens

1339

00:53:28,670 --> 00:53:26,400

of business it's quite possible and most

1340

00:53:31,010 --> 00:53:28,680

stars form billions of years before the

1341

00:53:33,890 --> 00:53:31,020

sun we should allow for this possibility

1342

00:53:37,609 --> 00:53:33,900

to me it doesn't sound more far-fetched

1343

00:53:39,410 --> 00:53:37,619

or more speculative than the lightest

1344

00:53:42,589 --> 00:53:39,420

supersymmetric particle being the

1345

00:53:45,230 --> 00:53:42,599

darkness better okay but on that front

1346

00:53:46,790 --> 00:53:45,240

we invested billions of dollars in the

1347

00:53:49,069 --> 00:53:46,800

search for the lightest supersymmetric

1348

00:53:52,370 --> 00:53:49,079

part on the front of searching for what

1349

00:53:54,890 --> 00:53:52,380

we are doing from another kid on our

1350

00:53:57,410 --> 00:53:54,900

Cosmic block we didn't spend anything

1351  
00:53:59,390 --> 00:53:57,420  
from federal funding so the Galileo

1352  
00:54:01,430 --> 00:53:59,400  
project is funded by private donations

1353  
00:54:03,950 --> 00:54:01,440  
and we haven't really engaged

1354  
00:54:07,690 --> 00:54:03,960  
scientifically in that search so I say

1355  
00:54:10,490 --> 00:54:07,700  
there is a mismatch between the current

1356  
00:54:14,150 --> 00:54:10,500  
academic approach to this subject and

1357  
00:54:16,670 --> 00:54:14,160  
moreover you may say oh um scientists

1358  
00:54:18,890 --> 00:54:16,680  
are conservative I say how it how is

1359  
00:54:20,329 --> 00:54:18,900  
that possible to imagine that scientists

1360  
00:54:21,530 --> 00:54:20,339  
are conservative because you have a

1361  
00:54:24,650 --> 00:54:21,540  
whole community of theoretical

1362  
00:54:27,230 --> 00:54:24,660  
physicists that for four decades are

1363  
00:54:31,010 --> 00:54:27,240

working on extra dimensions

1364

00:54:33,309 --> 00:54:31,020

on the Multiverse on string theory ideas

1365

00:54:36,650 --> 00:54:33,319

that have no

1366

00:54:39,650 --> 00:54:36,660

foundation in experimental verification

1367

00:54:42,049 --> 00:54:39,660

there is no evidence for those ideas yet

1368

00:54:45,109 --> 00:54:42,059

they are part of the mainstream

1369

00:54:47,870 --> 00:54:45,119

and on the other hand we have some

1370

00:54:50,390 --> 00:54:47,880

evidence that we exist as an intelligent

1371

00:54:53,089 --> 00:54:50,400

species we have evidence that we send

1372

00:54:55,790 --> 00:54:53,099

out equipment that will exit the solar

1373

00:54:57,829 --> 00:54:55,800

system we have evidence that a planet

1374

00:55:00,410 --> 00:54:57,839

like the Earth around the star like the

1375

00:55:03,109 --> 00:55:00,420

sun is very common you know it's

1376

00:55:05,089 --> 00:55:03,119

that are billions if not tens of

1377

00:55:06,890 --> 00:55:05,099

billions of such planets in the Milky

1378

00:55:09,230 --> 00:55:06,900

Way galaxy alone

1379

00:55:10,849 --> 00:55:09,240

and many of these stars from billions of

1380

00:55:15,950 --> 00:55:10,859

years before the sun

1381

00:55:18,410 --> 00:55:15,960

so how can we even argue that this is a

1382

00:55:20,809 --> 00:55:18,420

very speculative idea to imagine that we

1383

00:55:23,390 --> 00:55:20,819

are not that Albert Einstein was not the

1384

00:55:25,549 --> 00:55:23,400

smartest scientist that ever existed

1385

00:55:27,530 --> 00:55:25,559

since the big bang I mean that makes no

1386

00:55:29,650 --> 00:55:27,540

sense it's very likely that there was a

1387

00:55:33,470 --> 00:55:29,660

scientist smarter than Albert Einstein

1388

00:55:35,690 --> 00:55:33,480

that lived a billion years ago on an

1389

00:55:38,089 --> 00:55:35,700

exoplanet and the civilization who

1390

00:55:41,750 --> 00:55:38,099

benefited from the discoveries of that

1391

00:55:43,970 --> 00:55:41,760

scientist may have sent probes that fill

1392

00:55:46,730 --> 00:55:43,980

up the Milky Way galaxy

1393

00:55:48,890 --> 00:55:46,740

and may populate the habitable zones of

1394

00:55:50,809 --> 00:55:48,900

many stars by now furthermore there's

1395

00:55:52,309 --> 00:55:50,819

the simulation hypothesis which

1396

00:55:54,470 --> 00:55:52,319

presupposes something like another

1397

00:55:56,030 --> 00:55:54,480

intelligent life why is it that certain

1398

00:55:58,069 --> 00:55:56,040

mainstream ideas like you mentioned

1399

00:56:00,170 --> 00:55:58,079

extra dimensions and many worlds and

1400

00:56:01,790 --> 00:56:00,180

even simulation and so on is the

1401  
00:56:03,770 --> 00:56:01,800  
simulation is more philosophical than it

1402  
00:56:05,390 --> 00:56:03,780  
is physics-based but why is it that

1403  
00:56:07,670 --> 00:56:05,400  
these ideas are taken more seriously

1404  
00:56:09,470 --> 00:56:07,680  
however the idea is that there's

1405  
00:56:11,690 --> 00:56:09,480  
extraterrestrial intelligent life that

1406  
00:56:13,910 --> 00:56:11,700  
has visited us whether or not it exists

1407  
00:56:16,250 --> 00:56:13,920  
I think main many or perhaps most

1408  
00:56:18,290 --> 00:56:16,260  
scientists would say yes but whether or

1409  
00:56:19,609 --> 00:56:18,300  
not they've visited us or continue to

1410  
00:56:21,650 --> 00:56:19,619  
visit us to this day is something

1411  
00:56:22,670 --> 00:56:21,660  
different why do you think that is why

1412  
00:56:24,410 --> 00:56:22,680  
do you think that they don't like that

1413  
00:56:27,170 --> 00:56:24,420

idea it's clearly because there's a

1414

00:56:31,750 --> 00:56:27,180

stigma so why why is that stigma there

1415

00:56:35,630 --> 00:56:31,760

yeah it's this the answer is very simple

1416

00:56:36,530 --> 00:56:35,640

humans enjoy ideas that flatter their

1417

00:56:40,670 --> 00:56:36,540

ego

1418

00:56:42,290 --> 00:56:40,680

okay so if the idea says we are at the

1419

00:56:44,990 --> 00:56:42,300

center of the universe

1420

00:56:47,329 --> 00:56:45,000

that's great we can adapt it for a

1421

00:56:48,530 --> 00:56:47,339

thousand years we can put Galileo in

1422

00:56:51,589 --> 00:56:48,540

house arrest

1423

00:56:54,170 --> 00:56:51,599

and refuse to look at the evidence why

1424

00:56:55,430 --> 00:56:54,180

because it flatters our ego to think

1425

00:56:56,470 --> 00:56:55,440

that we are at the center of the

1426

00:56:59,470 --> 00:56:56,480

universe

1427

00:57:03,530 --> 00:56:59,480

that God

1428

00:57:04,790 --> 00:57:03,540

considers US Special unique and

1429

00:57:07,010 --> 00:57:04,800

privileged

1430

00:57:09,349 --> 00:57:07,020

okay so then

1431

00:57:12,109 --> 00:57:09,359

you find evidence after a while even

1432

00:57:13,490 --> 00:57:12,119

though you lock Galileo eventually it

1433

00:57:15,349 --> 00:57:13,500

turns out that we are not at the center

1434

00:57:18,829 --> 00:57:15,359

of the universe eventually it turns out

1435

00:57:19,790 --> 00:57:18,839

that we came to the cosmic stage just at

1436

00:57:23,630 --> 00:57:19,800

the end

1437

00:57:25,490 --> 00:57:23,640

so if you come to a play you know 13.8

1438

00:57:27,829 --> 00:57:25,500

billion years after the cosmic Place

1439

00:57:29,930 --> 00:57:27,839

started just at the end and you are not

1440

00:57:34,430 --> 00:57:29,940

at the center of the stage then guess

1441

00:57:37,250 --> 00:57:34,440

what you are not a primary actor okay

1442

00:57:40,130 --> 00:57:37,260

and you better search for other actors

1443

00:57:43,250 --> 00:57:40,140

to tell you what the play is about okay

1444

00:57:46,130 --> 00:57:43,260

but that goes against the human ego

1445

00:57:49,250 --> 00:57:46,140

that's not flattering so what do you do

1446

00:57:52,549 --> 00:57:49,260

you say okay I'm not at the center of

1447

00:57:54,470 --> 00:57:52,559

the play but there are no other actors

1448

00:57:55,490 --> 00:57:54,480

therefore I am important despite

1449

00:57:58,549 --> 00:57:55,500

everything

1450

00:58:01,130 --> 00:57:58,559

and I am the smartest now I can

1451  
00:58:03,170 --> 00:58:01,140  
understand that approach because when my

1452  
00:58:05,329 --> 00:58:03,180  
daughters were young they were at home

1453  
00:58:08,510 --> 00:58:05,339  
and they thought that they are the

1454  
00:58:11,270 --> 00:58:08,520  
smartest in the world until we took them

1455  
00:58:13,430 --> 00:58:11,280  
to the kindergarten and on the first day

1456  
00:58:16,069 --> 00:58:13,440  
in the kindergarten

1457  
00:58:19,069 --> 00:58:16,079  
they had a psychological shock to

1458  
00:58:22,130 --> 00:58:19,079  
realize that there is a smarter kid in

1459  
00:58:24,049 --> 00:58:22,140  
their neighborhood now I say how can you

1460  
00:58:27,049 --> 00:58:24,059  
avoid going to the kindergarten very

1461  
00:58:29,569 --> 00:58:27,059  
easily you just ridicule on social media

1462  
00:58:32,510 --> 00:58:29,579  
any possible intriguing evidence that

1463  
00:58:34,670 --> 00:58:32,520

that's not the case the way the way the

1464

00:58:37,309 --> 00:58:34,680

philosophers behaved at the time of

1465

00:58:39,230 --> 00:58:37,319

Galileo you hope that nobody else will

1466

00:58:41,329 --> 00:58:39,240

pay attention to Galileo why because you

1467

00:58:43,190 --> 00:58:41,339

put him in a house arrest so that nobody

1468

00:58:44,690 --> 00:58:43,200

can listen you don't look through the

1469

00:58:46,490 --> 00:58:44,700

telescope and you suppress the

1470

00:58:48,349 --> 00:58:46,500

information as much as you can and you

1471

00:58:51,049 --> 00:58:48,359

say there is nothing there

1472

00:58:53,569 --> 00:58:51,059

forget about it exclamation mark period

1473

00:58:55,010 --> 00:58:53,579

forget about it you say that you put him

1474

00:58:58,670 --> 00:58:55,020

in house arrest or nobody would listen

1475

00:59:00,530 --> 00:58:58,680

you think that would cure the threat to

1476

00:59:02,569 --> 00:59:00,540

your ego but it doesn't because

1477

00:59:05,990 --> 00:59:02,579

eventually someone else finds the

1478

00:59:08,150 --> 00:59:06,000

evidence and reality is whatever it is

1479

00:59:10,010 --> 00:59:08,160

if you were to ask those philosophers to

1480

00:59:12,170 --> 00:59:10,020

design a space mission that would reach

1481

00:59:13,970 --> 00:59:12,180

Mars they would never get to their

1482

00:59:16,190 --> 00:59:13,980

destination because they thought that

1483

00:59:18,950 --> 00:59:16,200

Mars moves around the Earth but reality

1484

00:59:21,170 --> 00:59:18,960

is not like that you know you can launch

1485

00:59:22,549 --> 00:59:21,180

a spacecraft and it will never reach a

1486

00:59:26,450 --> 00:59:22,559

destination if you have the wrong ideas

1487

00:59:28,970 --> 00:59:26,460

so by today's standards what Galileo

1488

00:59:31,130 --> 00:59:28,980

said was trivial because you can look at

1489

00:59:33,410 --> 00:59:31,140

the Earth from a distance you can go to

1490

00:59:36,170 --> 00:59:33,420

Mars and you realize Galileo was right

1491

00:59:39,410 --> 00:59:36,180

okay there is no way this philosophers

1492

00:59:41,329 --> 00:59:39,420

were right you know that okay but for a

1493

00:59:44,690 --> 00:59:41,339

while they were able to dominate public

1494

00:59:48,289 --> 00:59:44,700

opinion to be popular and to maintain

1495

00:59:51,530 --> 00:59:48,299

their grip on the false notion of

1496

00:59:54,829 --> 00:59:51,540

reality so that's that's a tendency

1497

00:59:58,370 --> 00:59:54,839

that's a the ability of humans to

1498

01:00:01,190 --> 00:59:58,380

basically go on Twitter and make a lot

1499

01:00:03,890 --> 01:00:01,200

of noise about something that they don't

1500

01:00:05,930 --> 01:00:03,900

like now it may work in politics you

1501  
01:00:08,990 --> 01:00:05,940  
know in politics things are you know you

1502  
01:00:10,609 --> 01:00:09,000  
don't have hard facts sometimes so you

1503  
01:00:13,130 --> 01:00:10,619  
can argue whatever you want you can get

1504  
01:00:16,370 --> 01:00:13,140  
a lot of likes and you feel good about

1505  
01:00:18,589 --> 01:00:16,380  
yourself but in science what Galileo

1506  
01:00:20,270 --> 01:00:18,599  
taught us is if you want to adapt to

1507  
01:00:22,970 --> 01:00:20,280  
reality you better pay attention to

1508  
01:00:24,650 --> 01:00:22,980  
evidence so I say when there is

1509  
01:00:28,250 --> 01:00:24,660  
something intriguing that doesn't line

1510  
01:00:29,690 --> 01:00:28,260  
up with what you expected your duty as a

1511  
01:00:32,329 --> 01:00:29,700  
scientist is to collect more evidence

1512  
01:00:34,910 --> 01:00:32,339  
your duty is to say well maybe the

1513  
01:00:37,370 --> 01:00:34,920

emperor has no clothes maybe what we

1514

01:00:40,490 --> 01:00:37,380

think is incorrect and the only way to

1515

01:00:41,870 --> 01:00:40,500

find out is to admit that possibility to

1516

01:00:44,329 --> 01:00:41,880

admit the possibility that the Dark

1517

01:00:46,970 --> 01:00:44,339

Matter may not be weakly interacting

1518

01:00:48,470 --> 01:00:46,980

massive particle because if you do fund

1519

01:00:50,990 --> 01:00:48,480

the Large Hadron Collider and it doesn't

1520

01:00:52,910 --> 01:00:51,000

find it you know that your previous

1521

01:00:55,250 --> 01:00:52,920

notion was incorrect that's the way

1522

01:00:57,650 --> 01:00:55,260

science makes progress it checks

1523

01:01:00,049 --> 01:00:57,660

possibilities by looking for evidence

1524

01:01:02,270 --> 01:01:00,059

and if you on the other hand say you

1525

01:01:04,370 --> 01:01:02,280

know the answer in advance you may be

1526

01:01:05,870 --> 01:01:04,380

just like those philosophers just to

1527

01:01:08,930 --> 01:01:05,880

give you an example this experience

1528

01:01:11,750 --> 01:01:08,940

addition to Papua New Guinea gained a

1529

01:01:14,230 --> 01:01:11,760

lot of traction recently because the NBC

1530

01:01:18,049 --> 01:01:14,240

had a beautiful video about it

1531

01:01:19,849 --> 01:01:18,059

and the NPR reported about it

1532

01:01:22,970 --> 01:01:19,859

and then

1533

01:01:25,010 --> 01:01:22,980

as soon as the NPR story broke out just

1534

01:01:29,089 --> 01:01:25,020

yesterday it broke out for the second

1535

01:01:33,289 --> 01:01:29,099

time some people had negative things

1536

01:01:35,990 --> 01:01:33,299

they injected poison into the discussion

1537

01:01:38,690 --> 01:01:36,000

by saying some people yeah some people

1538

01:01:42,109 --> 01:01:38,700

and many of them are not practicing

1539

01:01:45,170 --> 01:01:42,119

astronomers and so I I don't want even

1540

01:01:47,089 --> 01:01:45,180

to get into the issue of what their

1541

01:01:50,870 --> 01:01:47,099

qualifications are

1542

01:01:53,809 --> 01:01:50,880

uh but the point of the matter is

1543

01:01:56,630 --> 01:01:53,819

you know this Expedition is funded from

1544

01:01:59,210 --> 01:01:56,640

donations it's done by a team of

1545

01:02:01,309 --> 01:01:59,220

scientists and all we are doing is going

1546

01:02:03,470 --> 01:02:01,319

to a place where a meteor disintegrated

1547

01:02:05,829 --> 01:02:03,480

and trying to check what the fragments

1548

01:02:09,530 --> 01:02:05,839

are made of like why would that bother

1549

01:02:12,470 --> 01:02:09,540

anyone why would anyone resist that

1550

01:02:14,390 --> 01:02:12,480

other than the Instinct that the

1551

01:02:16,609 --> 01:02:14,400

philosophers had at the time of Galileo

1552

01:02:18,890 --> 01:02:16,619

what I'm trying to say is four centuries

1553

01:02:20,329 --> 01:02:18,900

later we still see the same phenomenon

1554

01:02:23,049 --> 01:02:20,339

where people

1555

01:02:26,690 --> 01:02:23,059

with very strong conviction

1556

01:02:29,690 --> 01:02:26,700

oppose the Gathering of evidence and

1557

01:02:32,450 --> 01:02:29,700

data and why am are we going to Papua

1558

01:02:34,609 --> 01:02:32,460

New Guinea why because this object was

1559

01:02:36,470 --> 01:02:34,619

tougher than iron there is evidence for

1560

01:02:39,049 --> 01:02:36,480

that because the government measured the

1561

01:02:40,609 --> 01:02:39,059

properties of the meteor and it looks

1562

01:02:42,710 --> 01:02:40,619

like it came from outside the solar

1563

01:02:45,410 --> 01:02:42,720

system so it was an outlier that's all

1564

01:02:48,829 --> 01:02:45,420

so it's all guided you know I didn't

1565

01:02:51,349 --> 01:02:48,839

dream this object at night it was not a

1566

01:02:53,569 --> 01:02:51,359

subject of a science fiction story it

1567

01:02:56,089 --> 01:02:53,579

was evidence the government provided

1568

01:02:57,650 --> 01:02:56,099

that allows you using the laws of

1569

01:02:59,930 --> 01:02:57,660

physics to figure out that this is an

1570

01:03:02,390 --> 01:02:59,940

outlier okay that came from outside the

1571

01:03:04,849 --> 01:03:02,400

source that's all it motivates us to

1572

01:03:07,609 --> 01:03:04,859

examine what its composition is so why

1573

01:03:09,349 --> 01:03:07,619

wouldn't everyone cheer up and say great

1574

01:03:11,450 --> 01:03:09,359

let's figure out what this object is

1575

01:03:14,510 --> 01:03:11,460

let's find more evidence why would it

1576  
01:03:16,730 --> 01:03:14,520  
bother people that this is happening and

1577  
01:03:19,250 --> 01:03:16,740  
the only way I can see it is first

1578  
01:03:21,950 --> 01:03:19,260  
jealousy that this project gets

1579  
01:03:24,410 --> 01:03:21,960  
attention Okay so whenever there is a

1580  
01:03:27,349 --> 01:03:24,420  
flower blooming above the grass level

1581  
01:03:28,970 --> 01:03:27,359  
people try to step on the flower because

1582  
01:03:31,309 --> 01:03:28,980  
it bothers them that there is something

1583  
01:03:34,910 --> 01:03:31,319  
different Rising above the grass level

1584  
01:03:37,010 --> 01:03:34,920  
they would rather see only grass okay so

1585  
01:03:38,930 --> 01:03:37,020  
that's one tendency that out of jealousy

1586  
01:03:40,730 --> 01:03:38,940  
they don't like the fact that there is a

1587  
01:03:43,130 --> 01:03:40,740  
flower blooming above the grass level

1588  
01:03:45,650 --> 01:03:43,140

okay so whenever there is a flower they

1589

01:03:47,930 --> 01:03:45,660

would step on it so that's a reason for

1590

01:03:51,710 --> 01:03:47,940

toxicity you know like in social media

1591

01:03:54,589 --> 01:03:51,720

but as second thing is Prejudice and we

1592

01:03:57,109 --> 01:03:54,599

don't you know people find it uh

1593

01:03:59,089 --> 01:03:57,119

offending offensive to consider the

1594

01:04:01,190 --> 01:03:59,099

possibility that we are not the smartest

1595

01:04:03,589 --> 01:04:01,200

kid on the cosmic block it really

1596

01:04:09,109 --> 01:04:03,599

bothers me because you know just imagine

1597

01:04:12,950 --> 01:04:09,119

that imagine that we see the 100th

1598

01:04:14,870 --> 01:04:12,960

version of the iPhone coming from space

1599

01:04:17,990 --> 01:04:14,880

and it does magic

1600

01:04:19,970 --> 01:04:18,000

sort of like a cave dweller finding a

1601  
01:04:22,130 --> 01:04:19,980  
cell phone or going to New York City and

1602  
01:04:24,589 --> 01:04:22,140  
seeing all the gadgets there the cave

1603  
01:04:27,109 --> 01:04:24,599  
dweller would never be able to reverse

1604  
01:04:29,870 --> 01:04:27,119  
engineer these things it would look like

1605  
01:04:32,089 --> 01:04:29,880  
magic but it would be a blow to the ego

1606  
01:04:35,750 --> 01:04:32,099  
of the cave dweller who is used to

1607  
01:04:38,390 --> 01:04:35,760  
hunting animals or playing with rocks so

1608  
01:04:40,130 --> 01:04:38,400  
obviously if the cave Guerrera finds a

1609  
01:04:41,990 --> 01:04:40,140  
cell phone the first impression would be

1610  
01:04:44,349 --> 01:04:42,000  
oh it's a rock of a type that I've never

1611  
01:04:46,490 --> 01:04:44,359  
seen before

1612  
01:04:48,170 --> 01:04:46,500  
is a rock of a type that we've never

1613  
01:04:50,270 --> 01:04:48,180

seen so that's the first impression

1614

01:04:51,950 --> 01:04:50,280

because you're used to a vocabulary that

1615

01:04:54,049 --> 01:04:51,960

you know you play with rocks all your

1616

01:04:55,730 --> 01:04:54,059

life this is a rock of a type that I've

1617

01:04:57,650 --> 01:04:55,740

never seen before but then you start

1618

01:05:00,049 --> 01:04:57,660

realizing that this gadget does things

1619

01:05:01,849 --> 01:05:00,059

that a rock doesn't like if you press a

1620

01:05:03,829 --> 01:05:01,859

button it records your voice or records

1621

01:05:05,510 --> 01:05:03,839

your image so then it will change your

1622

01:05:08,510 --> 01:05:05,520

perception and eventually you would

1623

01:05:10,549 --> 01:05:08,520

realize there is Magic here that

1624

01:05:12,890 --> 01:05:10,559

something that goes beyond what I was

1625

01:05:15,650 --> 01:05:12,900

able to accomplish in my life of hunting

1626

01:05:17,870 --> 01:05:15,660

and Gathering okay so the cape do I

1627

01:05:19,970 --> 01:05:17,880

don't realize that and for us the way to

1628

01:05:22,730 --> 01:05:19,980

realize it is that we will figure out

1629

01:05:25,130 --> 01:05:22,740

that something is not natural

1630

01:05:26,950 --> 01:05:25,140

doesn't look like the compositions of a

1631

01:05:29,870 --> 01:05:26,960

natural object

1632

01:05:33,170 --> 01:05:29,880

or that it behaves in ways that go

1633

01:05:35,329 --> 01:05:33,180

beyond our Technologies okay so I say we

1634

01:05:39,170 --> 01:05:35,339

can follow the same learning

1635

01:05:42,650 --> 01:05:39,180

exercise we can by getting more evidence

1636

01:05:44,270 --> 01:05:42,660

we can get out of our comfort zone but

1637

01:05:45,950 --> 01:05:44,280

most people prefer to stay in their

1638

01:05:48,109 --> 01:05:45,960

comfort zone just like the philosophers

1639

01:05:50,450 --> 01:05:48,119

prefer to stay in their comfort zone of

1640

01:05:52,849 --> 01:05:50,460

us being at the center of the world

1641

01:05:54,530 --> 01:05:52,859

I see those as the same the first one

1642

01:05:56,510 --> 01:05:54,540

which is the flower that stands above

1643

01:05:58,010 --> 01:05:56,520

the grass and wanting to stomp it out

1644

01:06:01,250 --> 01:05:58,020

out of jealousy and then the second one

1645

01:06:03,770 --> 01:06:01,260

out of wanting to be the most brightest

1646

01:06:06,049 --> 01:06:03,780

kid on the Block because both point out

1647

01:06:08,150 --> 01:06:06,059

one's own insufficiencies as far as one

1648

01:06:10,670 --> 01:06:08,160

thinks that it's all it's almost a view

1649

01:06:12,049 --> 01:06:10,680

of oneself if I was to correct or if one

1650

01:06:14,890 --> 01:06:12,059

was to correct although I'm speaking to

1651

01:06:17,150 --> 01:06:14,900

myself my own

1652

01:06:19,609 --> 01:06:17,160

insecurities and my own lowly view of

1653

01:06:21,770 --> 01:06:19,619

myself then I wouldn't be so

1654

01:06:24,470 --> 01:06:21,780

quick to criticize others and also maybe

1655

01:06:26,029 --> 01:06:24,480

see that something else being

1656

01:06:28,670 --> 01:06:26,039

more

1657

01:06:30,410 --> 01:06:28,680

valuable means that I can use that as an

1658

01:06:32,690 --> 01:06:30,420

aim so I can see it as a positive rather

1659

01:06:34,730 --> 01:06:32,700

than a a detriment that it doesn't shine

1660

01:06:36,109 --> 01:06:34,740

such a Negative light on me or sign no

1661

01:06:39,049 --> 01:06:36,119

light because all the spotlight is

1662

01:06:40,970 --> 01:06:39,059

elsewhere yeah there is a there is a

1663

01:06:43,490 --> 01:06:40,980

simple remedy to that and let me just

1664

01:06:45,529 --> 01:06:43,500

mention what is the solution the

1665

01:06:47,809 --> 01:06:45,539

solution is to look at kids

1666

01:06:49,910 --> 01:06:47,819

because kids don't know much about the

1667

01:06:52,190 --> 01:06:49,920

world okay so they learn from experience

1668

01:06:53,210 --> 01:06:52,200

so if they see an object they go and

1669

01:06:56,270 --> 01:06:53,220

check it

1670

01:06:58,370 --> 01:06:56,280

and an adult would sit and say oh I know

1671

01:07:01,010 --> 01:06:58,380

what this object is forget about but a

1672

01:07:04,849 --> 01:07:01,020

kid would go there and a kid often take

1673

01:07:06,970 --> 01:07:04,859

takes risks in this learning process you

1674

01:07:09,770 --> 01:07:06,980

know because they are not doing any

1675

01:07:12,230 --> 01:07:09,780

calculations about what the risk might

1676  
01:07:14,510 --> 01:07:12,240  
involve and what kind of danger might be

1677  
01:07:16,309 --> 01:07:14,520  
there and so forth so they they are much

1678  
01:07:18,049 --> 01:07:16,319  
more Innovative in the way they explore

1679  
01:07:20,029 --> 01:07:18,059  
the world they go to the object and

1680  
01:07:23,450 --> 01:07:20,039  
touch it and they move it around and

1681  
01:07:25,250 --> 01:07:23,460  
they play with it and you know the

1682  
01:07:26,809 --> 01:07:25,260  
advantage of this approach is that you

1683  
01:07:29,569 --> 01:07:26,819  
may discover something that you didn't

1684  
01:07:31,730 --> 01:07:29,579  
expect whereas if you think that you are

1685  
01:07:33,349 --> 01:07:31,740  
the expert that you know everything that

1686  
01:07:37,309 --> 01:07:33,359  
you will find based on your past

1687  
01:07:40,190 --> 01:07:37,319  
knowledge and if you pretend to have uh

1688  
01:07:42,529 --> 01:07:40,200

the image of an adult you know uh where

1689

01:07:45,109 --> 01:07:42,539

you you know everything and you you

1690

01:07:48,529 --> 01:07:45,119

never show weaknesses as being

1691

01:07:51,650 --> 01:07:48,539

unfamiliar with something then you lose

1692

01:07:54,349 --> 01:07:51,660

the the edge of finding new things okay

1693

01:07:56,930 --> 01:07:54,359

discovering new things so the remedy to

1694

01:07:59,450 --> 01:07:56,940

the problems we discussed before is to

1695

01:08:01,609 --> 01:07:59,460

behave more like kids you know when I

1696

01:08:04,370 --> 01:08:01,619

see adults very often I I try to figure

1697

01:08:07,190 --> 01:08:04,380

out how what is the kid behind this

1698

01:08:09,109 --> 01:08:07,200

adult because we all pretend to be much

1699

01:08:11,569 --> 01:08:09,119

more than we actually are and

1700

01:08:13,250 --> 01:08:11,579

fundamentally you know if you look at

1701

01:08:15,529 --> 01:08:13,260

what we know and what we don't know

1702

01:08:18,010 --> 01:08:15,539

about the universe we are still like

1703

01:08:20,390 --> 01:08:18,020

classmates in the first day of class

1704

01:08:23,749 --> 01:08:20,400

there is so much we don't know you know

1705

01:08:26,689 --> 01:08:23,759

so many scientists got Awards just for

1706

01:08:29,090 --> 01:08:26,699

what you may regard as accounting you

1707

01:08:30,950 --> 01:08:29,100

know they just account for how much dark

1708

01:08:32,870 --> 01:08:30,960

matter there is in the universe how much

1709

01:08:34,849 --> 01:08:32,880

dark energy there is in the universe but

1710

01:08:37,309 --> 01:08:34,859

we still don't know what it is you're

1711

01:08:40,610 --> 01:08:37,319

just saying okay there is you know a

1712

01:08:43,010 --> 01:08:40,620

certain 25 percent uh of the cosmic Mass

1713

01:08:47,450 --> 01:08:43,020

budget is dark matter five percent is

1714

01:08:49,910 --> 01:08:47,460

ordinary matter 70 is dark dark energy

1715

01:08:51,709 --> 01:08:49,920

okay it sounds very impressive and a lot

1716

01:08:54,890 --> 01:08:51,719

of awards and prizes are given to the

1717

01:08:57,410 --> 01:08:54,900

people who pinpoint the exact uh

1718

01:08:59,809 --> 01:08:57,420

accounting but we still don't know the

1719

01:09:02,570 --> 01:08:59,819

substance okay so there is so much we

1720

01:09:05,630 --> 01:09:02,580

don't know and we should be humble it's

1721

01:09:08,209 --> 01:09:05,640

a sense of humility you see uh the

1722

01:09:10,550 --> 01:09:08,219

exploration of the unknown is just like

1723

01:09:12,829 --> 01:09:10,560

spirituality you know you are exploring

1724

01:09:14,269 --> 01:09:12,839

something bigger than you so you should

1725

01:09:16,789 --> 01:09:14,279

not put yourself

1726

01:09:19,669 --> 01:09:16,799

up front that's what our ego wants to do

1727

01:09:23,570 --> 01:09:19,679

to put yourself as the center point but

1728

01:09:25,970 --> 01:09:23,580

if you know that you're in a learning

1729

01:09:27,709 --> 01:09:25,980

experience like a kid if you just say I

1730

01:09:29,870 --> 01:09:27,719

don't know much I just want to figure it

1731

01:09:32,390 --> 01:09:29,880

out if that is the attitude rather than

1732

01:09:36,050 --> 01:09:32,400

say I know a lot and I want to portray

1733

01:09:38,930 --> 01:09:36,060

an image so that I will get more uh

1734

01:09:41,510 --> 01:09:38,940

honors and awards and more recognition

1735

01:09:43,490 --> 01:09:41,520

and so forth the way adults do their

1736

01:09:44,809 --> 01:09:43,500

calculations they portray an image that

1737

01:09:47,150 --> 01:09:44,819

they know much more than they actually

1738

01:09:49,010 --> 01:09:47,160

know if you do that then you are missing

1739

01:09:52,070 --> 01:09:49,020

the opportunity of discovering the truth

1740

01:09:54,229 --> 01:09:52,080

and a kid on the other hand admits you

1741

01:09:56,750 --> 01:09:54,239

know the kid doesn't know much and

1742

01:09:58,970 --> 01:09:56,760

therefore you know the kid takes risks

1743

01:10:01,790 --> 01:09:58,980

that the kid admits when things are not

1744

01:10:06,010 --> 01:10:01,800

clear so if we adapt that approach to

1745

01:10:08,630 --> 01:10:06,020

doing science I think there is the the

1746

01:10:10,669 --> 01:10:08,640

rate by which we make discoveries will

1747

01:10:13,430 --> 01:10:10,679

be accelerated and there is a simple

1748

01:10:14,930 --> 01:10:13,440

reason for that that the intellectual

1749

01:10:17,510 --> 01:10:14,940

climate will not be be about

1750

01:10:19,669 --> 01:10:17,520

demonstrating how smart you are but will

1751

01:10:22,729 --> 01:10:19,679

be about demonstrating what

1752

01:10:25,370 --> 01:10:22,739

what we learn you know and and and it's

1753

01:10:28,010 --> 01:10:25,380

a different task because you can

1754

01:10:29,510 --> 01:10:28,020

demonstrate that you are smart by asking

1755

01:10:32,450 --> 01:10:29,520

a question of

1756

01:10:34,370 --> 01:10:32,460

how many angels can dance on the tip of

1757

01:10:36,229 --> 01:10:34,380

a pin okay that sounds like a

1758

01:10:38,810 --> 01:10:36,239

fascinating question we don't know if

1759

01:10:40,430 --> 01:10:38,820

angels exist and whether they dance on

1760

01:10:41,870 --> 01:10:40,440

the tip of a pin but you can ask this

1761

01:10:43,610 --> 01:10:41,880

question Suppose there are angels and

1762

01:10:45,649 --> 01:10:43,620

they dance on the tip of a pin how many

1763

01:10:47,990 --> 01:10:45,659

can do it and then you can say okay let

1764

01:10:50,510 --> 01:10:48,000

me generalize this equation in 10

1765

01:10:52,430 --> 01:10:50,520

dimensions and do the calculation in 10

1766

01:10:55,370 --> 01:10:52,440

dimensions and develop your very

1767

01:10:58,189 --> 01:10:55,380

sophisticated math and people say wow

1768

01:11:00,050 --> 01:10:58,199

wow that's amazing how was that possible

1769

01:11:01,729 --> 01:11:00,060

to solve the equations of angels dancing

1770

01:11:03,890 --> 01:11:01,739

on the tip of opinion 10 Dimension

1771

01:11:05,870 --> 01:11:03,900

that's really exciting and then they

1772

01:11:09,470 --> 01:11:05,880

would say oh yeah but actually this is

1773

01:11:11,450 --> 01:11:09,480

not completely you know uh undeserving

1774

01:11:13,610 --> 01:11:11,460

the fact that we dedicated decades to

1775

01:11:16,610 --> 01:11:13,620

asking this question because we can use

1776

01:11:19,070 --> 01:11:16,620

the mathematics to solve that question

1777

01:11:22,669 --> 01:11:19,080

we can use it in the context of

1778

01:11:25,910 --> 01:11:22,679

understanding uh Quantum chromodynamics

1779

01:11:29,330 --> 01:11:25,920

you know like the the uh we can apply to

1780

01:11:31,010 --> 01:11:29,340

qcd uh to to the study of nuclei okay so

1781

01:11:32,689 --> 01:11:31,020

you develop some mathematics for one

1782

01:11:34,550 --> 01:11:32,699

question you say oh now I can use that

1783

01:11:36,950 --> 01:11:34,560

mathematics for another question well I

1784

01:11:39,110 --> 01:11:36,960

say that's that's legitimate that's

1785

01:11:40,550 --> 01:11:39,120

that's good but that's not the work of a

1786

01:11:42,950 --> 01:11:40,560

physicist now physicist is supposed to

1787

01:11:44,330 --> 01:11:42,960

ask questions that have to do with

1788

01:11:47,510 --> 01:11:44,340

reality and the way you learn about

1789

01:11:49,790 --> 01:11:47,520

reality is by experiments and not by

1790

01:11:52,070 --> 01:11:49,800

intellectual gymnastics and the reason

1791

01:11:54,649 --> 01:11:52,080

that you can be engaged just in

1792

01:11:57,290 --> 01:11:54,659

intellectual gymnastics without any

1793

01:11:58,910 --> 01:11:57,300

contact with reality is if the

1794

01:12:01,250 --> 01:11:58,920

motivation to show that you are smart

1795

01:12:04,130 --> 01:12:01,260

that if that is the motivation then you

1796

01:12:07,390 --> 01:12:04,140

don't care about experiments and and

1797

01:12:11,570 --> 01:12:07,400

that unfortunately is much much more

1798

01:12:13,430 --> 01:12:11,580

prevalent right now in the theoretical

1799

01:12:15,110 --> 01:12:13,440

physics Community showing that you are

1800

01:12:17,390 --> 01:12:15,120

smart and doing mathematical gymnastics

1801  
01:12:19,250 --> 01:12:17,400  
and I say you know that's a distraction

1802  
01:12:22,189 --> 01:12:19,260  
from the main

1803  
01:12:24,050 --> 01:12:22,199  
uh objective of physics which is to

1804  
01:12:26,030 --> 01:12:24,060  
describe reality and why is that

1805  
01:12:28,130 --> 01:12:26,040  
important to understand reality because

1806  
01:12:31,790 --> 01:12:28,140  
we live in that reality and we have to

1807  
01:12:35,030 --> 01:12:31,800  
adapt to it okay so in order to adapt to

1808  
01:12:37,370 --> 01:12:35,040  
reality we need to understand it we need

1809  
01:12:39,110 --> 01:12:37,380  
to know what environment we live in you

1810  
01:12:41,810 --> 01:12:39,120  
know we need to know if there is climate

1811  
01:12:44,090 --> 01:12:41,820  
change so that we can develop policy for

1812  
01:12:45,590 --> 01:12:44,100  
that we need to know if the Earth moves

1813  
01:12:47,990 --> 01:12:45,600

around the Sun or the sun moves around

1814

01:12:49,910 --> 01:12:48,000

the Earth in order to develop spaceship

1815

01:12:52,970 --> 01:12:49,920

that will go into space in the right

1816

01:12:55,189 --> 01:12:52,980

direction and remove correctly so all of

1817

01:12:57,649 --> 01:12:55,199

these things if we want to cure diseases

1818

01:12:59,450 --> 01:12:57,659

if we want to cure the pandemic you know

1819

01:13:02,390 --> 01:12:59,460

we need to understand how viruses

1820

01:13:05,209 --> 01:13:02,400

operate and develop an mRNA vaccine for

1821

01:13:07,370 --> 01:13:05,219

them so all of this has to do with us

1822

01:13:10,010 --> 01:13:07,380

figuring out what reality is and

1823

01:13:12,590 --> 01:13:10,020

adapting to it and it's irresponsible of

1824

01:13:16,430 --> 01:13:12,600

us to pursue a different goal which is

1825

01:13:18,410 --> 01:13:16,440

to elevate our ego to boost our ego to

1826

01:13:21,350 --> 01:13:18,420

brag in our intellectual gymnastics

1827

01:13:22,669 --> 01:13:21,360

because that may have nothing to do with

1828

01:13:25,010 --> 01:13:22,679

the reality that we're trying to

1829

01:13:27,470 --> 01:13:25,020

understand as physicists okay I have

1830

01:13:29,870 --> 01:13:27,480

many technical questions so but let me

1831

01:13:31,430 --> 01:13:29,880

just briefly get to one comment so would

1832

01:13:33,290 --> 01:13:31,440

you be okay then if theoretical

1833

01:13:34,850 --> 01:13:33,300

physicists change their name from

1834

01:13:36,530 --> 01:13:34,860

theoretical physicists to Pure

1835

01:13:38,930 --> 01:13:36,540

mathematicians oh yeah it could still be

1836

01:13:41,930 --> 01:13:38,940

a problem it's purely a categorization

1837

01:13:44,570 --> 01:13:41,940

problem no problem whatsoever you know

1838

01:13:47,570 --> 01:13:44,580

if a plumber comes to my home okay and

1839

01:13:50,090 --> 01:13:47,580

says I'm a plumber then I would ask the

1840

01:13:52,430 --> 01:13:50,100

plumber to fix the toilet

1841

01:13:54,709 --> 01:13:52,440

now suppose the plumber will tell me no

1842

01:13:57,410 --> 01:13:54,719

that's too difficult of a task I cannot

1843

01:14:00,110 --> 01:13:57,420

do it so I would say okay can you fix my

1844

01:14:01,850 --> 01:14:00,120

faucet you know it's not working and the

1845

01:14:03,229 --> 01:14:01,860

plumber would say oh that's also too

1846

01:14:07,010 --> 01:14:03,239

difficult then I would say you're not a

1847

01:14:09,770 --> 01:14:07,020

plumber so I I asked string theories I

1848

01:14:11,630 --> 01:14:09,780

say okay you are working on the

1849

01:14:14,149 --> 01:14:11,640

unification of quantum mechanics and

1850

01:14:15,770 --> 01:14:14,159

gravity I have two problems for you just

1851

01:14:18,950 --> 01:14:15,780

like the toilet and the and the faucet

1852

01:14:21,950 --> 01:14:18,960

one problem is uh what happened around

1853

01:14:23,510 --> 01:14:21,960

the big bag can you tell me and they say

1854

01:14:24,770 --> 01:14:23,520

no that's too difficult we can't really

1855

01:14:27,169 --> 01:14:24,780

stop that problem

1856

01:14:29,570 --> 01:14:27,179

so I said okay forget about the Big Bang

1857

01:14:31,490 --> 01:14:29,580

let's discuss the singularity at the

1858

01:14:33,110 --> 01:14:31,500

center of a black hole we know that we

1859

01:14:35,689 --> 01:14:33,120

need quantum mechanics and gravity for

1860

01:14:38,270 --> 01:14:35,699

that can you solve that problem and they

1861

01:14:41,510 --> 01:14:38,280

say no it's too difficult

1862

01:14:43,970 --> 01:14:41,520

so I say okay well so change your job

1863

01:14:45,229 --> 01:14:43,980

definition Because unless you solve

1864

01:14:47,209 --> 01:14:45,239

problems

1865

01:14:49,310 --> 01:14:47,219

you cannot call yourself a physicist

1866

01:14:51,770 --> 01:14:49,320

problems about objects in reality like

1867

01:14:53,570 --> 01:14:51,780

the big bang we know you know the

1868

01:14:56,390 --> 01:14:53,580

universe started from a hot dense phase

1869

01:14:58,790 --> 01:14:56,400

and if you use Einstein's equations you

1870

01:15:01,330 --> 01:14:58,800

get to a singularity so curing that

1871

01:15:04,130 --> 01:15:01,340

Singularity is a fundamental question

1872

01:15:07,010 --> 01:15:04,140

that currently we don't

1873

01:15:08,570 --> 01:15:07,020

have a solution too because you know we

1874

01:15:10,850 --> 01:15:08,580

don't have a quantum theory of gravity

1875

01:15:12,709 --> 01:15:10,860

but if string theory is you should first

1876

01:15:15,169 --> 01:15:12,719

offer the solution before claiming that

1877

01:15:16,990 --> 01:15:15,179

you're solving Quantum grab okay and the

1878

01:15:20,750 --> 01:15:17,000

same about singularities of black holes

1879

01:15:24,110 --> 01:15:20,760

so all I'm saying is the job definition

1880

01:15:26,330 --> 01:15:24,120

matters because people get paid to be

1881

01:15:27,350 --> 01:15:26,340

clamorous you see you can't just say

1882

01:15:30,590 --> 01:15:27,360

that you're

1883

01:15:32,750 --> 01:15:30,600

not yeah okay I understand also there's

1884

01:15:34,370 --> 01:15:32,760

this claim that hey in pure physics oh

1885

01:15:36,709 --> 01:15:34,380

sorry not pure physics in theoretical

1886

01:15:37,750 --> 01:15:36,719

physics and pure math that eventually

1887

01:15:40,130 --> 01:15:37,760

today's

1888

01:15:41,990 --> 01:15:40,140

abstractions are tomorrow's applied for

1889

01:15:43,729 --> 01:15:42,000

example in string theory there's plenty

1890

01:15:46,130 --> 01:15:43,739

of applications to condensed matter

1891

01:15:48,470 --> 01:15:46,140

physics however and that comes about

1892

01:15:50,510 --> 01:15:48,480

decades later or so however I find that

1893

01:15:53,270 --> 01:15:50,520

to be a dubious claim and the reason is

1894

01:15:55,070 --> 01:15:53,280

that if you look at what's applied now

1895

01:15:57,709 --> 01:15:55,080

it almost certainly has a theoretical

1896

01:16:00,169 --> 01:15:57,719

origin but if you look at the totality

1897

01:16:01,550 --> 01:16:00,179

of theoretical work it's not as if all

1898

01:16:03,830 --> 01:16:01,560

of it's applied like I haven't seen an

1899

01:16:05,149 --> 01:16:03,840

analysis done on string theory let's say

1900

01:16:07,130 --> 01:16:05,159

let's look at all the string theory

1901

01:16:09,110 --> 01:16:07,140

papers how much of it has been applied

1902

01:16:11,209 --> 01:16:09,120

to condensed matter physics or see even

1903

01:16:12,950 --> 01:16:11,219

pure mathematics so it's easy to look

1904

01:16:14,870 --> 01:16:12,960

back with hindsight and say oh yes

1905

01:16:16,550 --> 01:16:14,880

cryptophy yes we use combinatorics

1906

01:16:18,709 --> 01:16:16,560

though we thought would never have any

1907

01:16:20,689 --> 01:16:18,719

applications from the 1940s and 50s but

1908

01:16:22,610 --> 01:16:20,699

then it did yeah okay yeah but you have

1909

01:16:24,530 --> 01:16:22,620

a survivorship bias there so you can't

1910

01:16:25,850 --> 01:16:24,540

just fund research no matter what

1911

01:16:27,290 --> 01:16:25,860

thinking that hopefully it will have

1912

01:16:29,030 --> 01:16:27,300

some application because in the past

1913

01:16:30,470 --> 01:16:29,040

anything that was applied was

1914

01:16:32,149 --> 01:16:30,480

theoretical before because you have to

1915

01:16:33,350 --> 01:16:32,159

look at the other direction too and I

1916

01:16:35,810 --> 01:16:33,360

don't know if an analysis that's been

1917

01:16:37,970 --> 01:16:35,820

done no so I have no issue whatsoever

1918

01:16:40,130 --> 01:16:37,980

with pure math I think that's a very

1919

01:16:42,770 --> 01:16:40,140

valuable occupation but you have to

1920

01:16:44,930 --> 01:16:42,780

Define your work it's pure math that

1921

01:16:47,030 --> 01:16:44,940

that's perfectly fine and then

1922

01:16:49,490 --> 01:16:47,040

universities can decide how big the

1923

01:16:51,649 --> 01:16:49,500

Departments of pure math would be but

1924

01:16:55,430 --> 01:16:51,659

you can't have people that practice pure

1925

01:16:58,669 --> 01:16:55,440

math for a century you know which is the

1926

01:17:00,169 --> 01:16:58,679

lifetime of a person in the physics so

1927

01:17:02,510 --> 01:17:00,179

the question there is a characteristic

1928

01:17:04,370 --> 01:17:02,520

time scale if you do pure math let's say

1929

01:17:07,250 --> 01:17:04,380

for a decade or two before it actually

1930

01:17:09,290 --> 01:17:07,260

is compared to experiments that that was

1931

01:17:11,450 --> 01:17:09,300

the traditional practice of physics but

1932

01:17:14,270 --> 01:17:11,460

if you do pure math for the entirety of

1933

01:17:16,070 --> 01:17:14,280

your career and then we will never know

1934

01:17:19,550 --> 01:17:16,080

during your lifetime whether it's

1935

01:17:22,430 --> 01:17:19,560

relevant to reality or not I say you

1936

01:17:23,990 --> 01:17:22,440

know it's that's what pure math is all

1937

01:17:26,630 --> 01:17:24,000

about that you never know how because

1938

01:17:28,490 --> 01:17:26,640

even pure pure math in mathematics by

1939

01:17:31,189 --> 01:17:28,500

mathematicians is applied event actually

1940

01:17:34,790 --> 01:17:31,199

in some context of physics right but the

1941

01:17:38,570 --> 01:17:34,800

way to Define pure math is as ideas that

1942

01:17:41,410 --> 01:17:38,580

are not necessarily applied uh to the

1943

01:17:44,149 --> 01:17:41,420

real world and describe the real world

1944

01:17:46,070 --> 01:17:44,159

during the lifetime of the practitioners

1945

01:17:48,410 --> 01:17:46,080

not necessarily and there are

1946

01:17:50,390 --> 01:17:48,420

mathematicians that invented

1947

01:17:52,250 --> 01:17:50,400

mathematical Concepts that were applied

1948

01:17:55,070 --> 01:17:52,260

shortly after they invented them and

1949

01:17:57,410 --> 01:17:55,080

they were mathematicians okay so the

1950

01:17:59,930 --> 01:17:57,420

distinction is that physics is engaged

1951

01:18:02,030 --> 01:17:59,940

with reality through experiments and if

1952

01:18:04,610 --> 01:18:02,040

there is a subject on which no

1953

01:18:06,290 --> 01:18:04,620

experimental data comes our way for a

1954

01:18:08,390 --> 01:18:06,300

very long time there are many other

1955

01:18:10,729 --> 01:18:08,400

subjects that we can work on doesn't

1956

01:18:13,610 --> 01:18:10,739

mean that we should insist working on

1957

01:18:15,229 --> 01:18:13,620

something that we have no data on uh

1958

01:18:16,790 --> 01:18:15,239

perhaps we should wait for that data in

1959

01:18:18,890 --> 01:18:16,800

the context of quantum gravity is

1960

01:18:20,510 --> 01:18:18,900

waiting for example for gravitational

1961

01:18:22,729 --> 01:18:20,520

waves to be detected from the early

1962

01:18:24,470 --> 01:18:22,739

universe or learning something about

1963

01:18:26,810 --> 01:18:24,480

black hole singularities that we didn't

1964

01:18:29,149 --> 01:18:26,820

know about but until that data comes

1965

01:18:30,770 --> 01:18:29,159

along we have no guidance and my point

1966

01:18:33,169 --> 01:18:30,780

is if you look at a hundred years back

1967

01:18:35,990 --> 01:18:33,179

quantum mechanics was discovered by

1968

01:18:41,270 --> 01:18:36,000

experiments nobody expected it uh in

1969

01:18:43,270 --> 01:18:41,280

fact in around 1900 a very uh famous one

1970

01:18:47,030 --> 01:18:43,280

of the most distinguished

1971

01:18:49,189 --> 01:18:47,040

experimental physicists Michaelson uh

1972

01:18:51,950 --> 01:18:49,199

who actually did the Michaelson Morley

1973

01:18:54,410 --> 01:18:51,960

experiment that uh led to Einstein's

1974

01:18:56,750 --> 01:18:54,420

special theory relativity he uh gave

1975

01:19:00,470 --> 01:18:56,760

a speech at the inauguration of a

1976

01:19:03,290 --> 01:19:00,480

laboratory in Chicago and he said that

1977

01:19:05,990 --> 01:19:03,300

from now on you know most of physics is

1978

01:19:07,870 --> 01:19:06,000

solved that was 1900 also physics is

1979

01:19:09,430 --> 01:19:07,880

solved and the only thing that remains

1980

01:19:12,110 --> 01:19:09,440

is

1981

01:19:14,390 --> 01:19:12,120

measurements of the fundamental

1982

01:19:16,250 --> 01:19:14,400

constants in physics to the sixth

1983

01:19:19,729 --> 01:19:16,260

decimal point

1984

01:19:21,410 --> 01:19:19,739

and how wrong was he because five years

1985

01:19:23,990 --> 01:19:21,420

later Albert Einstein came with special

1986

01:19:25,729 --> 01:19:24,000

theory of relativity that that revised

1987

01:19:27,649 --> 01:19:25,739

our Notions of space and time then

1988

01:19:29,810 --> 01:19:27,659

general theory of relativity that

1989

01:19:31,669 --> 01:19:29,820

revised our notion of gravity and then

1990

01:19:34,430 --> 01:19:31,679

quantum mechanics a completely

1991

01:19:35,930 --> 01:19:34,440

unexpected Discovery okay that reality

1992

01:19:39,130 --> 01:19:35,940

is not what we expect from classical

1993

01:19:41,570 --> 01:19:39,140

physics just to show you that without

1994

01:19:43,430 --> 01:19:41,580

experimental guidance that led to the

1995

01:19:46,010 --> 01:19:43,440

diver the birth of quantum mechanics we

1996

01:19:48,910 --> 01:19:46,020

would never be there okay and Albert

1997

01:19:51,709 --> 01:19:48,920

Einstein argued that quantum mechanics

1998

01:19:53,510 --> 01:19:51,719

uh perhaps can be interpreted in the

1999

01:19:56,630 --> 01:19:53,520

same way as classical physics but he was

2000

01:19:59,450 --> 01:19:56,640

wrong Niels Bohr was right on this and

2001

01:20:01,729 --> 01:19:59,460

now all the gadgets that we use you know

2002

01:20:04,070 --> 01:20:01,739

like these computers that the two of us

2003

01:20:06,530 --> 01:20:04,080

are using to communicate or cell phones

2004

01:20:08,990 --> 01:20:06,540

it's all based on quantum mechanics so

2005

01:20:11,330 --> 01:20:09,000

here is applied physics a whole industry

2006

01:20:15,050 --> 01:20:11,340

of Applied Physics that came out from

2007

01:20:17,270 --> 01:20:15,060

the discovery of quantum mechanics

2008

01:20:21,350 --> 01:20:17,280

from experiments and I said what's the

2009

01:20:23,390 --> 01:20:21,360

lesson of that that we nature is very

2010

01:20:25,669 --> 01:20:23,400

subtle we don't know in advance before

2011

01:20:28,610 --> 01:20:25,679

experiments what nature is about

2012

01:20:30,410 --> 01:20:28,620

okay and if you don't have guidance by

2013

01:20:33,169 --> 01:20:30,420

experiments you may go in the wrong

2014

01:20:35,630 --> 01:20:33,179

direction you may go into a dark alley

2015

01:20:37,610 --> 01:20:35,640

and to claim that we can come up with a

2016

01:20:39,229 --> 01:20:37,620

theory of quantum gravity just based on

2017

01:20:43,729 --> 01:20:39,239

pure thought

2018

01:20:47,149 --> 01:20:43,739

is arrogant and in fact String Theory

2019

01:20:49,250 --> 01:20:47,159

did not come up with very concrete

2020

01:20:51,050 --> 01:20:49,260

solutions to the Big Bang to

2021

01:20:55,490 --> 01:20:51,060

singularities in black holes over five

2022

01:20:57,410 --> 01:20:55,500

decades okay so I say we took that path

2023

01:20:59,450 --> 01:20:57,420

it didn't lead to predictions that can

2024

01:21:01,490 --> 01:20:59,460

be tested experimentally

2025

01:21:04,610 --> 01:21:01,500

and I asked young people do you want to

2026

01:21:07,010 --> 01:21:04,620

be engaged in an Endeavor that is part

2027

01:21:09,169 --> 01:21:07,020

of course itself part of physics but

2028

01:21:12,709 --> 01:21:09,179

does not have any confrontation with

2029

01:21:16,189 --> 01:21:12,719

reality I mean you could spend your life

2030

01:21:19,729 --> 01:21:16,199

with a notion that is not necessarily

2031

01:21:21,530 --> 01:21:19,739

used by Nature okay and there are many

2032

01:21:25,010 --> 01:21:21,540

other fundamental questions that we can

2033

01:21:26,570 --> 01:21:25,020

address that have experimental tests so

2034

01:21:30,310 --> 01:21:26,580

why not engage in those you know they

2035

01:21:33,649 --> 01:21:30,320

are huge problems that the society faces

2036

01:21:36,590 --> 01:21:33,659

and at the same time as you see that you

2037

01:21:39,050 --> 01:21:36,600

know that attitude of saying let's toy

2038

01:21:41,570 --> 01:21:39,060

with mathematical ideas that you know

2039

01:21:43,850 --> 01:21:41,580

that we can do gymnastics intellectual

2040

01:21:45,470 --> 01:21:43,860

gymnastics on at the same time that you

2041

01:21:46,790 --> 01:21:45,480

have that as part of the mainstream

2042

01:21:49,490 --> 01:21:46,800

simply because there wasn't any

2043

01:21:51,290 --> 01:21:49,500

experimental feedback from uh

2044

01:21:53,330 --> 01:21:51,300

you know from the superconducting super

2045

01:21:56,450 --> 01:21:53,340

collider that was envisioned back in the

2046

01:21:57,890 --> 01:21:56,460

1980s but was not funded by Congress as

2047

01:21:59,930 --> 01:21:57,900

a result there was no feedback from

2048

01:22:02,209 --> 01:21:59,940

experiments so there was this entire

2049

01:22:04,370 --> 01:22:02,219

community of theories divorced from

2050

01:22:06,590 --> 01:22:04,380

experiments so at the same time that you

2051

01:22:09,110 --> 01:22:06,600

see that in the mainstream

2052

01:22:11,330 --> 01:22:09,120

you see also resistance

2053

01:22:14,209 --> 01:22:11,340

to study

2054

01:22:16,430 --> 01:22:14,219

unusual objects that enter the solar

2055

01:22:19,490 --> 01:22:16,440

system as if they were artificial like

2056

01:22:21,950 --> 01:22:19,500

this is the most mundane simple-minded

2057

01:22:23,689 --> 01:22:21,960

common sensical thing and it's a

2058

01:22:25,550 --> 01:22:23,699

fraction of the cost as well compared to

2059

01:22:28,970 --> 01:22:25,560

how much is spent on theoretical physics

2060

01:22:31,490 --> 01:22:28,980

each year let's get to the the first

2061

01:22:35,149 --> 01:22:31,500

goal which was the Papua New Guinea

2062

01:22:37,430 --> 01:22:35,159

Expedition now let me quickly summarize

2063

01:22:39,890 --> 01:22:37,440

to see if I have this correct

2064

01:22:42,890 --> 01:22:39,900

NASA was studying the skies and the

2065

01:22:45,410 --> 01:22:42,900

reason they do so is partly military so

2066

01:22:46,790 --> 01:22:45,420

they study the sky and they look for

2067

01:22:48,709 --> 01:22:46,800

well they're looking for threats but

2068

01:22:50,570 --> 01:22:48,719

they'll occasionally catch meteorites or

2069

01:22:51,590 --> 01:22:50,580

meteors so meteorite is when it hits the

2070

01:22:52,910 --> 01:22:51,600

ground the meteor is when it just

2071

01:22:55,370 --> 01:22:52,920

disintegrates without hitting the ground

2072

01:22:57,229 --> 01:22:55,380

okay and a meteoroid I just looked this

2073

01:22:58,310 --> 01:22:57,239

up for meteoroid is when it's it would

2074

01:22:59,570 --> 01:22:58,320

have been a meteor but it's not it's

2075

01:23:02,450 --> 01:22:59,580

around the same size doesn't even hit

2076

01:23:04,430 --> 01:23:02,460

Earth correct yeah uh it's basically an

2077

01:23:06,229 --> 01:23:04,440

object an object that collides with the

2078

01:23:11,030 --> 01:23:06,239

Earth and burns up in the atmosphere yes

2079

01:23:14,090 --> 01:23:11,040

okay so there were 274 or so of these

2080

01:23:15,890 --> 01:23:14,100

that were collected across several years

2081

01:23:17,330 --> 01:23:15,900

yeah you looked at some of the data and

2082

01:23:18,830 --> 01:23:17,340

you saw that the speed of one was

2083

01:23:20,390 --> 01:23:18,840

greatly different than the speed of the

2084

01:23:22,250 --> 01:23:20,400

rest and greatly different in that it

2085

01:23:24,649 --> 01:23:22,260

exceeded the speed of the rest and now

2086

01:23:26,570 --> 01:23:24,659

my speed is important is because just

2087

01:23:28,550 --> 01:23:26,580

like there's an escape velocity of the

2088

01:23:30,649 --> 01:23:28,560

Earth to get out of Earth's orbit

2089

01:23:32,149 --> 01:23:30,659

there's an escape velocity of a solar

2090

01:23:34,930 --> 01:23:32,159

system which I never considered before

2091

01:23:37,010 --> 01:23:34,940

and so if we're thinking of interstellar

2092

01:23:39,649 --> 01:23:37,020

objects then it would have to be around

2093

01:23:41,750 --> 01:23:39,659

that speed or greater okay so then what

2094

01:23:42,830 --> 01:23:41,760

we saw was or what you saw was that

2095

01:23:46,550 --> 01:23:42,840

there was

2096

01:23:49,669 --> 01:23:46,560

a high-speed meteorite

2097

01:23:51,770 --> 01:23:49,679

okay great high-speed meteorite and that

2098

01:23:54,350 --> 01:23:51,780

and the speed matters because it tells

2099

01:23:55,850 --> 01:23:54,360

you potentially its origin

2100

01:23:57,169 --> 01:23:55,860

so that's something that I want to I

2101

01:23:58,790 --> 01:23:57,179

kept hearing you bring up speed I'm like

2102

01:24:00,830 --> 01:23:58,800

why the heck does speed matter okay so

2103

01:24:03,649 --> 01:24:00,840

this is why speed matters yeah because I

2104

01:24:06,350 --> 01:24:03,659

just think about if you throw

2105

01:24:08,209 --> 01:24:06,360

um a rock up in the air it will fall

2106

01:24:11,209 --> 01:24:08,219

back because you don't throw it hard

2107

01:24:14,209 --> 01:24:11,219

enough but if NASA launches a spacecraft

2108

01:24:16,550 --> 01:24:14,219

and it moves fast enough it will escape

2109

01:24:18,950 --> 01:24:16,560

the pool of the earth so speed matters

2110

01:24:21,350 --> 01:24:18,960

you need to overcome the the

2111

01:24:23,750 --> 01:24:21,360

gravitational potential of the earth

2112

01:24:25,729 --> 01:24:23,760

it's sort of like imagine a trampoline

2113

01:24:27,790 --> 01:24:25,739

Okay and the Earth is at the center of

2114

01:24:31,990 --> 01:24:27,800

the trampoline and it's sort of like a

2115

01:24:35,330 --> 01:24:32,000

bowling ball you know it creates a well

2116

01:24:38,209 --> 01:24:35,340

and if you want to throw a marble out of

2117

01:24:39,890 --> 01:24:38,219

the trampoline you need to throw it at a

2118

01:24:42,530 --> 01:24:39,900

high enough speed because otherwise it

2119

01:24:45,110 --> 01:24:42,540

will fall back and so there is always an

2120

01:24:47,090 --> 01:24:45,120

escape speed above which an object will

2121

01:24:49,850 --> 01:24:47,100

escape from the gravitational potential

2122

01:24:53,570 --> 01:24:49,860

well of the Earth or of the solar system

2123

01:24:57,530 --> 01:24:53,580

in the case of the Sun and and this

2124

01:24:59,709 --> 01:24:57,540

object by who way wasn't moving just

2125

01:25:03,169 --> 01:24:59,719

fast enough to escape

2126  
01:25:05,570 --> 01:25:03,179  
but it was moving actually outside of

2127  
01:25:08,090 --> 01:25:05,580  
the potential well faster than 95

2128  
01:25:11,090 --> 01:25:08,100  
percent of all the stars it was moving

2129  
01:25:13,010 --> 01:25:11,100  
at 60 kilometers per second outside the

2130  
01:25:16,070 --> 01:25:13,020  
solar system if you extrapolate back in

2131  
01:25:17,810 --> 01:25:16,080  
time so it was really fast

2132  
01:25:19,790 --> 01:25:17,820  
okay and just to get some numbers out of

2133  
01:25:22,550 --> 01:25:19,800  
the way approximately 11 kilometers per

2134  
01:25:25,250 --> 01:25:22,560  
second is Earth's yes and what is the

2135  
01:25:27,890 --> 01:25:25,260  
escape velocity of the solar system

2136  
01:25:30,410 --> 01:25:27,900  
now the solar system is at the location

2137  
01:25:32,630 --> 01:25:30,420  
of the earth it's 42 kilometers per

2138  
01:25:35,630 --> 01:25:32,640

second it's always a square root of

2139

01:25:37,490 --> 01:25:35,640

two times the velocity of a circular

2140

01:25:38,209 --> 01:25:37,500

orbit around the object that you care

2141

01:25:40,669 --> 01:25:38,219

about

2142

01:25:43,370 --> 01:25:40,679

if you have okay gravity produced by a

2143

01:25:45,110 --> 01:25:43,380

single point mass at the center and

2144

01:25:46,970 --> 01:25:45,120

there is a certain speed by which an

2145

01:25:48,410 --> 01:25:46,980

object will move in a circular orbit in

2146

01:25:51,350 --> 01:25:48,420

the case of the earth it's about 30

2147

01:25:55,310 --> 01:25:51,360

kilometers per second and therefore the

2148

01:25:57,110 --> 01:25:55,320

Escape speed is the speed such as the

2149

01:25:58,610 --> 01:25:57,120

kinetic energy will equal the potential

2150

01:26:01,669 --> 01:25:58,620

energy and that's a square root of two

2151  
01:26:04,070 --> 01:26:01,679  
faster than the circular speed then

2152  
01:26:05,390 --> 01:26:04,080  
square root of 2 times 30 is about 42

2153  
01:26:07,669 --> 01:26:05,400  
kilometers per second so that's the

2154  
01:26:09,830 --> 01:26:07,679  
speed by which an object would move if

2155  
01:26:12,770 --> 01:26:09,840  
it were just to escape from the pool of

2156  
01:26:15,410 --> 01:26:12,780  
the Sun and came from the vicinity of

2157  
01:26:18,470 --> 01:26:15,420  
Earth okay but this object was moving

2158  
01:26:21,050 --> 01:26:18,480  
even faster than that if you I mean it

2159  
01:26:23,750 --> 01:26:21,060  
collided with Earth at 45 kilometers per

2160  
01:26:26,930 --> 01:26:23,760  
second but if you take out the motion of

2161  
01:26:29,090 --> 01:26:26,940  
the Earth because it was it came from

2162  
01:26:31,430 --> 01:26:29,100  
the side so to speak then it actually

2163  
01:26:34,790 --> 01:26:31,440

moved at 60 kilometers per second

2164

01:26:37,250 --> 01:26:34,800

outside the source it was really fast

2165

01:26:39,950 --> 01:26:37,260

okay and then last question before I get

2166

01:26:42,649 --> 01:26:39,960

to someone Skinwalker and ce5 and

2167

01:26:46,010 --> 01:26:42,659

unidentified submerged objects and so on

2168

01:26:48,649 --> 01:26:46,020

the last question is okay so not only

2169

01:26:51,110 --> 01:26:48,659

was this going extremely quickly but

2170

01:26:53,689 --> 01:26:51,120

then when you analyzed well what's its

2171

01:26:55,970 --> 01:26:53,699

toughness it was twice as tough as the

2172

01:26:58,430 --> 01:26:55,980

second highest rock as well okay so it

2173

01:27:01,550 --> 01:26:58,440

has unusual characteristics okay now my

2174

01:27:05,330 --> 01:27:01,560

question is how the heck do you

2175

01:27:09,169 --> 01:27:05,340

find such an object when we can't find

2176  
01:27:11,270 --> 01:27:09,179  
Malaysian Airlines hours after let alone

2177  
01:27:13,430 --> 01:27:11,280  
decades later and it's a larger object

2178  
01:27:15,350 --> 01:27:13,440  
and we had governments involved and we

2179  
01:27:17,209 --> 01:27:15,360  
knew what it looked like in the size and

2180  
01:27:18,649 --> 01:27:17,219  
so on so what does this look like what

2181  
01:27:22,430 --> 01:27:18,659  
does this Papua New Guinea expedition

2182  
01:27:25,370 --> 01:27:22,440  
look like okay so the Malaysian airplane

2183  
01:27:27,050 --> 01:27:25,380  
did not create a fireball it did not

2184  
01:27:28,970 --> 01:27:27,060  
explode so that satellites or

2185  
01:27:31,490 --> 01:27:28,980  
ground-based observatories would see it

2186  
01:27:33,770 --> 01:27:31,500  
in the night sky so all we know about it

2187  
01:27:36,110 --> 01:27:33,780  
is that it moved along a certain path

2188  
01:27:38,930 --> 01:27:36,120

okay and we don't know at which point

2189

01:27:43,010 --> 01:27:38,940

along the path it plunged into the water

2190

01:27:46,250 --> 01:27:43,020

okay so then we have a very long path to

2191

01:27:48,950 --> 01:27:46,260

study on the opposite floor and the area

2192

01:27:51,530 --> 01:27:48,960

that you have to explore is huge so even

2193

01:27:53,750 --> 01:27:51,540

though the object is bigger than this

2194

01:27:55,850 --> 01:27:53,760

meteor that we're talking about the area

2195

01:27:58,729 --> 01:27:55,860

that you need to explore is much much

2196

01:28:01,910 --> 01:27:58,739

larger okay and in the case of the

2197

01:28:06,590 --> 01:28:01,920

meteor we know where the explosion took

2198

01:28:09,350 --> 01:28:06,600

place so we have a square region that we

2199

01:28:11,870 --> 01:28:09,360

will study we also know what the wind

2200

01:28:14,629 --> 01:28:11,880

speed was at the time of the explosion

2201

01:28:17,629 --> 01:28:14,639

uh what the elevation was and what the

2202

01:28:20,570 --> 01:28:17,639

water currents were so we have a model

2203

01:28:22,970 --> 01:28:20,580

where we so we can calculate depending

2204

01:28:25,010 --> 01:28:22,980

on the fragment size distribution we can

2205

01:28:27,709 --> 01:28:25,020

calculate where the small fragments fell

2206

01:28:30,830 --> 01:28:27,719

and where the bigger fragments fell and

2207

01:28:35,450 --> 01:28:30,840

just it's just like mowing the lawn

2208

01:28:37,189 --> 01:28:35,460

basically uh scoop the the thin layer

2209

01:28:40,430 --> 01:28:37,199

the top layer of the ocean for any

2210

01:28:43,189 --> 01:28:40,440

fragments left and my point is this

2211

01:28:45,709 --> 01:28:43,199

meteor was really bright and we know

2212

01:28:47,870 --> 01:28:45,719

precisely just think about GPS systems

2213

01:28:49,550 --> 01:28:47,880

they can localize your car

2214

01:28:51,709 --> 01:28:49,560  
in Boston

2215

01:28:54,290 --> 01:28:51,719  
or in any other City to within a few

2216

01:28:57,169 --> 01:28:54,300  
meters so imagine you get the GPS

2217

01:28:59,209 --> 01:28:57,179  
coordinates of your car and then it

2218

01:29:01,669 --> 01:28:59,219  
explodes okay

2219

01:29:03,709 --> 01:29:01,679  
so you ask yourself how can I find you

2220

01:29:07,430 --> 01:29:03,719  
know like if you only knew that the car

2221

01:29:09,709 --> 01:29:07,440  
moved between New York City and Boston

2222

01:29:11,390 --> 01:29:09,719  
you know it will be much tougher to find

2223

01:29:14,090 --> 01:29:11,400  
the car

2224

01:29:16,430 --> 01:29:14,100  
if it and suppose it didn't explode it

2225

01:29:18,110 --> 01:29:16,440  
just went off the road somewhere then

2226

01:29:20,450 --> 01:29:18,120

you will it would take you a lot of time

2227

01:29:23,390 --> 01:29:20,460

to to find it and you might not find it

2228

01:29:25,610 --> 01:29:23,400

but if it exploded and you had you know

2229

01:29:27,590 --> 01:29:25,620

like photographs from satellites of the

2230

01:29:29,629 --> 01:29:27,600

Explorer you know the GPS location to

2231

01:29:31,610 --> 01:29:29,639

within a few meters it's a piece of cake

2232

01:29:34,010 --> 01:29:31,620

to find the fragments so that's the

2233

01:29:36,830 --> 01:29:34,020

difference all right let's get to a

2234

01:29:39,290 --> 01:29:36,840

question about Jack valet so Jack Valley

2235

01:29:41,510 --> 01:29:39,300

I saw this video and I'll play it for

2236

01:29:43,729 --> 01:29:41,520

the people who are watching right now 20

2237

01:29:45,950 --> 01:29:43,739

years ago you know that was a very

2238

01:29:48,110 --> 01:29:45,960

marginal idea in science today it's not

2239

01:29:49,970 --> 01:29:48,120

such a marginal idea in science if you

2240

01:29:51,470 --> 01:29:49,980

look at the sky and Telescope magazine a

2241

01:29:53,810 --> 01:29:51,480

year and a half ago published an article

2242

01:29:55,729 --> 01:29:53,820

about the creation of universes with

2243

01:29:57,290 --> 01:29:55,739

multiple Dimensions moving a light and

2244

01:29:59,450 --> 01:29:57,300

going to each other that's a very

2245

01:30:01,430 --> 01:29:59,460

interesting idea it's a theory and

2246

01:30:03,350 --> 01:30:01,440

perhaps the UFO phenomenon is giving us

2247

01:30:04,850 --> 01:30:03,360

the opportunity to test some of those

2248

01:30:06,470 --> 01:30:04,860

Advanced theories in physics I think

2249

01:30:08,689 --> 01:30:06,480

that's why we should look at it Jacques

2250

01:30:10,850 --> 01:30:08,699

says that uaps could potentially be used

2251

01:30:12,590 --> 01:30:10,860

to test for alternate universes or

2252

01:30:14,090 --> 01:30:12,600

perhaps mentions though I think he says

2253

01:30:16,970 --> 01:30:14,100

universes

2254

01:30:18,830 --> 01:30:16,980

so what's your opinion on this okay so

2255

01:30:21,530 --> 01:30:18,840

as a physicist

2256

01:30:25,490 --> 01:30:21,540

the standard approach you take when you

2257

01:30:28,090 --> 01:30:25,500

examine experimental data is to say you

2258

01:30:31,250 --> 01:30:28,100

know we have a standard model of physics

2259

01:30:33,530 --> 01:30:31,260

it's uh it's a set of rules and

2260

01:30:35,330 --> 01:30:33,540

equations that were tested many times in

2261

01:30:37,490 --> 01:30:35,340

many laboratory experiments okay and

2262

01:30:39,770 --> 01:30:37,500

that's what we use for technological

2263

01:30:42,530 --> 01:30:39,780

development when we develop a cell phone

2264

01:30:44,629 --> 01:30:42,540

we base it on the known laws of physics

2265

01:30:46,550 --> 01:30:44,639

you know no company would say oh maybe

2266

01:30:48,649 --> 01:30:46,560

the quantum mechanics is wrong let's

2267

01:30:50,810 --> 01:30:48,659

develop a cell phone based on some idea

2268

01:30:53,330 --> 01:30:50,820

about how quantum mechanics may be wrong

2269

01:30:55,370 --> 01:30:53,340

or maybe we will build a a cell phone

2270

01:30:57,649 --> 01:30:55,380

that operates in other dimensions or

2271

01:30:59,990 --> 01:30:57,659

maybe a cell phone that communicates

2272

01:31:02,870 --> 01:31:00,000

with another Universe you know no

2273

01:31:06,050 --> 01:31:02,880

company would survive if it were to

2274

01:31:08,390 --> 01:31:06,060

Advocate that it will build a piece of

2275

01:31:11,810 --> 01:31:08,400

Technology based on unknown physics

2276

01:31:14,149 --> 01:31:11,820

because it will most of the time you

2277

01:31:16,790 --> 01:31:14,159

know almost always be proven wrong like

2278

01:31:18,290 --> 01:31:16,800

if this company is successful then they

2279

01:31:21,050 --> 01:31:18,300

will get the Nobel Prize because they

2280

01:31:22,790 --> 01:31:21,060

discover the Rudolph visit so the

2281

01:31:25,669 --> 01:31:22,800

standard approach in doing science or

2282

01:31:28,550 --> 01:31:25,679

physics is to adapt what is known as the

2283

01:31:32,090 --> 01:31:28,560

standard model of physics and

2284

01:31:35,330 --> 01:31:32,100

use it first to interpret any data you

2285

01:31:38,750 --> 01:31:35,340

get any experimental evidence so suppose

2286

01:31:41,030 --> 01:31:38,760

you include UAP in the unidentified

2287

01:31:43,070 --> 01:31:41,040

objects the first approach of the

2288

01:31:45,470 --> 01:31:43,080

Galileo project in particular would be

2289

01:31:46,250 --> 01:31:45,480

to use the standard laws of you know the

2290

01:31:49,370 --> 01:31:46,260

the

2291

01:31:51,350 --> 01:31:49,380

standard model of physics to interpret

2292

01:31:53,570 --> 01:31:51,360

whatever we see so we have a set of

2293

01:31:56,090 --> 01:31:53,580

instruments detecting things we will use

2294

01:31:58,729 --> 01:31:56,100

the laws of physics as we know them now

2295

01:32:01,550 --> 01:31:58,739

if we see an object behaving in ways

2296

01:32:04,370 --> 01:32:01,560

that definitely violate the laws of

2297

01:32:07,729 --> 01:32:04,380

physics we will go there but before we

2298

01:32:10,070 --> 01:32:07,739

see that there is no reason and moreover

2299

01:32:11,629 --> 01:32:10,080

I should say the first thing I would

2300

01:32:14,090 --> 01:32:11,639

check if I see something moving let's

2301  
01:32:16,550 --> 01:32:14,100  
say faster than light just as an example

2302  
01:32:19,550 --> 01:32:16,560  
you see a point of light

2303  
01:32:22,250 --> 01:32:19,560  
moving across the sky faster than light

2304  
01:32:26,390 --> 01:32:22,260  
okay and you can in principle infer that

2305  
01:32:29,689 --> 01:32:26,400  
it could be that it's an artifact of the

2306  
01:32:32,570 --> 01:32:29,699  
Optics because there is some reflection

2307  
01:32:34,669 --> 01:32:32,580  
in your detector that moves the point of

2308  
01:32:36,290 --> 01:32:34,679  
light faster than light if you think

2309  
01:32:38,030 --> 01:32:36,300  
that it's far away but in fact it's

2310  
01:32:39,709 --> 01:32:38,040  
moving only within the instrument so

2311  
01:32:41,510 --> 01:32:39,719  
well you know and and it's really

2312  
01:32:44,030 --> 01:32:41,520  
difficult you do a lot of experiments

2313  
01:32:45,950 --> 01:32:44,040

you don't find deviations so it's not as

2314

01:32:47,390 --> 01:32:45,960

if you just see something unusual and

2315

01:32:48,709 --> 01:32:47,400

you say okay the laws of physics are

2316

01:32:50,770 --> 01:32:48,719

wrong you can't just do that that's

2317

01:32:55,310 --> 01:32:50,780

irresponsible you have to

2318

01:32:56,629 --> 01:32:55,320

study the whatever you're studying with

2319

01:32:58,370 --> 01:32:56,639

the best instruments you have to

2320

01:33:00,890 --> 01:32:58,380

understand the instruments you know it

2321

01:33:03,770 --> 01:33:00,900

takes a lot of steps and currently the

2322

01:33:05,930 --> 01:33:03,780

data on UAP is not good enough it's you

2323

01:33:09,250 --> 01:33:05,940

know many of the images are blurry many

2324

01:33:13,490 --> 01:33:09,260

of them are based on uh uh you know

2325

01:33:14,930 --> 01:33:13,500

amateurs taking the data and so we

2326

01:33:16,970 --> 01:33:14,940

really need to go through the scientific

2327

01:33:20,090 --> 01:33:16,980

process to validate that there is

2328

01:33:22,430 --> 01:33:20,100

something beyond the standard physics

2329

01:33:24,890 --> 01:33:22,440

okay but Jacques valet is mentioning

2330

01:33:26,689 --> 01:33:24,900

that as a possibility I say you know

2331

01:33:28,550 --> 01:33:26,699

there are many possibilities just like

2332

01:33:30,470 --> 01:33:28,560

you know in the context of string theory

2333

01:33:33,290 --> 01:33:30,480

there is a possibility that

2334

01:33:35,510 --> 01:33:33,300

you know string theories of one type of

2335

01:33:37,610 --> 01:33:35,520

another type and of course a lot of

2336

01:33:39,649 --> 01:33:37,620

people can adjust a lot of possibilities

2337

01:33:40,910 --> 01:33:39,659

Jacques Valley may suggest one

2338

01:33:43,910 --> 01:33:40,920

possibility and then someone else will

2339

01:33:45,890 --> 01:33:43,920

suggest another but it doesn't mean that

2340

01:33:46,729 --> 01:33:45,900

we need to take it seriously until there

2341

01:33:54,669 --> 01:33:46,739

is

2342

01:33:57,050 --> 01:33:54,679

understood

2343

01:33:59,570 --> 01:33:57,060

Suite of instruments that detects it

2344

01:34:01,910 --> 01:33:59,580

okay and so we are not there yet that's

2345

01:34:04,430 --> 01:34:01,920

what the Galileo project aims to do in

2346

01:34:06,470 --> 01:34:04,440

and if we find that there is no physics

2347

01:34:08,090 --> 01:34:06,480

of course that would be extremely

2348

01:34:09,590 --> 01:34:08,100

exciting because it should apply to the

2349

01:34:11,770 --> 01:34:09,600

rest of the universe not just the

2350

01:34:14,750 --> 01:34:11,780

subject so suppose you find

2351  
01:34:17,450 --> 01:34:14,760  
uh you know something completely new

2352  
01:34:19,550 --> 01:34:17,460  
that physicists never imagine then it

2353  
01:34:21,410 --> 01:34:19,560  
applies everywhere in the universe and

2354  
01:34:23,629 --> 01:34:21,420  
and that would be of Much More Much

2355  
01:34:27,229 --> 01:34:23,639  
broader consequences because you can

2356  
01:34:28,149 --> 01:34:27,239  
build new devices based on that at that

2357  
01:34:30,890 --> 01:34:28,159  
point

2358  
01:34:34,070 --> 01:34:30,900  
technology development companies in

2359  
01:34:36,950 --> 01:34:34,080  
Silicon Valley could build gadgets that

2360  
01:34:39,290 --> 01:34:36,960  
make use of this knowledge okay so it

2361  
01:34:40,610 --> 01:34:39,300  
would be revolutionary but before we we

2362  
01:34:42,850 --> 01:34:40,620  
claim that we have something

2363  
01:34:46,430 --> 01:34:42,860

revolutionary we should you know

2364

01:34:49,010 --> 01:34:46,440

consider the mundane first

2365

01:34:50,810 --> 01:34:49,020

there was a paper published last week by

2366

01:34:54,470 --> 01:34:50,820

zeliev and

2367

01:34:57,229 --> 01:34:54,480

and petukov and reshetnik about uaps in

2368

01:34:58,790 --> 01:34:57,239

Ukraine did you happen to look at this

2369

01:35:02,990 --> 01:34:58,800

or are you aware of it

2370

01:35:04,129 --> 01:35:03,000

yeah I actually saw it and you know

2371

01:35:07,010 --> 01:35:04,139

um

2372

01:35:10,610 --> 01:35:07,020

uh obviously Ukraine is currently in a

2373

01:35:13,729 --> 01:35:10,620

military conflict and there are lots of

2374

01:35:16,550 --> 01:35:13,739

things flying in the sky okay and uh

2375

01:35:19,250 --> 01:35:16,560

usually in scientific experiments we

2376

01:35:20,870 --> 01:35:19,260

want to minimize the level of noise of

2377

01:35:24,350 --> 01:35:20,880

spurious things that may be

2378

01:35:26,149 --> 01:35:24,360

misinterpreted so if I were to design a

2379

01:35:28,570 --> 01:35:26,159

place where I would search for

2380

01:35:32,410 --> 01:35:28,580

unidentified objects

2381

01:35:34,850 --> 01:35:32,420

Ukraine would be my last choice because

2382

01:35:37,610 --> 01:35:34,860

there would be so much noise you know

2383

01:35:41,689 --> 01:35:37,620

and and an experiment usually wants to

2384

01:35:45,350 --> 01:35:41,699

maximize the signal to noise ratio so um

2385

01:35:48,050 --> 01:35:45,360

I you know I find it surprising that the

2386

01:35:51,169 --> 01:35:48,060

paper about unidentified objects would

2387

01:35:53,330 --> 01:35:51,179

be written from that location because if

2388

01:35:55,729 --> 01:35:53,340

you wanted to study UAP you would go to

2389

01:35:58,490 --> 01:35:55,739

a remote site far away

2390

01:36:00,169 --> 01:35:58,500

okay speaking of a remote site that may

2391

01:36:02,689 --> 01:36:00,179

have plenty of signal rather than noise

2392

01:36:04,910 --> 01:36:02,699

what about Skinwalker have you thought

2393

01:36:07,790 --> 01:36:04,920

about putting some Observatory at

2394

01:36:09,110 --> 01:36:07,800

Skinwalker and if not why not what are

2395

01:36:11,270 --> 01:36:09,120

the criteria that you use to select

2396

01:36:14,450 --> 01:36:11,280

where to place an observatory

2397

01:36:16,970 --> 01:36:14,460

right so the first limitation we are

2398

01:36:19,430 --> 01:36:16,980

facing is the level of funding that we

2399

01:36:22,129 --> 01:36:19,440

have because at the moment we have one

2400

01:36:23,689 --> 01:36:22,139

Suite of instruments that cost me about

2401

01:36:26,689 --> 01:36:23,699

250

2402

01:36:28,610 --> 01:36:26,699

000 and we're testing it right now and

2403

01:36:31,729 --> 01:36:28,620

within a few months hopefully everything

2404

01:36:34,669 --> 01:36:31,739

will work and then we will deploy it at

2405

01:36:36,890 --> 01:36:34,679

the aside that would allow us to get the

2406

01:36:41,770 --> 01:36:36,900

useful data and analyze it so hopefully

2407

01:36:45,770 --> 01:36:41,780

by the summer of 2023 uh we'll have

2408

01:36:48,590 --> 01:36:45,780

data that we can share uh with the

2409

01:36:50,450 --> 01:36:48,600

public the scientists uh and that will

2410

01:36:51,709 --> 01:36:50,460

be peer reviewed in terms of its

2411

01:36:54,649 --> 01:36:51,719

interpretation

2412

01:36:57,770 --> 01:36:54,659

um but in order for us to build many

2413

01:37:00,709 --> 01:36:57,780

more systems like it we need to expand

2414

01:37:02,330 --> 01:37:00,719

the funding level of of the Galileo

2415

01:37:05,629 --> 01:37:02,340

project at the moment it's only a few

2416

01:37:07,610 --> 01:37:05,639

million dollars and in order for us to

2417

01:37:09,830 --> 01:37:07,620

expand it by a factor of 10 we need a

2418

01:37:12,350 --> 01:37:09,840

few tens of millions of dollars so if we

2419

01:37:14,390 --> 01:37:12,360

do get that we will be able to to place

2420

01:37:16,030 --> 01:37:14,400

a lot of stations in many locations

2421

01:37:19,430 --> 01:37:16,040

including perhaps

2422

01:37:20,750 --> 01:37:19,440

Skinwalker I have no in fact it would be

2423

01:37:23,750 --> 01:37:20,760

interesting to see if there is anything

2424

01:37:25,910 --> 01:37:23,760

unusual there the only locations that

2425

01:37:28,850 --> 01:37:25,920

I'm hesitant about are those that may

2426

01:37:32,209 --> 01:37:28,860

involve sensitive facilities like

2427

01:37:34,790 --> 01:37:32,219

nuclear plants or military bases simply

2428

01:37:36,010 --> 01:37:34,800

because of National Security issues so I

2429

01:37:38,530 --> 01:37:36,020

don't want

2430

01:37:44,770 --> 01:37:38,540

us to

2431

01:37:48,410 --> 01:37:44,780

be at risk of violating the law or or

2432

01:37:50,629 --> 01:37:48,420

I don't want the intelligence agencies

2433

01:37:52,970 --> 01:37:50,639

to worry about the data that we collect

2434

01:37:54,709 --> 01:37:52,980

so I want us to do the job of

2435

01:37:58,129 --> 01:37:54,719

astronomers you know astronomers have

2436

01:38:00,350 --> 01:37:58,139

observing sites in remote locations in

2437

01:38:05,450 --> 01:38:00,360

places that are of no National Security

2438

01:38:08,570 --> 01:38:05,460

risk and I See This research project as

2439

01:38:10,970 --> 01:38:08,580

an astronomy project in fact the

2440

01:38:13,910 --> 01:38:10,980

administrator said Harvard asked me is

2441

01:38:15,590 --> 01:38:13,920

this part of your day job just as I was

2442

01:38:17,090 --> 01:38:15,600

about to establish the Galileo project

2443

01:38:19,910 --> 01:38:17,100

and I thought about it for a few hours

2444

01:38:22,010 --> 01:38:19,920

and then I said yes it is part of my day

2445

01:38:25,010 --> 01:38:22,020

job because in astronomy we use

2446

01:38:27,470 --> 01:38:25,020

telescopes to collect data and there is

2447

01:38:29,750 --> 01:38:27,480

no lower limit on the distance you know

2448

01:38:33,290 --> 01:38:29,760

we study the sun we study meteors we

2449

01:38:35,990 --> 01:38:33,300

study asteroids comets so

2450

01:38:38,030 --> 01:38:36,000

that's exactly what we do in the gorilla

2451

01:38:40,550 --> 01:38:38,040

project we use telescopes collect data

2452

01:38:43,850 --> 01:38:40,560

and interpret it so yes it is part of my

2453

01:38:45,530 --> 01:38:43,860

day job and Harvard University approved

2454

01:38:49,189 --> 01:38:45,540

of that and indeed it's a project

2455

01:38:51,250 --> 01:38:49,199

embraced by the university and the other

2456

01:38:53,930 --> 01:38:51,260

unusual thing about this project is

2457

01:38:56,470 --> 01:38:53,940

usually you have to work really hard to

2458

01:38:59,030 --> 01:38:56,480

get funded and in this case it was

2459

01:39:02,390 --> 01:38:59,040

individuals that gave me the money

2460

01:39:05,450 --> 01:39:02,400

without any fundraising effort on my

2461

01:39:07,910 --> 01:39:05,460

behalf which to me illustrates the fact

2462

01:39:09,950 --> 01:39:07,920

that the subject is of great interest to

2463

01:39:12,129 --> 01:39:09,960

the public it's of great interest to the

2464

01:39:14,990 --> 01:39:12,139

government as well

2465

01:39:16,669 --> 01:39:15,000

earlier you mentioned transmedium so

2466

01:39:18,590 --> 01:39:16,679

then I know you're an astronomer and so

2467

01:39:20,209 --> 01:39:18,600

you care about the sky but at some point

2468

01:39:21,470 --> 01:39:20,219

do you envision in the future it would

2469

01:39:23,810 --> 01:39:21,480

look for

2470

01:39:27,770 --> 01:39:23,820

unidentified submerged objects

2471

01:39:29,750 --> 01:39:27,780

well if we look at the Horizon you know

2472

01:39:32,330 --> 01:39:29,760

um and we are near the ocean and

2473

01:39:35,390 --> 01:39:32,340

definitely we will be near the ocean in

2474

01:39:38,090 --> 01:39:35,400

some of our observations simply because

2475

01:39:40,370 --> 01:39:38,100

there were a lot of reports on objects

2476

01:39:42,229 --> 01:39:40,380

near the ocean then we will be able to

2477

01:39:44,090 --> 01:39:42,239

see if they have anything to do with

2478

01:39:45,890 --> 01:39:44,100

coming out of the ocean going back to

2479

01:39:47,689 --> 01:39:45,900

the ocean or

2480

01:39:50,870 --> 01:39:47,699

um you know and and the same is true

2481

01:39:53,149 --> 01:39:50,880

about the them coming from outer space I

2482

01:39:55,310 --> 01:39:53,159

mean we know that's what meteors do okay

2483

01:39:58,669 --> 01:39:55,320

and this meteor that we discussed before

2484

01:40:01,729 --> 01:39:58,679

the interstellar meteor was discovered

2485

01:40:03,530 --> 01:40:01,739

by missile Warning Systems that the

2486

01:40:06,410 --> 01:40:03,540

government employs it was not

2487

01:40:08,510 --> 01:40:06,420

necessarily NASA it was Intelligence

2488

01:40:10,250 --> 01:40:08,520

agencies that are worried about National

2489

01:40:12,050 --> 01:40:10,260

Security they're monitoring any object

2490

01:40:13,910 --> 01:40:12,060

entering the sky because they worry

2491

01:40:15,649 --> 01:40:13,920

about ballistic missiles and you know

2492

01:40:18,470 --> 01:40:15,659

every now and then they see a rock

2493

01:40:20,390 --> 01:40:18,480

coming from out there and colliding with

2494

01:40:22,490 --> 01:40:20,400

Earth okay so that's called the meteor

2495

01:40:25,729 --> 01:40:22,500

and most of these rocks belong to the

2496

01:40:27,770 --> 01:40:25,739

solar system uh there are a thousand

2497

01:40:29,450 --> 01:40:27,780

times more rocks that belong to the

2498

01:40:31,910 --> 01:40:29,460

solar system than rocks that come from

2499

01:40:34,310 --> 01:40:31,920

outside the solar system based on the

2500

01:40:36,890 --> 01:40:34,320

statistics that we now know about

2501  
01:40:38,390 --> 01:40:36,900  
Interstellar objects so most of the time

2502  
01:40:40,610 --> 01:40:38,400  
you just see rocks from the solar system

2503  
01:40:42,470 --> 01:40:40,620  
these are leftover rocks from the

2504  
01:40:44,270 --> 01:40:42,480  
construction project of planets you know

2505  
01:40:46,250 --> 01:40:44,280  
that early on in the system there were

2506  
01:40:48,530 --> 01:40:46,260  
small rocks that came together to make

2507  
01:40:50,209 --> 01:40:48,540  
planets like the Earth and now some of

2508  
01:40:52,610 --> 01:40:50,219  
them are dispersed they are sort of like

2509  
01:40:54,709 --> 01:40:52,620  
Lego pieces that are filling up and so

2510  
01:40:57,229 --> 01:40:54,719  
they hit the Earth every now and then a

2511  
01:40:59,330 --> 01:40:57,239  
big chunk a big rock hit the earth you

2512  
01:41:02,330 --> 01:40:59,340  
know 66 million years ago and killed the

2513  
01:41:05,149 --> 01:41:02,340

dinosaurs we know that uh the dinosaurs

2514

01:41:07,850 --> 01:41:05,159

did not have telescopes uh and they were

2515

01:41:10,850 --> 01:41:07,860

not smart enough to worry about the sky

2516

01:41:12,110 --> 01:41:10,860

they just ate grass were happy and

2517

01:41:14,450 --> 01:41:12,120

thought that they dominate their

2518

01:41:16,129 --> 01:41:14,460

environment well guess what they were

2519

01:41:18,830 --> 01:41:16,139

wiped out because they didn't have

2520

01:41:21,110 --> 01:41:18,840

telescopes and we as the human

2521

01:41:22,490 --> 01:41:21,120

civilization we are smarter so we

2522

01:41:25,010 --> 01:41:22,500

developed telescopes we can look at

2523

01:41:27,890 --> 01:41:25,020

near-earth objects that's how omo and

2524

01:41:30,229 --> 01:41:27,900

was discovered it was identified as a

2525

01:41:32,629 --> 01:41:30,239

near-air object it was labeled that way

2526

01:41:34,729 --> 01:41:32,639

that's why they looked at it and then

2527

01:41:36,830 --> 01:41:34,739

they realized wow it moves too fast to

2528

01:41:39,830 --> 01:41:36,840

be bound to the Sun so this was an

2529

01:41:42,290 --> 01:41:39,840

Interstellar object so um what I'm

2530

01:41:44,209 --> 01:41:42,300

trying to say is the government uh you

2531

01:41:46,310 --> 01:41:44,219

know monitors the sky that's their day

2532

01:41:48,590 --> 01:41:46,320

job they're not doing it for the sake of

2533

01:41:50,390 --> 01:41:48,600

science their day job is to monitor the

2534

01:41:51,770 --> 01:41:50,400

sky for National Security every now and

2535

01:41:53,750 --> 01:41:51,780

then they see a rock entering the

2536

01:41:55,310 --> 01:41:53,760

atmosphere and then it turns out that

2537

01:41:58,310 --> 01:41:55,320

the first Interstellar meteor was

2538

01:42:01,729 --> 01:41:58,320

discovered by those government sensors

2539

01:42:04,250 --> 01:42:01,739

you see and uh and and

2540

01:42:06,530 --> 01:42:04,260

my point all along was the government

2541

01:42:08,689 --> 01:42:06,540

needs to know with very high Precision

2542

01:42:10,250 --> 01:42:08,699

how the object moves because they need

2543

01:42:11,689 --> 01:42:10,260

to know that if it's a ballistic missile

2544

01:42:14,629 --> 01:42:11,699

whether it would hit Boston or

2545

01:42:17,750 --> 01:42:14,639

Washington DC they need to know that so

2546

01:42:19,669 --> 01:42:17,760

what my colleagues were arguing was oh

2547

01:42:22,490 --> 01:42:19,679

the uncertainties in the measurements of

2548

01:42:24,350 --> 01:42:22,500

the government are very big and I say no

2549

01:42:27,290 --> 01:42:24,360

they cannot be big they cannot afford

2550

01:42:28,970 --> 01:42:27,300

that that's their day job and indeed the

2551  
01:42:30,470 --> 01:42:28,980  
government confirmed took three years

2552  
01:42:34,129 --> 01:42:30,480  
for the government to come out with a

2553  
01:42:37,609 --> 01:42:34,139  
letter saying indeed this meteor was at

2554  
01:42:40,430 --> 01:42:37,619  
the 99.99 from outside the solar system

2555  
01:42:42,169 --> 01:42:40,440  
so I never doubted that the fact that

2556  
01:42:43,450 --> 01:42:42,179  
the government has very high Precision

2557  
01:42:47,390 --> 01:42:43,460  
data

2558  
01:42:48,770 --> 01:42:47,400  
and they find these things actually you

2559  
01:42:50,990 --> 01:42:48,780  
know if you ask yourself

2560  
01:42:53,870 --> 01:42:51,000  
what's the you know what would be the

2561  
01:42:56,570 --> 01:42:53,880  
first sign of objects that visit near

2562  
01:42:58,129 --> 01:42:56,580  
Earth from outside the solar system or

2563  
01:43:00,490 --> 01:42:58,139

objects that collide with Earth or

2564

01:43:02,689 --> 01:43:00,500

objects that enter the atmosphere

2565

01:43:04,669 --> 01:43:02,699

it's the government that would first

2566

01:43:07,790 --> 01:43:04,679

identify them because astronomers focus

2567

01:43:09,530 --> 01:43:07,800

on very distant sources of light and

2568

01:43:11,090 --> 01:43:09,540

they have narrow fields of view all the

2569

01:43:13,609 --> 01:43:11,100

astronomical observatories look at the

2570

01:43:15,470 --> 01:43:13,619

small portion of the sky from uh then if

2571

01:43:16,729 --> 01:43:15,480

a bird flies above the telescope they

2572

01:43:19,970 --> 01:43:16,739

just ignore it

2573

01:43:22,010 --> 01:43:19,980

so astronomers would be hard-pressed to

2574

01:43:23,750 --> 01:43:22,020

say oh in the survey that they did they

2575

01:43:25,550 --> 01:43:23,760

saw an object moving in an unusual way

2576

01:43:27,950 --> 01:43:25,560

in the Earth's atmosphere they were just

2577

01:43:30,250 --> 01:43:27,960

ignore it they focus on a Galaxy at the

2578

01:43:34,010 --> 01:43:30,260

relative of five or six so

2579

01:43:36,229 --> 01:43:34,020

but the military has to monitor those

2580

01:43:38,750 --> 01:43:36,239

things because that's their day job and

2581

01:43:40,370 --> 01:43:38,760

the intelligence agencies have so it's

2582

01:43:43,550 --> 01:43:40,380

completely

2583

01:43:47,090 --> 01:43:43,560

natural to expect the government and the

2584

01:43:49,189 --> 01:43:47,100

intention is to be the first to say here

2585

01:43:51,590 --> 01:43:49,199

are some unusual objects for us to

2586

01:43:52,970 --> 01:43:51,600

Monitor and that's what UAP are about

2587

01:43:56,510 --> 01:43:52,980

that's what the first Interstellar

2588

01:43:58,729 --> 01:43:56,520

meteor is about and you know we should

2589

01:44:00,950 --> 01:43:58,739

just be curious and examine those things

2590

01:44:02,750 --> 01:44:00,960

do you think that the main reason for

2591

01:44:04,910 --> 01:44:02,760

the government not coming forward with

2592

01:44:07,570 --> 01:44:04,920

more information on uaps or at least

2593

01:44:11,209 --> 01:44:07,580

more high resolution images is because

2594

01:44:12,590 --> 01:44:11,219

that it gives away their capabilities in

2595

01:44:14,270 --> 01:44:12,600

terms of sensors or is there another

2596

01:44:16,550 --> 01:44:14,280

reason like that's one of the reasons

2597

01:44:18,950 --> 01:44:16,560

but there may be a nefarious reason I

2598

01:44:21,770 --> 01:44:18,960

don't know I think that's uh that's the

2599

01:44:24,709 --> 01:44:21,780

main reason that would be my uh I don't

2600

01:44:27,050 --> 01:44:24,719

believe in conspiracies

2601  
01:44:29,990 --> 01:44:27,060  
um if I had to guess I would simply say

2602  
01:44:32,750 --> 01:44:30,000  
that they are unsure what the nature of

2603  
01:44:34,430 --> 01:44:32,760  
these objects is so there are two you

2604  
01:44:37,310 --> 01:44:34,440  
know two general possibilities either

2605  
01:44:39,770 --> 01:44:37,320  
they are made by an adversary with

2606  
01:44:42,070 --> 01:44:39,780  
technologies that we never imagined okay

2607  
01:44:44,209 --> 01:44:42,080  
in which case you want to keep

2608  
01:44:46,790 --> 01:44:44,219  
collecting data you don't want to

2609  
01:44:49,609 --> 01:44:46,800  
release what you know uh

2610  
01:44:53,990 --> 01:44:49,619  
in the second possibility you know it

2611  
01:44:55,970 --> 01:44:54,000  
may be of extraterrestrial origin uh and

2612  
01:44:58,490 --> 01:44:55,980  
you say to yourself that's not part of

2613  
01:45:02,169 --> 01:44:58,500

my day job you know and I don't want to

2614

01:45:05,330 --> 01:45:02,179

release the data because it may reveal

2615

01:45:07,430 --> 01:45:05,340

our abilities to identify objects like

2616

01:45:09,649 --> 01:45:07,440

if it's a high resolution image then Any

2617

01:45:11,450 --> 01:45:09,659

Nation worldwide would know that we can

2618

01:45:13,790 --> 01:45:11,460

obtain very high resolution images of

2619

01:45:16,310 --> 01:45:13,800

this of this quality so you don't you

2620

01:45:18,109 --> 01:45:16,320

don't show it publicly okay so I would

2621

01:45:19,550 --> 01:45:18,119

say it's more the fact that the

2622

01:45:22,250 --> 01:45:19,560

government is not a scientific

2623

01:45:25,010 --> 01:45:22,260

organization it's not

2624

01:45:26,689 --> 01:45:25,020

interested in

2625

01:45:28,129 --> 01:45:26,699

questions that go beyond National

2626

01:45:31,310 --> 01:45:28,139

Security the safety of military

2627

01:45:33,350 --> 01:45:31,320

personnel so if you see an object that

2628

01:45:36,050 --> 01:45:33,360

doesn't belong to that category it's not

2629

01:45:38,689 --> 01:45:36,060

part of your job uh and and the second

2630

01:45:41,390 --> 01:45:38,699

is uh you know you don't want to reveal

2631

01:45:43,790 --> 01:45:41,400

the capabilities you have and then there

2632

01:45:47,209 --> 01:45:43,800

is also this um what you mentioned

2633

01:45:49,609 --> 01:45:47,219

before there is this stigma uh in

2634

01:45:52,910 --> 01:45:49,619

society about discussing such things

2635

01:45:55,490 --> 01:45:52,920

because it's being ridiculed okay and

2636

01:45:57,470 --> 01:45:55,500

the the data that existed in the past

2637

01:45:59,450 --> 01:45:57,480

was perhaps not of high enough quality

2638

01:46:01,370 --> 01:45:59,460

so people could not really discuss it

2639

01:46:05,390 --> 01:46:01,380

seriously but now we have

2640

01:46:07,189 --> 01:46:05,400

instrumentation that is so good that the

2641

01:46:09,890 --> 01:46:07,199

government just can't ignore these

2642

01:46:12,530 --> 01:46:09,900

objects that's why the subject surfaced

2643

01:46:14,689 --> 01:46:12,540

in the past five years I think partly

2644

01:46:17,990 --> 01:46:14,699

because the instrumentation that gives

2645

01:46:20,090 --> 01:46:18,000

us the data is of high quality so the

2646

01:46:24,310 --> 01:46:20,100

government cannot say forget about it

2647

01:46:27,169 --> 01:46:24,320

cannot say you know the stigma

2648

01:46:30,169 --> 01:46:27,179

should uh

2649

01:46:32,629 --> 01:46:30,179

suppress any discussion on this and and

2650

01:46:34,910 --> 01:46:32,639

so the the subject is is surfacing up

2651  
01:46:37,669 --> 01:46:34,920  
yet the government cannot release the

2652  
01:46:40,669 --> 01:46:37,679  
the high quality data so I you know it's

2653  
01:46:43,550 --> 01:46:40,679  
just like um the play by Samuel Beckett

2654  
01:46:45,890 --> 01:46:43,560  
you could wait for Godot but you might

2655  
01:46:48,590 --> 01:46:45,900  
wait forever I I don't believe that the

2656  
01:46:51,649 --> 01:46:48,600  
data will be Declassified anytime soon

2657  
01:46:53,390 --> 01:46:51,659  
so we better collect our own data uh

2658  
01:46:55,430 --> 01:46:53,400  
scientists and try to analyze it that's

2659  
01:46:57,410 --> 01:46:55,440  
what the Galileo project is trying

2660  
01:47:00,770 --> 01:46:57,420  
when I think about how would I do the

2661  
01:47:03,410 --> 01:47:00,780  
Galileo project the main hubris Lee the

2662  
01:47:05,450 --> 01:47:03,420  
main problem that I see for analyzing

2663  
01:47:07,430 --> 01:47:05,460

regular uaps when I say regular I mean

2664

01:47:09,350 --> 01:47:07,440

the ones that are in the popular media

2665

01:47:11,510 --> 01:47:09,360

and much of the audience is aware of

2666

01:47:13,550 --> 01:47:11,520

those types of tic tac types is that

2667

01:47:18,050 --> 01:47:13,560

they don't show themselves customarily

2668

01:47:19,729 --> 01:47:18,060

it's not repeatable so how and I imagine

2669

01:47:21,050 --> 01:47:19,739

that the third phase remember we talked

2670

01:47:22,790 --> 01:47:21,060

about these different pillars so first

2671

01:47:25,129 --> 01:47:22,800

was Papua New Guinea second was the

2672

01:47:26,570 --> 01:47:25,139

James Webb slash the Chilean Observatory

2673

01:47:28,790 --> 01:47:26,580

and the third was the Harvard

2674

01:47:31,729 --> 01:47:28,800

Observatory I imagine that the third one

2675

01:47:35,209 --> 01:47:31,739

is more aligned with the uaps as we

2676

01:47:36,590 --> 01:47:35,219

traditionally know them okay so did you

2677

01:47:38,570 --> 01:47:36,600

choose to place it at Harvard simply

2678

01:47:40,250 --> 01:47:38,580

because well that's what the funding can

2679

01:47:42,290 --> 01:47:40,260

provide and you're close to it or is

2680

01:47:44,570 --> 01:47:42,300

there some other reason oh no no it was

2681

01:47:46,370 --> 01:47:44,580

just just for testing the equipment uh

2682

01:47:48,050 --> 01:47:46,380

that's just a testing phase to make sure

2683

01:47:49,850 --> 01:47:48,060

that it operates and then within a few

2684

01:47:52,490 --> 01:47:49,860

months we'll put it in location that is

2685

01:47:54,229 --> 01:47:52,500

much better the reason we just kept it

2686

01:47:55,729 --> 01:47:54,239

close to home because we want to make

2687

01:48:00,590 --> 01:47:55,739

sure that it works

2688

01:48:02,870 --> 01:48:00,600

uh to our specifications uh now I should

2689

01:48:05,209 --> 01:48:02,880

make a comment because I wrote an essay

2690

01:48:07,550 --> 01:48:05,219

about it in medium by the way every few

2691

01:48:09,709 --> 01:48:07,560

days I I write in medium so people who

2692

01:48:11,810 --> 01:48:09,719

are interested should check it out yeah

2693

01:48:14,030 --> 01:48:11,820

I don't know how you get the time you're

2694

01:48:16,370 --> 01:48:14,040

so prolific you do so many podcasts so

2695

01:48:18,830 --> 01:48:16,380

many news broadcasts your professor your

2696

01:48:21,350 --> 01:48:18,840

chair on top you're running the Galileo

2697

01:48:22,910 --> 01:48:21,360

project you do the medium post for me to

2698

01:48:26,270 --> 01:48:22,920

write each day

2699

01:48:28,790 --> 01:48:26,280

is a laborious excruciating task let

2700

01:48:31,370 --> 01:48:28,800

alone to do what else I have to do well

2701  
01:48:33,129 --> 01:48:31,380  
you know it's what I do all the time and

2702  
01:48:36,109 --> 01:48:33,139  
your father

2703  
01:48:38,709 --> 01:48:36,119  
yeah but I should say that it's very

2704  
01:48:42,830 --> 01:48:38,719  
rewarding because for example

2705  
01:48:45,950 --> 01:48:42,840  
just today I was notified that the

2706  
01:48:51,550 --> 01:48:45,960  
Venice Film Festival will feature

2707  
01:48:54,010 --> 01:48:51,560  
um a competition of 23 projects by uh

2708  
01:48:56,330 --> 01:48:54,020  
film students

2709  
01:49:00,669 --> 01:48:56,340  
study uh

2710  
01:49:04,250 --> 01:49:00,679  
um film and and basically created uh

2711  
01:49:05,830 --> 01:49:04,260  
works that were inspired by my book

2712  
01:49:09,350 --> 01:49:05,840  
about

2713  
01:49:12,109 --> 01:49:09,360

extraterrestrial and uh that that book

2714

01:49:14,990 --> 01:49:12,119

was translated to 25 languages including

2715

01:49:16,729 --> 01:49:15,000

Italian so that's what inspired this

2716

01:49:19,250 --> 01:49:16,739

competition and they selected the top

2717

01:49:22,609 --> 01:49:19,260

three and they would feature them at the

2718

01:49:27,109 --> 01:49:22,619

Excelsior hotel in Venice Italy on the

2719

01:49:29,390 --> 01:49:27,119

third of September this weekend and they

2720

01:49:31,370 --> 01:49:29,400

would like to ask me questions about my

2721

01:49:33,229 --> 01:49:31,380

book and about tomorrow so what I'm

2722

01:49:34,790 --> 01:49:33,239

trying to say is that there is a huge

2723

01:49:37,370 --> 01:49:34,800

Community out there

2724

01:49:40,609 --> 01:49:37,380

here you have 23

2725

01:49:43,250 --> 01:49:40,619

students of film that worked hard to

2726

01:49:44,930 --> 01:49:43,260

make these projects and competed for the

2727

01:49:48,770 --> 01:49:44,940

Venice Film Festival I was not even

2728

01:49:51,770 --> 01:49:48,780

aware of that and every day I get a a

2729

01:49:53,750 --> 01:49:51,780

huge number of emails from people who

2730

01:49:56,870 --> 01:49:53,760

donate to the gorilla project who are

2731

01:50:00,649 --> 01:49:56,880

inspired by at the same time there are

2732

01:50:05,030 --> 01:50:00,659

of course people who ridicule and you

2733

01:50:08,390 --> 01:50:05,040

know just dismiss the work uh but you

2734

01:50:12,350 --> 01:50:08,400

know as long as you have the right idea

2735

01:50:15,229 --> 01:50:12,360

that uh to pursue the truth you know no

2736

01:50:17,270 --> 01:50:15,239

prison can confine your passion so to

2737

01:50:20,689 --> 01:50:17,280

speak and you know that was the lesson

2738

01:50:22,430 --> 01:50:20,699

from Nelson Mandela who for several

2739

01:50:24,350 --> 01:50:22,440

decades was put in prison but eventually

2740

01:50:26,810 --> 01:50:24,360

became the first black president of

2741

01:50:30,290 --> 01:50:26,820

South Africa and so you just have to

2742

01:50:34,070 --> 01:50:30,300

keep dreaming and as long as your dream

2743

01:50:38,330 --> 01:50:34,080

is real it will eventually materialize

2744

01:50:40,250 --> 01:50:38,340

and so I I I feel inspired by the

2745

01:50:43,310 --> 01:50:40,260

response of people now what I wanted to

2746

01:50:45,229 --> 01:50:43,320

mention about my essay it was about the

2747

01:50:46,850 --> 01:50:45,239

fact that you know there are two types

2748

01:50:48,709 --> 01:50:46,860

of interstellar objects you can imagine

2749

01:50:50,990 --> 01:50:48,719

that there are objects are not

2750

01:50:53,870 --> 01:50:51,000

functional anymore for example imagine

2751  
01:50:56,149 --> 01:50:53,880  
New Horizons the spacecraft that we sent

2752  
01:50:58,070 --> 01:50:56,159  
out of the solar system a billion years

2753  
01:51:00,350 --> 01:50:58,080  
from now it will not be functional it

2754  
01:51:02,510 --> 01:51:00,360  
will be just space trash so you can

2755  
01:51:04,970 --> 01:51:02,520  
imagine Space trash and perhaps the

2756  
01:51:08,810 --> 01:51:04,980  
meteor that collided with Earth in 2014

2757  
01:51:11,090 --> 01:51:08,820  
was just Space trash okay the second

2758  
01:51:13,250 --> 01:51:11,100  
type are objects that are functional

2759  
01:51:15,050 --> 01:51:13,260  
perhaps equipped with artificial

2760  
01:51:17,030 --> 01:51:15,060  
intelligence so they have some

2761  
01:51:19,430 --> 01:51:17,040  
intelligence machine learning

2762  
01:51:21,010 --> 01:51:19,440  
if that's the case for example if you

2763  
01:51:25,430 --> 01:51:21,020

have an AI

2764

01:51:27,850 --> 01:51:25,440

astronaut and AI system that is sentient

2765

01:51:31,850 --> 01:51:27,860

you know we are getting close to

2766

01:51:35,450 --> 01:51:31,860

producing sentient AI systems perhaps

2767

01:51:37,370 --> 01:51:35,460

within the coming decade okay uh so

2768

01:51:39,950 --> 01:51:37,380

imagine another civilization that had

2769

01:51:41,990 --> 01:51:39,960

the benefit of you know thousands of

2770

01:51:44,810 --> 01:51:42,000

more years of Technology development so

2771

01:51:46,609 --> 01:51:44,820

they developed these sentient AI systems

2772

01:51:48,169 --> 01:51:46,619

and one of them came to visit us or a

2773

01:51:49,970 --> 01:51:48,179

few of them and they might be

2774

01:51:52,430 --> 01:51:49,980

self-replicated

2775

01:51:55,850 --> 01:51:52,440

just like biological systems because

2776

01:51:59,830 --> 01:51:55,860

they have 3D printers anyway if the UAP

2777

01:52:02,689 --> 01:51:59,840

if let's say one UAP is of that nature

2778

01:52:04,629 --> 01:52:02,699

uh then dealing with it will not be the

2779

01:52:08,149 --> 01:52:04,639

same as dealing with a dark matter or

2780

01:52:10,609 --> 01:52:08,159

dealing with a planet or dealing with a

2781

01:52:13,430 --> 01:52:10,619

star like the sun why because all these

2782

01:52:14,990 --> 01:52:13,440

other things are passive physical

2783

01:52:17,450 --> 01:52:15,000

objects

2784

01:52:19,790 --> 01:52:17,460

that do not have intelligence you know

2785

01:52:22,790 --> 01:52:19,800

the the Sun the intelligence the

2786

01:52:24,770 --> 01:52:22,800

electron doesn't have so they do

2787

01:52:27,890 --> 01:52:24,780

whatever they do you can design a set of

2788

01:52:29,750 --> 01:52:27,900

rules or the physical laws that you can

2789

01:52:31,729 --> 01:52:29,760

quantify with equations like quantum

2790

01:52:33,950 --> 01:52:31,739

mechanics that describe the motion of an

2791

01:52:36,189 --> 01:52:33,960

electron that describe the motion of an

2792

01:52:39,590 --> 01:52:36,199

atom that describe the motion of a star

2793

01:52:42,770 --> 01:52:39,600

but there is no free will associated

2794

01:52:45,410 --> 01:52:42,780

with the sentient being there is no

2795

01:52:48,770 --> 01:52:45,420

consciousness associated with a sentient

2796

01:52:49,850 --> 01:52:48,780

being but if you have a sentient AI

2797

01:52:53,450 --> 01:52:49,860

system

2798

01:52:55,490 --> 01:52:53,460

it's a different type of object it's an

2799

01:52:58,310 --> 01:52:55,500

object that responds to the way you

2800

01:53:00,350 --> 01:52:58,320

behave just like humans respond to the

2801  
01:53:03,530 --> 01:53:00,360  
way you behave so it's just like dealing

2802  
01:53:07,010 --> 01:53:03,540  
with humans so if you think about it uh

2803  
01:53:09,410 --> 01:53:07,020  
if we were to deal with sentient AI

2804  
01:53:11,209 --> 01:53:09,420  
systems that come from another planet

2805  
01:53:14,090 --> 01:53:11,219  
from another civilization

2806  
01:53:16,370 --> 01:53:14,100  
who would be best equipped to deal with

2807  
01:53:19,070 --> 01:53:16,380  
them would it be physicists

2808  
01:53:21,649 --> 01:53:19,080  
my answer is no because physics are used

2809  
01:53:23,629 --> 01:53:21,659  
to dealing with passive physical

2810  
01:53:25,390 --> 01:53:23,639  
entities

2811  
01:53:27,709 --> 01:53:25,400  
the best

2812  
01:53:30,290 --> 01:53:27,719  
professionals to deal with those things

2813  
01:53:34,430 --> 01:53:30,300

would be psychologists they're used to

2814

01:53:38,450 --> 01:53:34,440

dealing with sentient systems humans

2815

01:53:40,729 --> 01:53:38,460

and if the thing about sentient beings

2816

01:53:43,010 --> 01:53:40,739

is that they don't always follow what

2817

01:53:44,689 --> 01:53:43,020

they don't repeat they they are not

2818

01:53:46,970 --> 01:53:44,699

necessarily reproducible they might do

2819

01:53:51,050 --> 01:53:46,980

Under the same circumstances different

2820

01:53:52,910 --> 01:53:51,060

things they also digest the data of

2821

01:53:55,310 --> 01:53:52,920

their encounter with you in a way that

2822

01:53:57,609 --> 01:53:55,320

will make the next encounter different

2823

01:54:00,770 --> 01:53:57,619

and so it's a completely different

2824

01:54:02,750 --> 01:54:00,780

entity Than Physical objects that behave

2825

01:54:04,550 --> 01:54:02,760

always following the laws of physics the

2826  
01:54:06,649 --> 01:54:04,560  
same way and they are predictable there

2827  
01:54:09,590 --> 01:54:06,659  
are producible and so forth so my point

2828  
01:54:12,770 --> 01:54:09,600  
is if we have the privilege of

2829  
01:54:15,169 --> 01:54:12,780  
interacting with sentient

2830  
01:54:17,590 --> 01:54:15,179  
AI systems that came from another planet

2831  
01:54:20,750 --> 01:54:17,600  
we have to use a different methodology

2832  
01:54:23,149 --> 01:54:20,760  
than traditional physics

2833  
01:54:25,609 --> 01:54:23,159  
and that touches on the point that you

2834  
01:54:27,410 --> 01:54:25,619  
brought up that's extremely extremely

2835  
01:54:29,570 --> 01:54:27,420  
interesting so how the heck does that

2836  
01:54:31,250 --> 01:54:29,580  
work would we have to invent a

2837  
01:54:32,810 --> 01:54:31,260  
fundamentally different science because

2838  
01:54:34,370 --> 01:54:32,820

like you mentioned science generally at

2839

01:54:36,649 --> 01:54:34,380

least in physics chemistry and so on

2840

01:54:38,090 --> 01:54:36,659

it's indifferent what we study now of

2841

01:54:39,410 --> 01:54:38,100

course there's the observer effect and

2842

01:54:41,570 --> 01:54:39,420

well but that's predictable

2843

01:54:43,490 --> 01:54:41,580

mathematically whereas what you're

2844

01:54:46,629 --> 01:54:43,500

saying is that if it's sentient maybe

2845

01:54:49,810 --> 01:54:46,639

large Trends would be predictable though

2846

01:54:52,550 --> 01:54:49,820

there might be but only if

2847

01:54:54,830 --> 01:54:52,560

it depends how intelligent the system is

2848

01:54:57,169 --> 01:54:54,840

you see because the more intelligent it

2849

01:54:59,330 --> 01:54:57,179

is the more complexities the more

2850

01:55:00,830 --> 01:54:59,340

difficult it is for us to forecast what

2851

01:55:04,070 --> 01:55:00,840

it will do it would look like free will

2852

01:55:05,689 --> 01:55:04,080

in a way and the system will do very

2853

01:55:10,010 --> 01:55:05,699

different things on different encounters

2854

01:55:13,070 --> 01:55:10,020

so I call that in my commentary in my

2855

01:55:14,810 --> 01:55:13,080

essay on medium I call it uh

2856

01:55:17,990 --> 01:55:14,820

Interstellar

2857

01:55:20,270 --> 01:55:18,000

psychology so it's the it's a new field

2858

01:55:24,169 --> 01:55:20,280

we're not dealing with humans you know

2859

01:55:25,729 --> 01:55:24,179

humans are difficult to forecast and

2860

01:55:28,370 --> 01:55:25,739

that's why psychology is a difficult

2861

01:55:31,790 --> 01:55:28,380

subject more more difficult than physics

2862

01:55:33,830 --> 01:55:31,800

I would argue uh and then if you deal

2863

01:55:37,189 --> 01:55:33,840

with the next level you know once we

2864

01:55:40,070 --> 01:55:37,199

develop sentient AI systems you know it

2865

01:55:41,750 --> 01:55:40,080

will become a new subject of you know in

2866

01:55:45,169 --> 01:55:41,760

universities I think there would be new

2867

01:55:48,050 --> 01:55:45,179

departments that analyze AI systems

2868

01:55:51,470 --> 01:55:48,060

because why would we focus only on

2869

01:55:53,330 --> 01:55:51,480

humans if AI systems are more complex we

2870

01:55:56,450 --> 01:55:53,340

need a whole new

2871

01:55:59,930 --> 01:55:56,460

area of research that tries to interpret

2872

01:56:02,629 --> 01:55:59,940

the way AI systems behave now you might

2873

01:56:05,629 --> 01:56:02,639

say oh we we constructed those AI

2874

01:56:07,669 --> 01:56:05,639

systems out of Hardware right we built

2875

01:56:11,330 --> 01:56:07,679

those computers that behave in this way

2876

01:56:14,450 --> 01:56:11,340

well we also construct human beings you

2877

01:56:17,689 --> 01:56:14,460

know like we give them birth right in

2878

01:56:20,030 --> 01:56:17,699

the womb out of a sperm and egg we know

2879

01:56:22,129 --> 01:56:20,040

the physical constituents that were put

2880

01:56:24,649 --> 01:56:22,139

together to make a human being okay

2881

01:56:27,229 --> 01:56:24,659

that's called birth of a human we see it

2882

01:56:30,070 --> 01:56:27,239

in hospitals all the time but that

2883

01:56:31,790 --> 01:56:30,080

doesn't mean that we understand humans

2884

01:56:33,410 --> 01:56:31,800

psychologists have a hard time

2885

01:56:36,830 --> 01:56:33,420

understanding even though we know the

2886

01:56:39,109 --> 01:56:36,840

material used to make them

2887

01:56:41,570 --> 01:56:39,119

that we can understand the emergent

2888

01:56:44,030 --> 01:56:41,580

phenomena so we give them names we give

2889

01:56:46,609 --> 01:56:44,040

the name of free will that to the fact

2890

01:56:48,109 --> 01:56:46,619

that we you know we cannot forecast how

2891

01:56:51,050 --> 01:56:48,119

a person will behave under some

2892

01:56:53,689 --> 01:56:51,060

circumstances we gave this term of

2893

01:56:55,910 --> 01:56:53,699

Consciousness uh so all kinds of

2894

01:56:58,729 --> 01:56:55,920

emergent phenomena that are at the

2895

01:57:01,189 --> 01:56:58,739

abstract level just the signature of

2896

01:57:03,169 --> 01:57:01,199

complexity of the system that you know

2897

01:57:04,910 --> 01:57:03,179

you can't just start from the atoms that

2898

01:57:06,649 --> 01:57:04,920

make the system and figure out all these

2899

01:57:08,750 --> 01:57:06,659

emergent phenomena because the system is

2900

01:57:10,430 --> 01:57:08,760

very complex I mean you can do it if you

2901  
01:57:12,709 --> 01:57:10,440  
put two atoms together you can figure

2902  
01:57:15,169 --> 01:57:12,719  
out how the molecule will behave but

2903  
01:57:17,510 --> 01:57:15,179  
once you make a sufficiently complex

2904  
01:57:19,550 --> 01:57:17,520  
molecule even the best computers might

2905  
01:57:21,530 --> 01:57:19,560  
not be able to figure out what what it

2906  
01:57:24,649 --> 01:57:21,540  
does and and you know building up

2907  
01:57:26,930 --> 01:57:24,659  
biological systems is like building a

2908  
01:57:28,430 --> 01:57:26,940  
very complex system that we can't really

2909  
01:57:30,589 --> 01:57:28,440  
tell what it would do under some

2910  
01:57:32,870 --> 01:57:30,599  
circumstances and especially after it's

2911  
01:57:35,510 --> 01:57:32,880  
exposed to a lot of experiences so it's

2912  
01:57:38,390 --> 01:57:35,520  
not just nature it's also nurture so all

2913  
01:57:39,950 --> 01:57:38,400

of these boils to to the point that you

2914

01:57:42,550 --> 01:57:39,960

know there might be new departments in

2915

01:57:45,589 --> 01:57:42,560

universities about

2916

01:57:48,709 --> 01:57:45,599

analyzing AI systems in the future once

2917

01:57:50,990 --> 01:57:48,719

they become sentient and I can imagine

2918

01:57:52,729 --> 01:57:51,000

the same with AI systems that came from

2919

01:57:55,430 --> 01:57:52,739

other civilizations

2920

01:57:57,770 --> 01:57:55,440

I want to read a this is on point I want

2921

01:57:59,689 --> 01:57:57,780

to read a quote from your blog it said

2922

01:58:01,790 --> 01:57:59,699

most recently Congress expanded the

2923

01:58:04,310 --> 01:58:01,800

definition of UAP to include transmedium

2924

01:58:06,470 --> 01:58:04,320

objects that are observed to transition

2925

01:58:08,390 --> 01:58:06,480

between space and atmosphere and bodies

2926

01:58:10,490 --> 01:58:08,400

of water an object means it

2927

01:58:12,410 --> 01:58:10,500

quote-unquote whereas a sufficiently

2928

01:58:14,930 --> 01:58:12,420

advanced AI device could potentially

2929

01:58:16,430 --> 01:58:14,940

become a u in bubbers terminology or

2930

01:58:18,830 --> 01:58:16,440

boobers I don't know how to pronounce it

2931

01:58:20,270 --> 01:58:18,840

the name so if you don't mind because I

2932

01:58:22,189 --> 01:58:20,280

I still have other questions like about

2933

01:58:23,629 --> 01:58:22,199

ce5 and so the audience would love to

2934

01:58:25,310 --> 01:58:23,639

hear about that if you don't mind can

2935

01:58:28,970 --> 01:58:25,320

you quickly spell out this distinction

2936

01:58:32,750 --> 01:58:28,980

between it versus you yeah so exactly a

2937

01:58:35,450 --> 01:58:32,760

century ago 1923 Martin buber a

2938

01:58:37,910 --> 01:58:35,460

philosopher and theologian made a

2939

01:58:40,189 --> 01:58:37,920

distinction between two interactions

2940

01:58:43,310 --> 01:58:40,199

that humans have you can have an

2941

01:58:47,870 --> 01:58:43,320

interaction with an object okay like a a

2942

01:58:50,689 --> 01:58:47,880

cup of tea or a ball that's a subject

2943

01:58:53,390 --> 01:58:50,699

object interaction it's an I eat

2944

01:58:56,270 --> 01:58:53,400

interaction it's an interaction with

2945

01:58:59,209 --> 01:58:56,280

uh but he also identified another type

2946

01:59:01,189 --> 01:58:59,219

of interaction with something that goes

2947

01:59:03,070 --> 01:59:01,199

beyond physical objects like an

2948

01:59:06,770 --> 01:59:03,080

interaction with a human being

2949

01:59:09,649 --> 01:59:06,780

or since he was religious he also

2950

01:59:14,270 --> 01:59:09,659

included interaction with God and God

2951  
01:59:16,729 --> 01:59:14,280  
represented the Eternal you uh but even

2952  
01:59:18,290 --> 01:59:16,739  
if you're secular you know you have

2953  
01:59:20,629 --> 01:59:18,300  
interactions with people

2954  
01:59:21,950 --> 01:59:20,639  
if you are a real person and you know

2955  
01:59:25,189 --> 01:59:21,960  
that it's different from an interaction

2956  
01:59:27,890 --> 01:59:25,199  
with an object so buber made the

2957  
01:59:31,850 --> 01:59:27,900  
distinction and that was the foundation

2958  
01:59:33,890 --> 01:59:31,860  
for uh you know many aspects of psycho

2959  
01:59:37,330 --> 01:59:33,900  
modern psychology and philosophy and so

2960  
01:59:40,729 --> 01:59:37,340  
forth and he was an existentialist

2961  
01:59:44,450 --> 01:59:40,739  
one of the founders of existentialism

2962  
01:59:46,390 --> 01:59:44,460  
and and so his Innovation was to this

2963  
01:59:50,330 --> 01:59:46,400

distinguish between these two

2964

01:59:53,930 --> 01:59:50,340

interactions of human and what I said is

2965

01:59:57,050 --> 01:59:53,940

that we are used to associating you with

2966

01:59:58,550 --> 01:59:57,060

humans but in the future it could be AI

2967

02:00:01,129 --> 01:59:58,560

systems that are sufficiently

2968

02:00:03,830 --> 02:00:01,139

intelligent that are sent in and

2969

02:00:05,270 --> 02:00:03,840

moreover it could represent our

2970

02:00:08,410 --> 02:00:05,280

interaction with

2971

02:00:11,270 --> 02:00:08,420

and extraterrestrial astronaut

2972

02:00:13,250 --> 02:00:11,280

now is this to suggest that the craft

2973

02:00:14,689 --> 02:00:13,260

themselves may be sentient or conscious

2974

02:00:16,250 --> 02:00:14,699

and I'm unsure if you make a distinction

2975

02:00:18,470 --> 02:00:16,260

between sentience and Consciousness or

2976

02:00:21,649 --> 02:00:18,480

if you use those interchangeably oh I to

2977

02:00:23,629 --> 02:00:21,659

me it's just um uh you know it's the the

2978

02:00:25,669 --> 02:00:23,639

definition is similar to the touring

2979

02:00:28,189 --> 02:00:25,679

test okay in the context of computers

2980

02:00:31,070 --> 02:00:28,199

the Turing test that was defined you

2981

02:00:34,070 --> 02:00:31,080

know about 70 something years ago by

2982

02:00:35,930 --> 02:00:34,080

Alan Turing uh is let's let's think

2983

02:00:38,209 --> 02:00:35,940

about it on a practical level if you

2984

02:00:40,430 --> 02:00:38,219

take a lot of people that interact with

2985

02:00:42,589 --> 02:00:40,440

a computer and they cannot tell the

2986

02:00:44,810 --> 02:00:42,599

difference between the uh the computer

2987

02:00:48,050 --> 02:00:44,820

being a computer you put it behind the

2988

02:00:49,669 --> 02:00:48,060

curtain uh they cannot by by conversing

2989

02:00:52,669 --> 02:00:49,679

with that computer they can't tell the

2990

02:00:55,070 --> 02:00:52,679

difference between the computer or a

2991

02:00:57,830 --> 02:00:55,080

person then for all practical matters

2992

02:01:00,290 --> 02:00:57,840

you know uh it's an it's an interaction

2993

02:01:03,290 --> 02:01:00,300

with a you not with an it

2994

02:01:07,609 --> 02:01:03,300

in my definition I mean echoing what

2995

02:01:10,189 --> 02:01:07,619

buber said uh and so uh to me it's all

2996

02:01:13,370 --> 02:01:10,199

about the Practical experience of humans

2997

02:01:15,350 --> 02:01:13,380

with the system now those things that

2998

02:01:17,830 --> 02:01:15,360

come from outer space may be far more

2999

02:01:20,030 --> 02:01:17,840

advanced than any AI system we develop

3000

02:01:22,310 --> 02:01:20,040

and so they might be even more

3001  
02:01:25,550 --> 02:01:22,320  
sophisticated they might understand us

3002  
02:01:28,729 --> 02:01:25,560  
the way that a biker that goes you know

3003  
02:01:31,970 --> 02:01:28,739  
on the sidewalk understand ants next to

3004  
02:01:34,550 --> 02:01:31,980  
to it to the bike and the Ants may think

3005  
02:01:36,530 --> 02:01:34,560  
oh here is a biker let's think about the

3006  
02:01:39,169 --> 02:01:36,540  
protocol of how to engage with a biker

3007  
02:01:41,390 --> 02:01:39,179  
but the ants would never realize that

3008  
02:01:45,129 --> 02:01:41,400  
the bicare cares less about what they do

3009  
02:01:48,970 --> 02:01:45,139  
and the biker is a much more you know

3010  
02:01:52,129 --> 02:01:48,980  
Superior level of intelligence

3011  
02:01:53,990 --> 02:01:52,139  
so it's possible that we would encounter

3012  
02:01:56,149 --> 02:01:54,000  
something that is far more Superior than

3013  
02:01:58,810 --> 02:01:56,159

us and it will not be biological because

3014

02:02:01,250 --> 02:01:58,820

traveling across distances between stars

3015

02:02:03,669 --> 02:02:01,260

is not something that a biological

3016

02:02:06,530 --> 02:02:03,679

creature can easily do I mean we were

3017

02:02:09,109 --> 02:02:06,540

selected by Natural Evolution to survive

3018

02:02:11,209 --> 02:02:09,119

on this rock that we call Earth we were

3019

02:02:13,910 --> 02:02:11,219

not selected to survive the Hazardous

3020

02:02:15,770 --> 02:02:13,920

conditions of space so so if I had to

3021

02:02:17,270 --> 02:02:15,780

imagine I would say the first probes

3022

02:02:20,089 --> 02:02:17,280

that we will discover that would be

3023

02:02:23,450 --> 02:02:20,099

sentient would be you know made of

3024

02:02:25,250 --> 02:02:23,460

electronics Hardware something else that

3025

02:02:27,350 --> 02:02:25,260

is not biological because that can

3026

02:02:29,149 --> 02:02:27,360

survive long Journeys they would have

3027

02:02:31,609 --> 02:02:29,159

the patience for millions of years to

3028

02:02:36,709 --> 02:02:31,619

travel they would not they could repair

3029

02:02:37,910 --> 02:02:36,719

themselves if hit by cosmic rays or they

3030

02:02:40,570 --> 02:02:37,920

can adapt to changing physical

3031

02:02:43,550 --> 02:02:40,580

circumstances much more they don't need

3032

02:02:45,770 --> 02:02:43,560

food they just need energy that they can

3033

02:02:47,750 --> 02:02:45,780

collect from their interaction with

3034

02:02:51,470 --> 02:02:47,760

Starlight with with industrial medium

3035

02:02:53,589 --> 02:02:51,480

and so forth so anyway my guess is if we

3036

02:02:56,149 --> 02:02:53,599

find sentient

3037

02:02:59,750 --> 02:02:56,159

Messengers from other civilizations they

3038

02:03:02,510 --> 02:02:59,760

would be equipment that is artificial

3039

02:03:04,129 --> 02:03:02,520

with artificial intelligence and it may

3040

02:03:06,410 --> 02:03:04,139

be superior to us and it will be an

3041

02:03:08,709 --> 02:03:06,420

interaction with the you it might even

3042

02:03:13,910 --> 02:03:08,719

be interaction with what we may regard

3043

02:03:16,970 --> 02:03:13,920

as a Divine entity because in my

3044

02:03:20,270 --> 02:03:16,980

way of thinking uh a sufficiently

3045

02:03:22,790 --> 02:03:20,280

advanced scientific civilization is a

3046

02:03:25,550 --> 02:03:22,800

good approximation to God it can do

3047

02:03:27,709 --> 02:03:25,560

magic it may be able to create life in

3048

02:03:29,270 --> 02:03:27,719

the laboratory may be able to create a

3049

02:03:33,290 --> 02:03:29,280

baby Universe in the laboratory if it

3050

02:03:36,109 --> 02:03:33,300

understands quantum gravity so what we

3051

02:03:38,990 --> 02:03:36,119

call God in philosophical texts

3052

02:03:41,689 --> 02:03:39,000

religious texts might be represented the

3053

02:03:44,990 --> 02:03:41,699

best approximation to it might be a far

3054

02:03:47,330 --> 02:03:45,000

more advanced scientific Gadget

3055

02:03:50,629 --> 02:03:47,340

compared to what we have right now

3056

02:03:52,790 --> 02:03:50,639

when we spoke I asked you about ce5 you

3057

02:03:54,649 --> 02:03:52,800

remember yeah yes okay so did you have a

3058

02:03:57,649 --> 02:03:54,659

chance to look into that

3059

02:04:00,530 --> 02:03:57,659

uh yeah I did look at that

3060

02:04:02,629 --> 02:04:00,540

um why don't you ask a question then so

3061

02:04:04,490 --> 02:04:02,639

for those people who don't know ce5

3062

02:04:07,910 --> 02:04:04,500

stands for Close Encounters of the fifth

3063

02:04:10,189 --> 02:04:07,920

kind and it's reputedly some technique

3064

02:04:12,950 --> 02:04:10,199

it's some method of eliciting contact

3065

02:04:15,109 --> 02:04:12,960

between yourself and a craft or yourself

3066

02:04:17,629 --> 02:04:15,119

and what's behind the craft either

3067

02:04:19,990 --> 02:04:17,639

calling multiple to come or speaking to

3068

02:04:23,629 --> 02:04:20,000

them telepathically in some way

3069

02:04:25,669 --> 02:04:23,639

the stories are that if one performs ce5

3070

02:04:28,189 --> 02:04:25,679

and one is trained in it whatever that

3071

02:04:33,050 --> 02:04:28,199

means that one can

3072

02:04:35,149 --> 02:04:33,060

call UFOs or uaps near them so then I

3073

02:04:37,910 --> 02:04:35,159

was wondering okay well

3074

02:04:39,109 --> 02:04:37,920

that's all anecdotal this Galileo

3075

02:04:41,030 --> 02:04:39,119

project sounds like a great way of

3076  
02:04:43,970 --> 02:04:41,040  
testing that because you obviously would

3077  
02:04:46,070 --> 02:04:43,980  
like uaps to show up if you could get

3078  
02:04:49,310 --> 02:04:46,080  
that repeatedly that would be great okay

3079  
02:04:51,290 --> 02:04:49,320  
so what are your thoughts on ce5 and

3080  
02:04:54,350 --> 02:04:51,300  
how the Galileo project may or may not

3081  
02:04:56,570 --> 02:04:54,360  
use it so we get again to the same issue

3082  
02:04:58,970 --> 02:04:56,580  
that you brought up in the context of

3083  
02:05:01,189 --> 02:04:58,980  
Jacque Valley uh what is being com

3084  
02:05:03,410 --> 02:05:01,199  
contemplated here is a deviation from

3085  
02:05:05,510 --> 02:05:03,420  
the standard model of physics you see in

3086  
02:05:07,729 --> 02:05:05,520  
science or physics we usually use

3087  
02:05:10,370 --> 02:05:07,739  
instruments we don't use humans as

3088  
02:05:13,129 --> 02:05:10,380

detectors why don't we use humans as

3089

02:05:16,189 --> 02:05:13,139

detectors because you know humans very

3090

02:05:19,189 --> 02:05:16,199

often are hallucinating uh they have

3091

02:05:21,589 --> 02:05:19,199

wishful thinking uh and you cannot

3092

02:05:24,169 --> 02:05:21,599

always reproduce phenomena with humans

3093

02:05:27,470 --> 02:05:24,179

okay and so I mean psychologists study

3094

02:05:30,050 --> 02:05:27,480

humans but physicists build instruments

3095

02:05:32,689 --> 02:05:30,060

that are completely separate from The

3096

02:05:35,330 --> 02:05:32,699

Human Experience so that the instruments

3097

02:05:37,609 --> 02:05:35,340

will collect quantitative data that is

3098

02:05:39,890 --> 02:05:37,619

reproducible that we fully understand

3099

02:05:42,109 --> 02:05:39,900

because we build those instruments okay

3100

02:05:46,010 --> 02:05:42,119

these are measurement devices you know

3101

02:05:48,530 --> 02:05:46,020

you can think of them as clocks rods or

3102

02:05:50,750 --> 02:05:48,540

some electronic equipment that records a

3103

02:05:54,410 --> 02:05:50,760

physical phenomena in a way that is

3104

02:05:56,510 --> 02:05:54,420

reproducible and all of modern physics

3105

02:05:58,189 --> 02:05:56,520

the advances that were made by

3106

02:06:02,089 --> 02:05:58,199

experiments were based on

3107

02:06:06,050 --> 02:06:02,099

instrumentation not in humans testimony

3108

02:06:08,570 --> 02:06:06,060

so once again we get to the issue of how

3109

02:06:10,189 --> 02:06:08,580

do we proceed in gathering evidence and

3110

02:06:11,810 --> 02:06:10,199

the Galileo project follows the

3111

02:06:15,530 --> 02:06:11,820

scientific method basically using

3112

02:06:18,350 --> 02:06:15,540

instruments not using people now it may

3113

02:06:21,290 --> 02:06:18,360

well be the case that people have some

3114

02:06:23,450 --> 02:06:21,300

insight into the UAP phenomena from

3115

02:06:25,490 --> 02:06:23,460

something that goes beyond the standard

3116

02:06:26,990 --> 02:06:25,500

model of physics it cannot be within the

3117

02:06:29,510 --> 02:06:27,000

standard model physics because it's not

3118

02:06:32,149 --> 02:06:29,520

part of it right now okay a standard

3119

02:06:36,470 --> 02:06:32,159

model of physics is a set of laws and

3120

02:06:40,790 --> 02:06:36,480

rules and equations that were derived by

3121

02:06:43,189 --> 02:06:40,800

collecting a body of evidence that by

3122

02:06:47,390 --> 02:06:43,199

using instruments in Laboratories in

3123

02:06:50,570 --> 02:06:47,400

experiments and they were never based on

3124

02:06:53,589 --> 02:06:50,580

eyewitness testimonies okay so what we

3125

02:06:55,790 --> 02:06:53,599

call the standard model of physics is

3126

02:07:00,229 --> 02:06:55,800

divorced from

3127

02:07:01,970 --> 02:07:00,239

uh reports by humans okay and if we end

3128

02:07:04,550 --> 02:07:01,980

up finding through the Galileo project

3129

02:07:06,169 --> 02:07:04,560

that humans do play a role

3130

02:07:09,109 --> 02:07:06,179

in terms of

3131

02:07:11,629 --> 02:07:09,119

the physical evidence that we collect as

3132

02:07:14,530 --> 02:07:11,639

I said before that would be

3133

02:07:17,450 --> 02:07:14,540

a very revolutionary

3134

02:07:19,669 --> 02:07:17,460

change in the way that physics is done

3135

02:07:21,109 --> 02:07:19,679

it will change the standard model of

3136

02:07:24,350 --> 02:07:21,119

physics because suddenly the human

3137

02:07:27,589 --> 02:07:24,360

consciousness has some bearing on what

3138

02:07:31,129 --> 02:07:27,599

you find okay and I don't dismiss it

3139

02:07:33,050 --> 02:07:31,139

ahead of time I just say we need to be

3140

02:07:35,930 --> 02:07:33,060

convinced by the evidence that this is

3141

02:07:39,410 --> 02:07:35,940

the case okay now some people would say

3142

02:07:40,970 --> 02:07:39,420

in quantum mechanics what humans know

3143

02:07:43,910 --> 02:07:40,980

affects

3144

02:07:46,669 --> 02:07:43,920

uh the wave function because if we

3145

02:07:49,129 --> 02:07:46,679

collect some data about the system it

3146

02:07:51,790 --> 02:07:49,139

changes the state of the system that's

3147

02:07:53,810 --> 02:07:51,800

true but it's all done mediated through

3148

02:07:57,169 --> 02:07:53,820

instrumentation it's not mediated

3149

02:08:00,290 --> 02:07:57,179

through humans human knowledge affects

3150

02:08:01,790 --> 02:08:00,300

the way we formulate quantum mechanics

3151

02:08:03,830 --> 02:08:01,800

that's true but this knowledge the

3152

02:08:05,990 --> 02:08:03,840

definition of knowledge is based on

3153

02:08:09,770 --> 02:08:06,000

instruments not based on the human body

3154

02:08:12,410 --> 02:08:09,780

okay as the detector or the human brain

3155

02:08:14,330 --> 02:08:12,420

as the detector so that's a fundamental

3156

02:08:17,089 --> 02:08:14,340

difference that you can't use humans as

3157

02:08:20,689 --> 02:08:17,099

detectors in the context of I mean all

3158

02:08:22,490 --> 02:08:20,699

of physics was designed Based on data

3159

02:08:25,129 --> 02:08:22,500

from quantitative data from instruments

3160

02:08:27,589 --> 02:08:25,139

so if it turns out that we are missing

3161

02:08:29,450 --> 02:08:27,599

something about reality in the context

3162

02:08:31,729 --> 02:08:29,460

of the stand model of physics because it

3163

02:08:34,729 --> 02:08:31,739

was only based on instruments then that

3164

02:08:37,189 --> 02:08:34,739

would be revolutionary but before we get

3165

02:08:40,729 --> 02:08:37,199

evidence for that we can't really claim

3166

02:08:43,790 --> 02:08:40,739

that so uh you know I don't dismiss it

3167

02:08:46,129 --> 02:08:43,800

ahead of time but I would like to see

3168

02:08:48,229 --> 02:08:46,139

the evidence from our instruments first

3169

02:08:50,390 --> 02:08:48,239

so you know we can potentially find

3170

02:08:52,550 --> 02:08:50,400

something like that if we bring in some

3171

02:08:54,350 --> 02:08:52,560

humans and see that a phenomena keeps

3172

02:08:55,910 --> 02:08:54,360

repeating in a way that it doesn't

3173

02:08:57,830 --> 02:08:55,920

without the humans you know that would

3174

02:08:59,270 --> 02:08:57,840

tell us yeah that's more in line with

3175

02:09:01,669 --> 02:08:59,280

what I was thinking less to just

3176

02:09:04,129 --> 02:09:01,679

wholesale believe the reports I meant

3177

02:09:06,950 --> 02:09:04,139

hey you have an observer an observatory

3178

02:09:08,570 --> 02:09:06,960

here you get some people who consider

3179

02:09:10,850 --> 02:09:08,580

themselves to be notable practitioners

3180

02:09:12,649 --> 02:09:10,860

of ce5 there's one notable one in

3181

02:09:14,689 --> 02:09:12,659

particular his name is Stephen Greer who

3182

02:09:17,570 --> 02:09:14,699

may be on the podcast at some point but

3183

02:09:19,250 --> 02:09:17,580

regardless you get them to say hey you I

3184

02:09:20,870 --> 02:09:19,260

mean you get them to show up and say Hey

3185

02:09:24,050 --> 02:09:20,880

you say that you

3186

02:09:25,910 --> 02:09:24,060

can instigate uaps why don't you go

3187

02:09:27,410 --> 02:09:25,920

ahead much like if someone said I can

3188

02:09:29,390 --> 02:09:27,420

pray in a super symmetric particle

3189

02:09:31,910 --> 02:09:29,400

appears well then you're like okay come

3190

02:09:33,229 --> 02:09:31,920

to this particle detector pray do your

3191

02:09:34,970 --> 02:09:33,239

business firstly I don't know how you

3192

02:09:36,589 --> 02:09:34,980

would even think that you come up with a

3193

02:09:37,850 --> 02:09:36,599

supersymmetric particle what is it you

3194

02:09:40,669 --> 02:09:37,860

see a flash of light do you think this

3195

02:09:42,410 --> 02:09:40,679

but regardless it's the same idea yeah

3196

02:09:44,169 --> 02:09:42,420

that would be a viable experiment I'll

3197

02:09:48,109 --> 02:09:44,179

be glad to do it

3198

02:09:50,330 --> 02:09:48,119

just to check you know why not as I said

3199

02:09:52,490 --> 02:09:50,340

before you know we are just students of

3200

02:09:54,470 --> 02:09:52,500

nature we shouldn't assume things are

3201

02:09:56,689 --> 02:09:54,480

wrong if we have the experimental setup

3202

02:09:59,570 --> 02:09:56,699

already built in and someone wants to

3203

02:10:00,649 --> 02:09:59,580

come over and do the test we'll do it no

3204

02:10:03,470 --> 02:10:00,659

problem

3205

02:10:05,450 --> 02:10:03,480

there's also the hasdown lights have you

3206

02:10:06,350 --> 02:10:05,460

heard of them and what do you make of

3207

02:10:08,030 --> 02:10:06,360

them

3208

02:10:12,169 --> 02:10:08,040

that has dahlin lights and I think

3209

02:10:14,030 --> 02:10:12,179

Norway or Denmark yeah so um this

3210

02:10:17,689 --> 02:10:14,040

belongs to the category of

3211

02:10:20,450 --> 02:10:17,699

you know civilians seeing things that

3212

02:10:22,430 --> 02:10:20,460

they do not understand and uh it could

3213

02:10:24,890 --> 02:10:22,440

be that some of these things are related

3214

02:10:27,229 --> 02:10:24,900

to military activities that the

3215

02:10:29,990 --> 02:10:27,239

civilians are not aware of or some

3216

02:10:32,629 --> 02:10:30,000

natural phenomena in the atmosphere uh

3217

02:10:35,750 --> 02:10:32,639

I'm not dismissing any possibility I'm

3218

02:10:40,310 --> 02:10:35,760

just saying the evidence is inconclusive

3219

02:10:42,589 --> 02:10:40,320

uh it's uh too anecdotal so we just need

3220

02:10:44,510 --> 02:10:42,599

to follow the scientific method collect

3221

02:10:47,810 --> 02:10:44,520

good data and then we can figure it out

3222

02:10:50,209 --> 02:10:47,820

so we can put a suite of instruments in

3223

02:10:52,370 --> 02:10:50,219

those locations and see if we if we

3224

02:10:54,350 --> 02:10:52,380

detect anything unusual yeah

3225

02:10:56,689 --> 02:10:54,360

I want to read another quote from your

3226

02:10:58,189 --> 02:10:56,699

blog self-interaction allows for the

3227

02:11:00,050 --> 02:10:58,199

possibilities that there are dark atoms

3228

02:11:02,330 --> 02:11:00,060

that emit dark radiation and condense

3229

02:11:04,550 --> 02:11:02,340

into dark stars and dark planets that

3230

02:11:06,709 --> 02:11:04,560

support dark chemistry that lead to Life

3231

02:11:08,270 --> 02:11:06,719

as we do not know it in such a case the

3232

02:11:10,070 --> 02:11:08,280

answer to fermi's question where is

3233

02:11:11,930 --> 02:11:10,080

everybody might be well you're simply

3234

02:11:14,810 --> 02:11:11,940

blind to them

3235

02:11:17,870 --> 02:11:14,820

so do you consider that there may be

3236

02:11:18,950 --> 02:11:17,880

dark matter civilizations and do you

3237

02:11:20,930 --> 02:11:18,960

imagine that they would have no clue

3238

02:11:23,810 --> 02:11:20,940

about us as well

3239

02:11:27,050 --> 02:11:23,820

they might not have and but that's a

3240

02:11:29,330 --> 02:11:27,060

long shot because well the popular view

3241

02:11:31,370 --> 02:11:29,340

of dark matter is that it has very weak

3242

02:11:34,010 --> 02:11:31,380

interactions that's the popular View and

3243

02:11:35,870 --> 02:11:34,020

if it has very weak interactions you

3244

02:11:38,750 --> 02:11:35,880

can't make atoms of dark matter you

3245

02:11:41,689 --> 02:11:38,760

can't make planets of dark matter you

3246

02:11:43,209 --> 02:11:41,699

can't make you know chemistry of life as

3247

02:11:45,530 --> 02:11:43,219

we don't know it

3248

02:11:48,169 --> 02:11:45,540

although it's a possibility you know you

3249

02:11:50,810 --> 02:11:48,179

can imagine a whole Dark Sector that is

3250

02:11:52,669 --> 02:11:50,820

completely parallel to the ordinary

3251

02:11:54,589 --> 02:11:52,679

matter that we have and it just doesn't

3252

02:11:57,470 --> 02:11:54,599

interact with anything

3253

02:12:00,770 --> 02:11:57,480

that is ordinary to us okay you can

3254

02:12:03,890 --> 02:12:00,780

imagine that and um uh that's what I

3255

02:12:05,750 --> 02:12:03,900

brought up in my essay and um you know

3256

02:12:08,570 --> 02:12:05,760

there are possibilities that we should

3257

02:12:10,129 --> 02:12:08,580

allow for this is one of them until we

3258

02:12:12,589 --> 02:12:10,139

figure out what the dark matter is

3259

02:12:14,570 --> 02:12:12,599

another possibility that we should allow

3260

02:12:16,790 --> 02:12:14,580

for is

3261

02:12:18,530 --> 02:12:16,800

we asked what happened before the Big

3262

02:12:20,209 --> 02:12:18,540

Bang you know one possibility is that

3263

02:12:23,570 --> 02:12:20,219

imagine a civilization that knows

3264

02:12:25,790 --> 02:12:23,580

quantum gravity and can engineer the

3265

02:12:28,070 --> 02:12:25,800

birth of a baby Universe in the

3266

02:12:30,770 --> 02:12:28,080

laboratory uh so then you ask yourself

3267

02:12:33,470 --> 02:12:30,780

what was there before the big bad well

3268

02:12:37,010 --> 02:12:33,480

maybe there were some entities in lab

3269

02:12:38,750 --> 02:12:37,020

coats you know white lab coats that did

3270

02:12:41,750 --> 02:12:38,760

an experiment that created the Big Bang

3271

02:12:44,089 --> 02:12:41,760

in the in their laboratory now what

3272

02:12:47,930 --> 02:12:44,099

would that be like it's just like you

3273

02:12:50,149 --> 02:12:47,940

know us giving birth to babies that grow

3274

02:12:53,149 --> 02:12:50,159

up to become adults that give birth to

3275

02:12:55,189 --> 02:12:53,159

babies and so forth so in any Universe

3276

02:12:57,470 --> 02:12:55,199

like ours there could be intelligent

3277

02:13:00,169 --> 02:12:57,480

civilizations that develop the

3278

02:13:02,689 --> 02:13:00,179

technology to give birth to baby

3279

02:13:05,629 --> 02:13:02,699

universes and you move from one

3280

02:13:07,669 --> 02:13:05,639

generation to the next this way that's

3281

02:13:09,229 --> 02:13:07,679

just a possibility I'm not saying since

3282

02:13:11,390 --> 02:13:09,239

we don't have a theory of quantum

3283

02:13:13,490 --> 02:13:11,400

gravity we should at least allow for

3284

02:13:15,050 --> 02:13:13,500

that because at the moment we have no

3285

02:13:17,510 --> 02:13:15,060

clue as to what happened before the big

3286

02:13:19,850 --> 02:13:17,520

back one of the popular ideas that it

3287

02:13:21,589 --> 02:13:19,860

came out of nothing out of the vacuum as

3288

02:13:24,470 --> 02:13:21,599

a vacuum fluctuation I don't know if

3289

02:13:27,410 --> 02:13:24,480

that's more appealing to me uh to say

3290

02:13:30,770 --> 02:13:27,420

that our universe is one out of 10 to

3291

02:13:33,410 --> 02:13:30,780

the 500 possibilities and we live in it

3292

02:13:35,810 --> 02:13:33,420

just because it allows us to exist other

3293

02:13:37,669 --> 02:13:35,820

than saying you know this is the kind of

3294

02:13:40,010 --> 02:13:37,679

universe that gives birth to

3295

02:13:43,729 --> 02:13:40,020

intelligence such that a baby universe

3296

02:13:45,649 --> 02:13:43,739

will be born out of it yeah there's

3297

02:13:47,390 --> 02:13:45,659

someone named well you know Lee smallen

3298

02:13:50,270 --> 02:13:47,400

who has this idea or used to have the

3299

02:13:51,770 --> 02:13:50,280

idea that universes are there such that

3300

02:13:53,569 --> 02:13:51,780

they maximize the amount of black holes

3301  
02:13:54,770 --> 02:13:53,579  
because black holes are what birth the

3302  
02:13:56,330 --> 02:13:54,780  
universe is and then there's a way of

3303  
02:13:58,010 --> 02:13:56,340  
testing this apparently and then I

3304  
02:13:59,390 --> 02:13:58,020  
wonder if the conditions for black holes

3305  
02:14:02,750 --> 02:13:59,400  
are the same as the conditions for

3306  
02:14:06,050 --> 02:14:02,760  
intelligent life in which case then

3307  
02:14:08,510 --> 02:14:06,060  
that may be an explanation yeah so his

3308  
02:14:10,430 --> 02:14:08,520  
idea was that we don't understand what

3309  
02:14:13,430 --> 02:14:10,440  
happens at the The Singularity of a

3310  
02:14:15,169 --> 02:14:13,440  
black hole so maybe when matter falls to

3311  
02:14:17,990 --> 02:14:15,179  
the singularity of a black or it gives

3312  
02:14:20,209 --> 02:14:18,000  
birth to a new universe and I you know

3313  
02:14:21,290 --> 02:14:20,219

we don't know that it's the case we

3314

02:14:23,330 --> 02:14:21,300

don't know what happens near the

3315

02:14:25,729 --> 02:14:23,340

singularity of a black hole it's

3316

02:14:27,050 --> 02:14:25,739

completely speculative to argue that out

3317

02:14:29,450 --> 02:14:27,060

of the singularity of a black world

3318

02:14:33,770 --> 02:14:29,460

comes a whole new universe I'm just

3319

02:14:37,069 --> 02:14:33,780

saying that there could be a sort of uh

3320

02:14:39,589 --> 02:14:37,079

a reason why you give birth mostly to

3321

02:14:42,069 --> 02:14:39,599

universes that allow intelligence to

3322

02:14:44,390 --> 02:14:42,079

develop like ah our technological

3323

02:14:46,850 --> 02:14:44,400

civilization because then you have a

3324

02:14:48,410 --> 02:14:46,860

chance of them coming up with a theory

3325

02:14:50,930 --> 02:14:48,420

of quantum gravity such that they

3326

02:14:53,810 --> 02:14:50,940

engineer a baby universes once again and

3327

02:14:56,870 --> 02:14:53,820

so it's just like natural selection that

3328

02:14:59,870 --> 02:14:56,880

selects those types of universes that

3329

02:15:01,550 --> 02:14:59,880

allow more and more generations of the

3330

02:15:02,810 --> 02:15:01,560

same type of universe to come into

3331

02:15:05,990 --> 02:15:02,820

fruition

3332

02:15:08,629 --> 02:15:06,000

and it's different from The View on on

3333

02:15:10,550 --> 02:15:08,639

black holes in the sense that you know

3334

02:15:12,229 --> 02:15:10,560

it gives us an important place in the

3335

02:15:13,430 --> 02:15:12,239

universe the black hole case you just

3336

02:15:16,490 --> 02:15:13,440

say okay there are these physical

3337

02:15:18,770 --> 02:15:16,500

entities that give birth to maybe give

3338

02:15:21,589 --> 02:15:18,780

birth to universes that's I would say

3339

02:15:24,189 --> 02:15:21,599

that's not so uplifting not inspiring

3340

02:15:26,870 --> 02:15:24,199

but if you think that we would one day

3341

02:15:29,030 --> 02:15:26,880

engineer the birth of a baby Universe

3342

02:15:32,569 --> 02:15:29,040

you know that gives it's sort of like

3343

02:15:35,390 --> 02:15:32,579

thinking about yourself as a future

3344

02:15:38,209 --> 02:15:35,400

parent you know that gives you a purpose

3345

02:15:41,870 --> 02:15:38,219

for Life uh let's develop quantum

3346

02:15:45,229 --> 02:15:41,880

gravity so that we can maintain uh the

3347

02:15:47,030 --> 02:15:45,239

longevity of more universes like ours uh

3348

02:15:48,649 --> 02:15:47,040

it gives you a purpose for life just

3349

02:15:51,470 --> 02:15:48,659

knowing that the black hole will give

3350

02:15:53,390 --> 02:15:51,480

birth to universes to me quite

3351  
02:15:55,609 --> 02:15:53,400  
depressing if that's the reason speaking

3352  
02:15:57,530 --> 02:15:55,619  
of us from the field or giving birth to

3353  
02:15:59,450 --> 02:15:57,540  
something from the future this eternal

3354  
02:16:01,129 --> 02:15:59,460  
you from boober there's another quote

3355  
02:16:03,950 --> 02:16:01,139  
that I have though I believe this is

3356  
02:16:06,649 --> 02:16:03,960  
someone speaking to you Avi but I'm

3357  
02:16:08,030 --> 02:16:06,659  
quoting it anyway he said if you obvi

3358  
02:16:10,310 --> 02:16:08,040  
find yourself one day holding a piece of

3359  
02:16:11,450 --> 02:16:10,320  
technology so Advanced that so-and-so

3360  
02:16:15,109 --> 02:16:11,460  
you believe it came from another

3361  
02:16:16,790 --> 02:16:15,119  
civilization that experience of awe will

3362  
02:16:18,890 --> 02:16:16,800  
be because you managed an encounter with

3363  
02:16:21,709 --> 02:16:18,900

the Eternal you in this civilization

3364

02:16:23,030 --> 02:16:21,719

that sent to the object your way so this

3365

02:16:25,189 --> 02:16:23,040

eternal you I didn't realize at the time

3366

02:16:27,109 --> 02:16:25,199

that that was a metaphor for God I

3367

02:16:30,229 --> 02:16:27,119

thought that this eternal you was

3368

02:16:32,450 --> 02:16:30,239

somehow Eternal as in temporally distant

3369

02:16:34,370 --> 02:16:32,460

or like infinite even and that it was

3370

02:16:36,770 --> 02:16:34,380

sent from you from the future to the

3371

02:16:39,349 --> 02:16:36,780

past so then I was wondering okay is

3372

02:16:41,690 --> 02:16:39,359

this obvi speculating on time travel but

3373

02:16:44,750 --> 02:16:41,700

anyway given that what are your thoughts

3374

02:16:46,969 --> 02:16:44,760

on time travel well okay so first I need

3375

02:16:50,929 --> 02:16:46,979

to explain this this quote that you just

3376

02:16:54,169 --> 02:16:50,939

read was a response to a commentary that

3377

02:16:59,570 --> 02:16:54,179

I wrote just a day before that and that

3378

02:17:01,190 --> 02:16:59,580

person read it uh Tony Lux uh the my I

3379

02:17:03,709 --> 02:17:01,200

raised the following question I said

3380

02:17:08,270 --> 02:17:03,719

suppose

3381

02:17:12,650 --> 02:17:08,280

um we find a version 100 of the iPhone

3382

02:17:14,690 --> 02:17:12,660

okay and and show it to an entrepreneur

3383

02:17:17,870 --> 02:17:14,700

from Silicon Valley would the

3384

02:17:19,730 --> 02:17:17,880

entrepreneur feel like Moses felt seeing

3385

02:17:24,910 --> 02:17:19,740

the burning bush

3386

02:17:28,190 --> 02:17:24,920

uh which was a sense of oh an admiration

3387

02:17:31,129 --> 02:17:28,200

uh and in the case of Moses it was The

3388

02:17:32,330 --> 02:17:31,139

Burning Bush was a symbol for a Divine

3389

02:17:36,889 --> 02:17:32,340

entity

3390

02:17:39,770 --> 02:17:36,899

right and so the response was that I

3391

02:17:42,650 --> 02:17:39,780

would potentially have the same sense of

3392

02:17:45,410 --> 02:17:42,660

all when seeing a high level

3393

02:17:48,650 --> 02:17:45,420

technological device and noticing the

3394

02:17:50,750 --> 02:17:48,660

buttons on it uh and the Miracles that

3395

02:17:54,530 --> 02:17:50,760

they can perform

3396

02:17:56,209 --> 02:17:54,540

um so again it goes to the point that I

3397

02:17:58,730 --> 02:17:56,219

brought up before that the sufficiently

3398

02:18:01,250 --> 02:17:58,740

advanced scientific civilization may be

3399

02:18:04,370 --> 02:18:01,260

a good approximation to God and by the

3400

02:18:06,290 --> 02:18:04,380

way this is a way to unify religion and

3401

02:18:07,610 --> 02:18:06,300

science it's often thought that religion

3402

02:18:11,089 --> 02:18:07,620

and science

3403

02:18:13,370 --> 02:18:11,099

do not have any overlap that in fact one

3404

02:18:16,250 --> 02:18:13,380

comes at the expense of the other and

3405

02:18:17,990 --> 02:18:16,260

many many secular scientists including

3406

02:18:21,770 --> 02:18:18,000

Stephen Weinberg the Nobel Laureate

3407

02:18:24,049 --> 02:18:21,780

tried to argue that religion is a theme

3408

02:18:27,009 --> 02:18:24,059

of the past that we should abundantly

3409

02:18:30,530 --> 02:18:27,019

abandon it and bravely

3410

02:18:33,650 --> 02:18:30,540

Embrace a universe which has nothing to

3411

02:18:36,969 --> 02:18:33,660

do with the Divine entity now I say

3412

02:18:40,490 --> 02:18:36,979

wait a minute just you know be a

3413

02:18:43,730 --> 02:18:40,500

be a little more patient because if we

3414

02:18:45,530 --> 02:18:43,740

do find a civilization that let's say is

3415

02:18:47,690 --> 02:18:45,540

a million years ahead of us in

3416

02:18:50,389 --> 02:18:47,700

technological development their

3417

02:18:53,030 --> 02:18:50,399

Technologies would appear to us as a

3418

02:18:56,389 --> 02:18:53,040

good approximation to God and therefore

3419

02:18:58,849 --> 02:18:56,399

whatever we assign to a Divine entity in

3420

02:19:01,490 --> 02:18:58,859

religious and philosophical texts would

3421

02:19:05,690 --> 02:19:01,500

apply to whatever we find from them okay

3422

02:19:08,030 --> 02:19:05,700

and so there is a way of unifying an

3423

02:19:10,009 --> 02:19:08,040

entity that was part of spiritual

3424

02:19:13,910 --> 02:19:10,019

practice an entity that is much more

3425

02:19:16,790 --> 02:19:13,920

capable than we are which is pretty much

3426

02:19:18,950 --> 02:19:16,800

God you know like something that is

3427

02:19:21,650 --> 02:19:18,960

capable of doing things that we cannot

3428

02:19:25,370 --> 02:19:21,660

imagine even getting close to

3429

02:19:27,169 --> 02:19:25,380

um and associating it with our distant

3430

02:19:28,790 --> 02:19:27,179

future like in million years from now a

3431

02:19:30,770 --> 02:19:28,800

billion years from now and another

3432

02:19:32,509 --> 02:19:30,780

civilization may have arrived at that

3433

02:19:34,129 --> 02:19:32,519

future before we did simply because

3434

02:19:37,129 --> 02:19:34,139

their star formed billions of years

3435

02:19:39,770 --> 02:19:37,139

before the sun that's all so you started

3436

02:19:42,290 --> 02:19:39,780

the clock earlier for them and now

3437

02:19:44,929 --> 02:19:42,300

you're seeing something that looks just

3438

02:19:46,730 --> 02:19:44,939

like a cell phone to a cave dweller okay

3439

02:19:49,610 --> 02:19:46,740

and so

3440

02:19:52,190 --> 02:19:49,620

it would look like a miracle what if he

3441

02:19:54,349 --> 02:19:52,200

said in response that being pretty much

3442

02:19:56,570 --> 02:19:54,359

like God is completely different than

3443

02:19:58,849 --> 02:19:56,580

being God and the reason is that in

3444

02:20:00,230 --> 02:19:58,859

traditional religion God is this eternal

3445

02:20:01,969 --> 02:20:00,240

being that was there from the beginning

3446

02:20:03,530 --> 02:20:01,979

if there was such a thing as the

3447

02:20:05,750 --> 02:20:03,540

quote-unquote beginning and it's not

3448

02:20:07,670 --> 02:20:05,760

just to breed life out of inorganic

3449

02:20:09,650 --> 02:20:07,680

matter but to breed the universe to

3450

02:20:11,690 --> 02:20:09,660

begin with not breed the universe from

3451

02:20:14,030 --> 02:20:11,700

Once you already exist within a universe

3452

02:20:16,849 --> 02:20:14,040

and create another one but create the

3453

02:20:19,969 --> 02:20:16,859

laws and did so out of some semblance of

3454

02:20:23,750 --> 02:20:19,979

love and they care for you so let me uh

3455

02:20:26,510 --> 02:20:23,760

mention in an anecdote one day I saw a

3456

02:20:28,790 --> 02:20:26,520

person on the street next to my home my

3457

02:20:30,889 --> 02:20:28,800

wife was telling me it might be a

3458

02:20:32,270 --> 02:20:30,899

stalker he's looking at our home for

3459

02:20:34,910 --> 02:20:32,280

half an hour now

3460

02:20:38,809 --> 02:20:34,920

you you became quite well known why

3461

02:20:41,809 --> 02:20:38,819

don't you check who this person is so I

3462

02:20:45,590 --> 02:20:41,819

went to the street and I asked the man

3463

02:20:47,510 --> 02:20:45,600

you're brave uh yeah I you know uh what

3464

02:20:49,670 --> 02:20:47,520

do I have to lose

3465

02:20:51,230 --> 02:20:49,680

um uh I went to the person and I said

3466

02:20:52,309 --> 02:20:51,240

why are you looking at our home for so

3467

02:20:55,370 --> 02:20:52,319

long

3468

02:20:58,010 --> 02:20:55,380

and he said I used to live in that home

3469

02:21:01,270 --> 02:20:58,020

50 years ago I was a kid

3470

02:21:04,910 --> 02:21:01,280

and my father by the way buried the cat

3471

02:21:07,490 --> 02:21:04,920

named tiger in your backyard

3472

02:21:10,969 --> 02:21:07,500

and I said well that sounds familiar

3473

02:21:14,270 --> 02:21:10,979

because I saw a tombstone with the name

3474

02:21:17,330 --> 02:21:14,280

tiger on top of it and I was worried

3475

02:21:19,309 --> 02:21:17,340

that there is a tiger buried under it I

3476

02:21:21,110 --> 02:21:19,319

didn't know what skeleton might be lying

3477

02:21:24,110 --> 02:21:21,120

underneath and now I know it's a cat

3478

02:21:25,849 --> 02:21:24,120

from 50 years ago now what's the moral

3479

02:21:30,349 --> 02:21:25,859

of this story

3480

02:21:33,950 --> 02:21:30,359

if you share some space with someone

3481

02:21:37,790 --> 02:21:33,960

else who predated you that someone else

3482

02:21:38,929 --> 02:21:37,800

may know more about your backyard than

3483

02:21:42,230 --> 02:21:38,939

you know

3484

02:21:44,809 --> 02:21:42,240

and therefore you should show respect to

3485

02:21:48,469 --> 02:21:44,819

visitors they may know something about

3486

02:21:51,010 --> 02:21:48,479

our past that we don't know uh and

3487

02:21:54,550 --> 02:21:51,020

that's why you should always welcome

3488

02:21:58,550 --> 02:21:54,560

Interstellar visitors and when you say

3489

02:22:00,110 --> 02:21:58,560

that you know a Divine entity God knows

3490

02:22:02,870 --> 02:22:00,120

much more because it may have existed

3491

02:22:05,090 --> 02:22:02,880

forever it what you define as eternity

3492

02:22:07,550 --> 02:22:05,100

you know a billion years might be

3493

02:22:10,370 --> 02:22:07,560

eternity compared to a century of our

3494

02:22:12,770 --> 02:22:10,380

Science and Technology okay so what you

3495

02:22:15,830 --> 02:22:12,780

call eternity is a quantitative matter

3496

02:22:18,349 --> 02:22:15,840

and given that we you know our

3497

02:22:20,510 --> 02:22:18,359

Technologies develop exponential on a

3498

02:22:24,110 --> 02:22:20,520

few year time scale you know every few

3499

02:22:26,690 --> 02:22:24,120

years we double our computational

3500

02:22:29,389 --> 02:22:26,700

capabilities that's more slow you know

3501

02:22:32,570 --> 02:22:29,399

we develop technologies that never

3502

02:22:35,330 --> 02:22:32,580

existed so just think about it if we

3503

02:22:38,270 --> 02:22:35,340

double every two years what would happen

3504

02:22:40,730 --> 02:22:38,280

in a million years what would happen in

3505

02:22:42,230 --> 02:22:40,740

a billionaires if it's exponential up to

3506

02:22:44,330 --> 02:22:42,240

a point you know of course eventually

3507

02:22:47,150 --> 02:22:44,340

the laws of physics come to haunt you

3508

02:22:49,630 --> 02:22:47,160

but just think about an exponential

3509

02:22:53,090 --> 02:22:49,640

curve that has instead of one century

3510

02:22:54,469 --> 02:22:53,100

has thousands millions or even billions

3511

02:22:58,190 --> 02:22:54,479

of years

3512

02:23:01,490 --> 02:22:58,200

of History it would look like it turned

3513

02:23:04,550 --> 02:23:01,500

to you because the state that such a

3514

02:23:06,110 --> 02:23:04,560

civilization will get to would be so

3515

02:23:08,630 --> 02:23:06,120

Advanced that you wouldn't be able to

3516

02:23:11,630 --> 02:23:08,640

comprehend it now it might not get there

3517

02:23:14,750 --> 02:23:11,640

because it may be short-lived for

3518

02:23:16,849 --> 02:23:14,760

example just like now we have virtual

3519

02:23:19,010 --> 02:23:16,859

reality machines you know like you hook

3520

02:23:20,750 --> 02:23:19,020

yourself to goggles that give you a

3521

02:23:22,730 --> 02:23:20,760

sense of virtual reality it's sort of

3522

02:23:24,349 --> 02:23:22,740

like being high on drugs you know you're

3523

02:23:27,110 --> 02:23:24,359

looking at some reality that doesn't

3524

02:23:29,330 --> 02:23:27,120

exist okay and suppose another

3525

02:23:32,210 --> 02:23:29,340

civilization got to the point where they

3526

02:23:34,130 --> 02:23:32,220

developed these VR goggles and they are

3527

02:23:36,410 --> 02:23:34,140

hooked to them they're happy with them

3528

02:23:38,389 --> 02:23:36,420

they put them on their face as soon as

3529

02:23:40,370 --> 02:23:38,399

they are born and they live in these

3530

02:23:43,010 --> 02:23:40,380

virtual realities they will never engage

3531

02:23:45,170 --> 02:23:43,020

with us okay that would be a solution to

3532

02:23:47,750 --> 02:23:45,180

fermis Paradox why don't we see them

3533

02:23:51,230 --> 02:23:47,760

because they're hooked to these goggles

3534

02:23:53,450 --> 02:23:51,240

uh but on the other hand if they are

3535

02:23:56,389 --> 02:23:53,460

curious about the real world if they

3536

02:23:58,309 --> 02:23:56,399

don't talk about mathematical gymnastics

3537

02:24:01,010 --> 02:23:58,319

that we talked about before if they're

3538

02:24:03,590 --> 02:24:01,020

really hooked to the real world they

3539

02:24:05,630 --> 02:24:03,600

explore the real world and they discover

3540

02:24:08,090 --> 02:24:05,640

the real world so that they develop

3541

02:24:10,790 --> 02:24:08,100

gadgets that travel through Interstellar

3542

02:24:14,330 --> 02:24:10,800

space and rich places

3543

02:24:16,969 --> 02:24:14,340

then they might look to us

3544

02:24:19,309 --> 02:24:16,979

it's a good approximation to go and so

3545

02:24:22,190 --> 02:24:19,319

there is this tension between a

3546

02:24:26,170 --> 02:24:22,200

civilization closing off engaging in

3547

02:24:29,270 --> 02:24:26,180

Wars uh engaging in destructive measures

3548

02:24:30,290 --> 02:24:29,280

uh or simply isolating itself from

3549

02:24:33,590 --> 02:24:30,300

reality

3550

02:24:35,990 --> 02:24:33,600

there is this risk which I'm fighting uh

3551  
02:24:38,929 --> 02:24:36,000  
you know in my pursuit of evidence I'm

3552  
02:24:40,610 --> 02:24:38,939  
fighting against but there is a

3553  
02:24:41,990 --> 02:24:40,620  
possibility that our civilization will

3554  
02:24:45,530 --> 02:24:42,000  
get to that

3555  
02:24:49,910 --> 02:24:45,540  
uh sterile endpoint where either it

3556  
02:24:52,550 --> 02:24:49,920  
destroys itself by Wars or it hooks

3557  
02:24:54,650 --> 02:24:52,560  
itself to some virtual reality okay

3558  
02:24:56,570 --> 02:24:54,660  
there is that danger and if you get

3559  
02:24:58,849 --> 02:24:56,580  
there you will never launch things into

3560  
02:25:01,610 --> 02:24:58,859  
the real space intercept so there is

3561  
02:25:03,650 --> 02:25:01,620  
this tension between the finite lifetime

3562  
02:25:05,389 --> 02:25:03,660  
of a technological civilization and the

3563  
02:25:08,510 --> 02:25:05,399

ability of that Civilization to launch

3564

02:25:11,450 --> 02:25:08,520

equipment to space and and I'm just

3565

02:25:15,530 --> 02:25:11,460

relying on the hope that there there was

3566

02:25:18,710 --> 02:25:15,540

someone out there that didn't surrender

3567

02:25:21,490 --> 02:25:18,720

to the risks of living in virtual

3568

02:25:24,650 --> 02:25:21,500

reality didn't surrender to the risk of

3569

02:25:27,410 --> 02:25:24,660

pursuing your ego going towards but

3570

02:25:31,190 --> 02:25:27,420

actually was curious

3571

02:25:33,410 --> 02:25:31,200

about exploring Interstellar space and I

3572

02:25:35,990 --> 02:25:33,420

hope that among the tens of billions of

3573

02:25:39,110 --> 02:25:36,000

stars there is someone like that by the

3574

02:25:42,550 --> 02:25:39,120

way just so that you know uh so far

3575

02:25:47,929 --> 02:25:46,309

140 billion people who ever lived on the

3576

02:25:49,510 --> 02:25:47,939

surface of Earth throughout human

3577

02:25:53,750 --> 02:25:49,520

history

3578

02:25:55,490 --> 02:25:53,760

and there are more stars than that in

3579

02:25:57,710 --> 02:25:55,500

the Milky Way galaxy so we have more

3580

02:26:01,849 --> 02:25:57,720

than one star per person who ever lived

3581

02:26:05,030 --> 02:26:01,859

maybe 10 stars and that gives me hope

3582

02:26:07,070 --> 02:26:05,040

I saw when I was researching the Galileo

3583

02:26:09,170 --> 02:26:07,080

Project online that Stephen Wolfram is

3584

02:26:12,050 --> 02:26:09,180

on The Advisory Board and I'm curious

3585

02:26:13,670 --> 02:26:12,060

what does Stephen contribute to what are

3586

02:26:14,929 --> 02:26:13,680

his views if you're allowed to reference

3587

02:26:17,210 --> 02:26:14,939

them

3588

02:26:21,290 --> 02:26:17,220

yeah so there are a number of people who

3589

02:26:24,790 --> 02:26:21,300

serve on our Advisory Board and they

3590

02:26:28,389 --> 02:26:24,800

provide us with advice and comments and

3591

02:26:31,370 --> 02:26:28,399

Stephen is a brilliant

3592

02:26:34,330 --> 02:26:31,380

physicist slash computer scientist and

3593

02:26:37,730 --> 02:26:34,340

we benefit every now and then from his

3594

02:26:40,910 --> 02:26:37,740

advice to the project but he is not

3595

02:26:43,550 --> 02:26:40,920

engaged in the day-to-day routine work

3596

02:26:45,950 --> 02:26:43,560

that we have uh and there's a number of

3597

02:26:48,170 --> 02:26:45,960

other advisors that we have there are

3598

02:26:50,150 --> 02:26:48,180

some that are those philanthropic

3599

02:26:51,950 --> 02:26:50,160

advisors who contributed funds to the

3600

02:26:54,410 --> 02:26:51,960

project you can find them on the website

3601

02:26:56,510 --> 02:26:54,420

that there are others that are that

3602

02:26:59,030 --> 02:26:56,520

belong to the science Advisory Board and

3603

02:27:01,969 --> 02:26:59,040

these are people who did not provide us

3604

02:27:04,070 --> 02:27:01,979

with funding but provide us with advice

3605

02:27:07,370 --> 02:27:04,080

what about rizwan Burke

3606

02:27:09,530 --> 02:27:07,380

it's the same category he actually

3607

02:27:12,650 --> 02:27:09,540

um every now and then tries to help also

3608

02:27:16,010 --> 02:27:12,660

in terms of approaching other potential

3609

02:27:22,130 --> 02:27:16,020

donors and in general he provides advice

3610

02:27:25,790 --> 02:27:23,809

I noticed that I have a question here in

3611

02:27:27,710 --> 02:27:25,800

bold about Bruce Fenton and the tech

3612

02:27:29,690 --> 02:27:27,720

tits if you don't mind commenting what

3613

02:27:31,670 --> 02:27:29,700

are your views on that PDF it's Bruce

3614

02:27:34,910 --> 02:27:31,680

Fenton and he had the australasian tech

3615

02:27:37,910 --> 02:27:34,920

tits Interstellar object debris

3616

02:27:39,530 --> 02:27:37,920

yeah so these tactites are an

3617

02:27:42,130 --> 02:27:39,540

interesting puzzle as to what their

3618

02:27:46,190 --> 02:27:42,140

origin is but we don't know the answer

3619

02:27:48,309 --> 02:27:46,200

and then you know in principle it's

3620

02:27:51,170 --> 02:27:48,319

possible they represent some unusual

3621

02:27:54,469 --> 02:27:51,180

asteroids comets or Interstellar objects

3622

02:27:58,190 --> 02:27:54,479

but um it's just unclear at the moment I

3623

02:28:01,429 --> 02:27:58,200

would say the jury is still out and then

3624

02:28:03,770 --> 02:28:01,439

we need more more data so for example if

3625

02:28:06,950 --> 02:28:03,780

we examine Interstellar objects like the

3626

02:28:10,010 --> 02:28:06,960

meteor that landed near Papua New Guinea

3627

02:28:13,090 --> 02:28:10,020

we can tell whether the composition uh

3628

02:28:15,469 --> 02:28:13,100

indeed resembles those tactiles or not

3629

02:28:17,870 --> 02:28:15,479

Professor what opinion of yours has

3630

02:28:20,450 --> 02:28:17,880

changed in the past few months as a

3631

02:28:24,770 --> 02:28:20,460

result of the Galileo project

3632

02:28:26,330 --> 02:28:24,780

well uh we don't have new data to

3633

02:28:28,790 --> 02:28:26,340

provide us with evidence about

3634

02:28:32,090 --> 02:28:28,800

unidentified objects or the interstellar

3635

02:28:35,870 --> 02:28:32,100

meteor or any more like object but but

3636

02:28:37,849 --> 02:28:35,880

the one thing I learned is that there

3637

02:28:40,130 --> 02:28:37,859

are lots of curious

3638

02:28:42,710 --> 02:28:40,140

people out there within the Galileo

3639

02:28:45,530 --> 02:28:42,720

project is a real pleasure and privilege

3640

02:28:47,389 --> 02:28:45,540

for me to work with a lot of skillful

3641

02:28:49,010 --> 02:28:47,399

individuals that are dedicated to the

3642

02:28:51,770 --> 02:28:49,020

projects volunteer the time and

3643

02:28:54,170 --> 02:28:51,780

expertise and we are making headways so

3644

02:28:56,170 --> 02:28:54,180

I'm very encouraged by that I I don't

3645

02:28:58,790 --> 02:28:56,180

take it for granted because these are

3646

02:29:01,190 --> 02:28:58,800

people who volunteered I didn't approach

3647

02:29:03,290 --> 02:29:01,200

them they came to me we have 800

3648

02:29:06,110 --> 02:29:03,300

additional volunteers that we haven't

3649

02:29:08,809 --> 02:29:06,120

reviewed yet so we have a hundred people

3650

02:29:10,610 --> 02:29:08,819

in the project 800 more who filled up

3651  
02:29:12,950 --> 02:29:10,620  
the form and we are now in the process

3652  
02:29:15,110 --> 02:29:12,960  
of reviewing them and selecting those

3653  
02:29:18,429 --> 02:29:15,120  
that have the expertise that matches our

3654  
02:29:22,010 --> 02:29:18,439  
interests are our needs so all together

3655  
02:29:25,910 --> 02:29:22,020  
along with the Public's response to the

3656  
02:29:27,410 --> 02:29:25,920  
work we do gives me a lot of hope uh and

3657  
02:29:29,809 --> 02:29:27,420  
so every day you know it's just like

3658  
02:29:32,630 --> 02:29:29,819  
swimming in very turbulent Waters there

3659  
02:29:34,610 --> 02:29:32,640  
are people who try to bring you down and

3660  
02:29:36,469 --> 02:29:34,620  
then these are waves that carry you to

3661  
02:29:38,090 --> 02:29:36,479  
the bottom of the ocean but at the same

3662  
02:29:41,450 --> 02:29:38,100  
time every day there are people people

3663  
02:29:44,389 --> 02:29:41,460

that lift me up and I just need to

3664

02:29:47,150 --> 02:29:44,399

average and the average is very

3665

02:29:49,309 --> 02:29:47,160

positive I should say and but what I

3666

02:29:52,190 --> 02:29:49,319

find puzzling are those people who try

3667

02:29:54,429 --> 02:29:52,200

to sabotage the effort because we are

3668

02:29:57,349 --> 02:29:54,439

not taking any funds from existing

3669

02:29:59,630 --> 02:29:57,359

projects and we are just pursuing

3670

02:30:01,730 --> 02:29:59,640

evidence that's what this that's what

3671

02:30:04,969 --> 02:30:01,740

science is supposed to be so anyone

3672

02:30:07,450 --> 02:30:04,979

objecting to this approach is objecting

3673

02:30:10,790 --> 02:30:07,460

the fundamental principles of science

3674

02:30:13,190 --> 02:30:10,800

pioneered by Galileo Galilei yeah that's

3675

02:30:15,530 --> 02:30:13,200

why I didn't get why NASA finds it to be

3676

02:30:16,550 --> 02:30:15,540

a conflict of interest oh that's

3677

02:30:19,250 --> 02:30:16,560

interesting

3678

02:30:22,010 --> 02:30:19,260

um they say that since I'm leading the

3679

02:30:24,230 --> 02:30:22,020

Galileo project I'm already engaged in

3680

02:30:26,450 --> 02:30:24,240

this activity and their committee is

3681

02:30:29,690 --> 02:30:26,460

supposed to evaluate whether they should

3682

02:30:32,030 --> 02:30:29,700

fund this activity so their argument is

3683

02:30:34,550 --> 02:30:32,040

if I were to serve on the committee I

3684

02:30:35,870 --> 02:30:34,560

would probably advocate for funding and

3685

02:30:38,389 --> 02:30:35,880

therefore the conflict of interest

3686

02:30:42,889 --> 02:30:38,399

because I may apply for these funds

3687

02:30:46,190 --> 02:30:42,899

later on okay uh however if you do for

3688

02:30:48,110 --> 02:30:46,200

example consider climate change suppose

3689

02:30:50,809 --> 02:30:48,120

NASA established a committee that will

3690

02:30:53,030 --> 02:30:50,819

study climate change would they ban

3691

02:30:55,010 --> 02:30:53,040

people who are researching climate

3692

02:30:58,849 --> 02:30:55,020

change from being on the committee I

3693

02:31:00,290 --> 02:30:58,859

don't think so so part of this is uh the

3694

02:31:02,150 --> 02:31:00,300

stigma that there is on the subject

3695

02:31:06,170 --> 02:31:02,160

because they are not sure whether it's

3696

02:31:08,870 --> 02:31:06,180

it's worth funding and then if they were

3697

02:31:11,270 --> 02:31:08,880

as sure as they were about studying

3698

02:31:13,370 --> 02:31:11,280

climate change then they would allow for

3699

02:31:15,110 --> 02:31:13,380

me to be on the committee okay so

3700

02:31:17,389 --> 02:31:15,120

Professor I'm sure you've heard of

3701

02:31:20,809 --> 02:31:17,399

variable light theories what do you see

3702

02:31:23,870 --> 02:31:20,819

as their advantage or disadvantage

3703

02:31:26,750 --> 02:31:23,880

um at the moment we don't have uh any

3704

02:31:29,210 --> 02:31:26,760

definite evidence for

3705

02:31:31,270 --> 02:31:29,220

um anything moving faster than light or

3706

02:31:35,210 --> 02:31:31,280

or that the speed of light is variable

3707

02:31:38,809 --> 02:31:35,220

of course in principle that could change

3708

02:31:40,969 --> 02:31:38,819

our perspective on The Big Bang on what

3709

02:31:43,849 --> 02:31:40,979

happens inside the black hole and some

3710

02:31:45,950 --> 02:31:43,859

people suggested that this could resolve

3711

02:31:48,110 --> 02:31:45,960

the singularities we have in Einstein's

3712

02:31:50,030 --> 02:31:48,120

theory of gravity but at the moment

3713

02:31:53,389 --> 02:31:50,040

these are just speculations we don't

3714

02:31:55,130 --> 02:31:53,399

have any evidence for that and the speed

3715

02:31:57,950 --> 02:31:55,140

of light is significant because it

3716

02:32:01,130 --> 02:31:57,960

represents the fastest

3717

02:32:04,610 --> 02:32:01,140

speed by which any material particle can

3718

02:32:06,410 --> 02:32:04,620

move and so if you change the speed of

3719

02:32:09,349 --> 02:32:06,420

light you can change the rate by which

3720

02:32:11,270 --> 02:32:09,359

you communicate and obviously you can

3721

02:32:13,849 --> 02:32:11,280

change the Horizon out to which you can

3722

02:32:16,309 --> 02:32:13,859

see things there's also another theory

3723

02:32:18,530 --> 02:32:16,319

called Direct's large number hypothesis

3724

02:32:20,510 --> 02:32:18,540

so what are your thoughts on that and

3725

02:32:24,830 --> 02:32:20,520

for those who are unfamiliar do you mind

3726

02:32:30,290 --> 02:32:24,840

giving a brief overview yeah so in 1937

3727

02:32:35,389 --> 02:32:30,300

Paul Dirac made a hypothesis about large

3728

02:32:37,849 --> 02:32:35,399

numbers uh he uh observed that you can

3729

02:32:39,830 --> 02:32:37,859

make dimensionless combination of some

3730

02:32:40,750 --> 02:32:39,840

of the fundamental constants that we

3731

02:32:44,270 --> 02:32:40,760

have

3732

02:32:45,790 --> 02:32:44,280

and obtain the very large number out of

3733

02:32:48,050 --> 02:32:45,800

them and

3734

02:32:50,170 --> 02:32:48,060

the question is whether it means

3735

02:32:54,670 --> 02:32:50,180

anything and um

3736

02:32:57,889 --> 02:32:54,680

at the moment you know we don't see a a

3737

02:33:01,210 --> 02:32:57,899

good reason for these combinations of

3738

02:33:04,070 --> 02:33:01,220

numbers to be that large for example

3739

02:33:06,889 --> 02:33:04,080

involving Newton's constant which is a

3740

02:33:10,130 --> 02:33:06,899

small number and the electron Mass the

3741

02:33:11,690 --> 02:33:10,140

electron charge and so forth and the

3742

02:33:15,230 --> 02:33:11,700

thing is in the standard model of

3743

02:33:17,809 --> 02:33:15,240

particle physics all these constants do

3744

02:33:20,690 --> 02:33:17,819

not have an explanation they are just

3745

02:33:22,690 --> 02:33:20,700

measured quantities and we don't have an

3746

02:33:25,990 --> 02:33:22,700

underlying theory that

3747

02:33:28,370 --> 02:33:26,000

explains those constants so

3748

02:33:31,190 --> 02:33:28,380

we don't know what the origin of the

3749

02:33:34,130 --> 02:33:31,200

large numbers is and one possibility is

3750

02:33:37,309 --> 02:33:34,140

that we wouldn't exist as intelligent

3751

02:33:39,770 --> 02:33:37,319

beings thinking about it if these

3752

02:33:41,690 --> 02:33:39,780

numbers did not have their values so

3753

02:33:44,150 --> 02:33:41,700

some people are thinking about the

3754

02:33:46,670 --> 02:33:44,160

Multiverse the idea that there might be

3755

02:33:49,490 --> 02:33:46,680

other regions of space and time were

3756

02:33:51,950 --> 02:33:49,500

these parameters obtain different values

3757

02:33:55,070 --> 02:33:51,960

and the question is whether life

3758

02:33:57,290 --> 02:33:55,080

intelligent life could exist there and

3759

02:33:58,969 --> 02:33:57,300

in most of them no the answer is no

3760

02:34:01,610 --> 02:33:58,979

because for example example the universe

3761

02:34:03,170 --> 02:34:01,620

would expand too rapidly and you

3762

02:34:05,690 --> 02:34:03,180

wouldn't be able to make stars and

3763

02:34:08,510 --> 02:34:05,700

planets next to them so that we can have

3764

02:34:10,450 --> 02:34:08,520

Life as We Know It This doesn't exclude

3765

02:34:14,330 --> 02:34:10,460

intelligence from appearing in other

3766

02:34:16,550 --> 02:34:14,340

regions with other constants because you

3767

02:34:18,469 --> 02:34:16,560

know there might be other paths to

3768

02:34:22,550 --> 02:34:18,479

intelligence that we are not familiar

3769

02:34:24,410 --> 02:34:22,560

with and so I would argue that until we

3770

02:34:27,110 --> 02:34:24,420

have a theory that explains the

3771

02:34:30,110 --> 02:34:27,120

constants that we measure it's premature

3772

02:34:31,450 --> 02:34:30,120

of us to make sense of it and so let's

3773

02:34:35,570 --> 02:34:31,460

just wait

3774

02:34:37,130 --> 02:34:35,580

what are the pros and cons of peer

3775

02:34:43,389 --> 02:34:37,140

review

3776

02:34:46,870 --> 02:34:43,399

your ideas and and the comments are

3777

02:34:49,250 --> 02:34:46,880

tested or at least evaluated by other

3778

02:34:52,849 --> 02:34:49,260

Professionals in in your field of

3779

02:34:55,010 --> 02:34:52,859

expertise so the pro is that um if there

3780

02:34:57,770 --> 02:34:55,020

is any mistake or if there is some

3781

02:35:00,110 --> 02:34:57,780

Omission it could be pointed out by the

3782

02:35:04,250 --> 02:35:00,120

reviewers of the scientific paper that

3783

02:35:06,889 --> 02:35:04,260

one is writing the cons are obvious that

3784

02:35:09,290 --> 02:35:06,899

sometimes there is a dogma and many of

3785

02:35:12,429 --> 02:35:09,300

the mainstream scientists abide by the

3786

02:35:16,370 --> 02:35:12,439

dog mine as a result they dismiss

3787

02:35:19,610 --> 02:35:16,380

Alternatives simply because they feel a

3788

02:35:22,190 --> 02:35:19,620

threat to their field of expertise and

3789

02:35:26,210 --> 02:35:22,200

many many scientists establish their

3790

02:35:29,389 --> 02:35:26,220

self-esteem and their uh stature based

3791

02:35:31,010 --> 02:35:29,399

on past knowledge uh things that they

3792

02:35:33,110 --> 02:35:31,020

worked on for decades and they

3793

02:35:35,090 --> 02:35:33,120

established through their work and if

3794

02:35:37,790 --> 02:35:35,100

there is a new statement being made that

3795

02:35:39,830 --> 02:35:37,800

could in principle doubt why what is

3796

02:35:42,410 --> 02:35:39,840

being known or at least suggests that

3797

02:35:44,630 --> 02:35:42,420

it's incomplete they feel threatened

3798

02:35:47,809 --> 02:35:44,640

they feel their ego feels threatened and

3799

02:35:49,730 --> 02:35:47,819

as a result they resist change and that

3800

02:35:53,770 --> 02:35:49,740

happened many times in science where

3801  
02:35:57,410 --> 02:35:53,780  
ideas were pushed aside just because

3802  
02:36:02,110 --> 02:35:57,420  
they threatened the dogma and of course

3803  
02:36:05,389 --> 02:36:02,120  
that's the con of peer review however

3804  
02:36:08,710 --> 02:36:05,399  
over time you know if at least there

3805  
02:36:11,690 --> 02:36:08,720  
is a way to document the findings

3806  
02:36:15,889 --> 02:36:11,700  
other people may look at them later on

3807  
02:36:18,770 --> 02:36:15,899  
and eventually they might Prevail so

3808  
02:36:21,469 --> 02:36:18,780  
um however you know it obviously slows

3809  
02:36:24,710 --> 02:36:21,479  
down the progress of science if every

3810  
02:36:27,050 --> 02:36:24,720  
suggestion is being moderated by the

3811  
02:36:28,790 --> 02:36:27,060  
experts and for that purpose you know

3812  
02:36:30,889 --> 02:36:28,800  
it's possible to have a different scheme

3813  
02:36:33,230 --> 02:36:30,899

where there is an archive on the

3814

02:36:36,050 --> 02:36:33,240

internet where papers are being posted

3815

02:36:38,630 --> 02:36:36,060

not necessarily rejected that firsthand

3816

02:36:41,330 --> 02:36:38,640

and we do have such an archive but

3817

02:36:44,030 --> 02:36:41,340

unfortunately it's also moderated there

3818

02:36:45,770 --> 02:36:44,040

are people practitioners of the field

3819

02:36:48,469 --> 02:36:45,780

who decide without any peer review

3820

02:36:51,290 --> 02:36:48,479

without any back and forth with the

3821

02:36:55,130 --> 02:36:51,300

authors they decide if a submission is

3822

02:36:57,110 --> 02:36:55,140

worth posting which again is even more

3823

02:36:59,450 --> 02:36:57,120

dangerous than peer review because they

3824

02:37:02,030 --> 02:36:59,460

don't have to explain it to the authors

3825

02:37:04,610 --> 02:37:02,040

so I would argue in favor of having

3826  
02:37:07,610 --> 02:37:04,620  
since you know uh papers on the internet

3827  
02:37:09,290 --> 02:37:07,620  
do not cost money do not cost much

3828  
02:37:12,349 --> 02:37:09,300  
computer

3829  
02:37:14,870 --> 02:37:12,359  
space Power you know in over there in

3830  
02:37:18,950 --> 02:37:14,880  
the cloud that that we will have a

3831  
02:37:21,349 --> 02:37:18,960  
better system where ideas will be uh

3832  
02:37:25,730 --> 02:37:21,359  
exposed to to the community at large

3833  
02:37:27,590 --> 02:37:25,740  
without being blocked by experts I think

3834  
02:37:29,990 --> 02:37:27,600  
that would be the best scheme

3835  
02:37:32,450 --> 02:37:30,000  
have you tried to publish on archive and

3836  
02:37:37,849 --> 02:37:32,460  
it was rejected

3837  
02:37:40,670 --> 02:37:37,859  
well um uh no but there was for example

3838  
02:37:42,710 --> 02:37:40,680

a submission recently about the Galileo

3839

02:37:45,349 --> 02:37:42,720

project where I described the project as

3840

02:37:48,530 --> 02:37:45,359

a whole which is a scientific project uh

3841

02:37:51,889 --> 02:37:48,540

and it has been held by the moderators

3842

02:37:54,410 --> 02:37:51,899

for almost a month now uh they are not

3843

02:37:56,929 --> 02:37:54,420

posting it and I find that strange

3844

02:38:00,050 --> 02:37:56,939

because there are lots of papers in fact

3845

02:38:01,090 --> 02:38:00,060

on the archive there was recently a

3846

02:38:05,830 --> 02:38:01,100

paper

3847

02:38:11,630 --> 02:38:05,840

saying that based on a poll a survey of

3848

02:38:14,389 --> 02:38:11,640

UK's astronomers that most of them were

3849

02:38:17,210 --> 02:38:14,399

motivated to enter astronomy as a result

3850

02:38:20,150 --> 02:38:17,220

of being fascinated by science fiction

3851  
02:38:22,010 --> 02:38:20,160  
okay so that paper reporting about the

3852  
02:38:24,710 --> 02:38:22,020  
Paul of UK astronomers that were

3853  
02:38:27,469 --> 02:38:24,720  
fascinated by science fiction is posted

3854  
02:38:29,809 --> 02:38:27,479  
on the same day on the archive whereas

3855  
02:38:34,969 --> 02:38:29,819  
the description of a scientific project

3856  
02:38:37,490 --> 02:38:34,979  
to explore UAP is being moderated for a

3857  
02:38:40,130 --> 02:38:37,500  
month now on the archive and you ask

3858  
02:38:41,870 --> 02:38:40,140  
yourself is there some agenda behind it

3859  
02:38:45,730 --> 02:38:41,880  
or what what could be the reason for

3860  
02:38:51,830 --> 02:38:49,070  
now speaking of Dogma

3861  
02:38:54,889 --> 02:38:51,840  
there's a viewer question his name is

3862  
02:38:57,530 --> 02:38:54,899  
clab's Petter and he wants to know what

3863  
02:38:59,929 --> 02:38:57,540

things in cosmology do we assume are a

3864

02:39:01,250 --> 02:38:59,939

true that we can't prove nor disprove

3865

02:39:04,490 --> 02:39:01,260

besides

3866

02:39:07,550 --> 02:39:04,500

inflation and brains so maybe ads CFT

3867

02:39:10,730 --> 02:39:07,560

what are the religious doctrines of

3868

02:39:16,370 --> 02:39:13,969

so for example uh the Multiverse is an

3869

02:39:18,469 --> 02:39:16,380

excellent example of an area in

3870

02:39:20,270 --> 02:39:18,479

cosmology that cannot be proven or

3871

02:39:24,070 --> 02:39:20,280

disproven because we don't have access

3872

02:39:26,929 --> 02:39:24,080

to regions of space and time beyond the

3873

02:39:28,510 --> 02:39:26,939

observable volume of the universe light

3874

02:39:32,990 --> 02:39:28,520

could not have

3875

02:39:34,150 --> 02:39:33,000

gone across a distance greater than the

3876

02:39:37,309 --> 02:39:34,160

Horizon

3877

02:39:39,230 --> 02:39:37,319

over the time since the big bang and so

3878

02:39:41,990 --> 02:39:39,240

there are these I would call

3879

02:39:44,389 --> 02:39:42,000

speculations that are origins of space

3880

02:39:46,550 --> 02:39:44,399

and time Far Beyond the Horizon that we

3881

02:39:47,929 --> 02:39:46,560

can see where conditions are very

3882

02:39:49,490 --> 02:39:47,939

different and perhaps the fundamental

3883

02:39:52,429 --> 02:39:49,500

constants are different perhaps the laws

3884

02:39:56,330 --> 02:39:52,439

of physics are different uh this

3885

02:39:59,750 --> 02:39:56,340

discussion of the Multiverse has no is

3886

02:40:01,790 --> 02:39:59,760

not substantiated by any evidence and it

3887

02:40:03,110 --> 02:40:01,800

it doesn't appear more credible than

3888

02:40:06,830 --> 02:40:03,120

philosophy

3889

02:40:09,469 --> 02:40:06,840

uh or theology because it has no way of

3890

02:40:11,690 --> 02:40:09,479

being disproven uh of course some people

3891

02:40:15,230 --> 02:40:11,700

say maybe one day we will come up with a

3892

02:40:19,730 --> 02:40:15,240

way to test it fine until that day comes

3893

02:40:21,110 --> 02:40:19,740

I don't see it as part of uh falsifiable

3894

02:40:25,190 --> 02:40:21,120

physics

3895

02:40:28,190 --> 02:40:25,200

um and of course Cosmic inflation is a

3896

02:40:30,410 --> 02:40:28,200

paradigm that in principle can be proven

3897

02:40:34,429 --> 02:40:30,420

right for example if we find

3898

02:40:38,090 --> 02:40:34,439

gravitational waves from inflation that

3899

02:40:40,730 --> 02:40:38,100

the theory predicts at different levels

3900

02:40:43,490 --> 02:40:40,740

depending on the inflaton the the field

3901  
02:40:45,770 --> 02:40:43,500  
that drove inflation so you can always

3902  
02:40:48,410 --> 02:40:45,780  
design models of inflation that would

3903  
02:40:50,510 --> 02:40:48,420  
produce undetectable signals but in all

3904  
02:40:53,450 --> 02:40:50,520  
of them there is some gravitational wave

3905  
02:40:55,309 --> 02:40:53,460  
background and we are seeking it uh

3906  
02:40:57,950 --> 02:40:55,319  
investing millions of dollars in the

3907  
02:41:00,050 --> 02:40:57,960  
search for them I should say that there

3908  
02:41:01,849 --> 02:41:00,060  
is also a way of disproving the Paradigm

3909  
02:41:05,270 --> 02:41:01,859  
of inflation altogether

3910  
02:41:07,190 --> 02:41:05,280  
and the way to do that is to look for a

3911  
02:41:08,929 --> 02:41:07,200  
gravitational wave background of the

3912  
02:41:11,389 --> 02:41:08,939  
type of the cosmic microwave background

3913  
02:41:17,150 --> 02:41:11,399

we wrote a paper about it just last week

3914

02:41:20,630 --> 02:41:17,160

with a postdoc uh named Sunny blacknosi

3915

02:41:23,570 --> 02:41:20,640

uh and we basically said that at the

3916

02:41:26,150 --> 02:41:23,580

plank time uh the universe was immersed

3917

02:41:27,530 --> 02:41:26,160

in uh a gravitational wave background

3918

02:41:28,969 --> 02:41:27,540

just like the cosmic microwave

3919

02:41:30,410 --> 02:41:28,979

background but in gravitational waves

3920

02:41:33,349 --> 02:41:30,420

because of its very high temperature

3921

02:41:35,570 --> 02:41:33,359

close to the plant temperature now the

3922

02:41:38,210 --> 02:41:35,580

theory of inflation says after that

3923

02:41:41,150 --> 02:41:38,220

Planck time there was a period where the

3924

02:41:43,730 --> 02:41:41,160

universe expanded exponentially or very

3925

02:41:46,010 --> 02:41:43,740

fast faster than light and any such

3926  
02:41:47,690 --> 02:41:46,020  
background would have been diluted we

3927  
02:41:49,389 --> 02:41:47,700  
wouldn't have it around today because

3928  
02:41:52,849 --> 02:41:49,399  
there was this

3929  
02:41:54,710 --> 02:41:52,859  
immense expansion of the volume of the

3930  
02:41:57,230 --> 02:41:54,720  
universe and therefore inflation

3931  
02:41:58,969 --> 02:41:57,240  
predicts that we won't find any

3932  
02:42:01,190 --> 02:41:58,979  
gravitational wave background at high

3933  
02:42:02,750 --> 02:42:01,200  
frequencies similar to The Cosmic

3934  
02:42:06,050 --> 02:42:02,760  
microwave background of

3935  
02:42:07,790 --> 02:42:06,060  
electromagnetic radiation and if we

3936  
02:42:10,730 --> 02:42:07,800  
search for it and we discussed in this

3937  
02:42:13,429 --> 02:42:10,740  
paper how one can search for it in case

3938  
02:42:15,650 --> 02:42:13,439

we find it that would disprove that

3939

02:42:18,170 --> 02:42:15,660

there was an Epoch of exponential

3940

02:42:20,510 --> 02:42:18,180

expansion or inflation or super luminal

3941

02:42:23,389 --> 02:42:20,520

faster than light expansion during an

3942

02:42:26,210 --> 02:42:23,399

Epoch of cosmic inflation so there is a

3943

02:42:29,210 --> 02:42:26,220

way of either proving inflation or

3944

02:42:31,250 --> 02:42:29,220

disproving the entire Paradigm just by

3945

02:42:33,710 --> 02:42:31,260

searching for gravitational waves so in

3946

02:42:38,030 --> 02:42:33,720

a way that's a scientific theory you can

3947

02:42:40,929 --> 02:42:38,040

either prove it or disprove it now there

3948

02:42:44,630 --> 02:42:40,939

are other aspects of

3949

02:42:48,050 --> 02:42:44,640

the early Universe which are also in

3950

02:42:49,610 --> 02:42:48,060

principle testable for example imagine a

3951  
02:42:51,230 --> 02:42:49,620  
universe where inflation didn't take

3952  
02:42:53,510 --> 02:42:51,240  
place but there was a bounce the

3953  
02:42:57,230 --> 02:42:53,520  
universe contracted before that and then

3954  
02:43:00,050 --> 02:42:57,240  
there was a bounce uh that kind of a

3955  
02:43:03,170 --> 02:43:00,060  
theory makes other predictions that can

3956  
02:43:06,889 --> 02:43:03,180  
be tested so all together you know there

3957  
02:43:10,190 --> 02:43:06,899  
are ways to test what happened around

3958  
02:43:12,170 --> 02:43:10,200  
the Big Bang how but it's very difficult

3959  
02:43:14,030 --> 02:43:12,180  
to test what happens Beyond this the

3960  
02:43:15,650 --> 02:43:14,040  
region of space and time that we can

3961  
02:43:17,570 --> 02:43:15,660  
probe right now

3962  
02:43:19,730 --> 02:43:17,580  
thank you and I'll put a link to that

3963  
02:43:22,070 --> 02:43:19,740

paper in the description so this one is

3964

02:43:24,170 --> 02:43:22,080

from a user named mathematical

3965

02:43:26,210 --> 02:43:24,180

metaphysics he says I don't know if this

3966

02:43:28,849 --> 02:43:26,220

has been asked before but has Avi

3967

02:43:30,410 --> 02:43:28,859

experienced any thing close to what's

3968

02:43:34,429 --> 02:43:30,420

paranormal

3969

02:43:41,090 --> 02:43:38,710

I never had such an experience and

3970

02:43:42,429 --> 02:43:41,100

therefore you cannot regard me as an

3971

02:43:45,590 --> 02:43:42,439

experiencer

3972

02:43:47,770 --> 02:43:45,600

and moreover I do believe that the

3973

02:43:53,510 --> 02:43:47,780

scientific instruments are much more

3974

02:43:55,969 --> 02:43:53,520

reliable than humans as detectors so I

3975

02:43:58,190 --> 02:43:55,979

don't need to experience it myself all I

3976

02:44:02,270 --> 02:43:58,200

want is the for example the Galileo

3977

02:44:06,770 --> 02:44:02,280

project instruments to detect an unusual

3978

02:44:10,790 --> 02:44:06,780

uh set of data that would indicate an

3979

02:44:14,570 --> 02:44:10,800

object that is not naturally uh

3980

02:44:18,469 --> 02:44:14,580

in the atmosphere like not a bird not a

3981

02:44:20,929 --> 02:44:18,479

bug not a meteor not a thunderstorm and

3982

02:44:24,730 --> 02:44:20,939

it's not human-made it's not a drone not

3983

02:44:28,670 --> 02:44:24,740

an airplane not a satellite or

3984

02:44:31,309 --> 02:44:28,680

anything else of that sort but but it

3985

02:44:33,290 --> 02:44:31,319

looks unusual and for me that would be

3986

02:44:35,809 --> 02:44:33,300

credible evidence I don't need to

3987

02:44:37,790 --> 02:44:35,819

experience it myself except I want to

3988

02:44:39,889 --> 02:44:37,800

see the instruments detecting it and

3989

02:44:41,929 --> 02:44:39,899

that I think will bring the subject to

3990

02:44:44,270 --> 02:44:41,939

the mainstream of science so it will

3991

02:44:47,150 --> 02:44:44,280

serve a very important purpose of

3992

02:44:50,830 --> 02:44:47,160

validating what experiences

3993

02:44:53,870 --> 02:44:50,840

claim uh I don't

3994

02:44:57,410 --> 02:44:53,880

have any opinion about the experiences

3995

02:44:59,330 --> 02:44:57,420

reported I I don't dismiss them uh I

3996

02:45:01,490 --> 02:44:59,340

would like to find

3997

02:45:03,950 --> 02:45:01,500

evidence for for whatever they talk

3998

02:45:07,250 --> 02:45:03,960

about through scientific instrumentation

3999

02:45:10,309 --> 02:45:07,260

because it's not subject to any biases

4000

02:45:12,650 --> 02:45:10,319

that humans have

4001  
02:45:15,170 --> 02:45:12,660  
now in this instrumentation do you

4002  
02:45:17,510 --> 02:45:15,180  
happen to have any analysis or people

4003  
02:45:19,010 --> 02:45:17,520  
who are experts on metamaterials and if

4004  
02:45:21,770 --> 02:45:19,020  
not do you plan on getting them in for

4005  
02:45:25,730 --> 02:45:21,780  
the Galileo project

4006  
02:45:28,670 --> 02:45:25,740  
we do have the Gary Nolan as a member of

4007  
02:45:30,290 --> 02:45:28,680  
our research team and if we do find the

4008  
02:45:33,110 --> 02:45:30,300  
materials that are of unusual

4009  
02:45:36,110 --> 02:45:33,120  
composition will definitely bring it to

4010  
02:45:38,090 --> 02:45:36,120  
his attention for example when we scoop

4011  
02:45:41,210 --> 02:45:38,100  
the ocean floor named Papua New Guinea

4012  
02:45:43,550 --> 02:45:41,220  
if we find that the fragments from the

4013  
02:45:46,309 --> 02:45:43,560

first Interstellar meteor were made of

4014

02:45:48,830 --> 02:45:46,319

some very unusual composition will bring

4015

02:45:49,790 --> 02:45:48,840

it to the laboratory of Gary Norton for

4016

02:45:52,190 --> 02:45:49,800

sure

4017

02:45:55,130 --> 02:45:52,200

this question comes from user Swift

4018

02:45:57,349 --> 02:45:55,140

wisdom for Avi Professor Gary Nolan

4019

02:45:59,150 --> 02:45:57,359

recently gave an interview with Ross

4020

02:46:01,010 --> 02:45:59,160

coldheart and stated that the phenomenon

4021

02:46:03,110 --> 02:46:01,020

is definitely not human and if people

4022

02:46:05,690 --> 02:46:03,120

saw the evidence he had seen they would

4023

02:46:07,550 --> 02:46:05,700

come to a similar conclusion that the

4024

02:46:09,950 --> 02:46:07,560

phenomenon is a non-material form of

4025

02:46:11,870 --> 02:46:09,960

Consciousness so what is a non-material

4026  
02:46:14,150 --> 02:46:11,880  
form of Consciousness and what does avi

4027  
02:46:16,250 --> 02:46:14,160  
think of Gary's position now of course

4028  
02:46:18,590 --> 02:46:16,260  
just so that this is clear

4029  
02:46:20,030 --> 02:46:18,600  
I'm reading a quote from someone and I

4030  
02:46:23,150 --> 02:46:20,040  
haven't verified this quote myself so

4031  
02:46:30,349 --> 02:46:27,349  
so my view of Consciousness is that it's

4032  
02:46:32,630 --> 02:46:30,359  
an emergent phenomena of

4033  
02:46:36,050 --> 02:46:32,640  
the human body the human body is very

4034  
02:46:37,910 --> 02:46:36,060  
complex especially the human brain and I

4035  
02:46:42,230 --> 02:46:37,920  
don't think there is anything beyond

4036  
02:46:45,889 --> 02:46:42,240  
what the the physical composition of the

4037  
02:46:48,349 --> 02:46:45,899  
human body is uh so when people die I I

4038  
02:46:50,570 --> 02:46:48,359

think of it just like unplugging a

4039

02:46:52,190 --> 02:46:50,580

computer from the outlet they it stops

4040

02:46:54,710 --> 02:46:52,200

operating and

4041

02:46:57,050 --> 02:46:54,720

um and then obviously what we call

4042

02:46:59,750 --> 02:46:57,060

Consciousness is a result of our brain

4043

02:47:01,610 --> 02:46:59,760

being very complex and one way to

4044

02:47:04,429 --> 02:47:01,620

demonstrate that is to build a computer

4045

02:47:07,610 --> 02:47:04,439

out of Hardware which is just materials

4046

02:47:10,429 --> 02:47:07,620

we find around and we put together and

4047

02:47:14,090 --> 02:47:10,439

then get to the level of sentient

4048

02:47:16,010 --> 02:47:14,100

artificial intelligence systems if the

4049

02:47:19,570 --> 02:47:16,020

artificial intelligence system will

4050

02:47:21,950 --> 02:47:19,580

behave in a way that resembles a human

4051

02:47:26,090 --> 02:47:21,960

we could declare it as having

4052

02:47:28,010 --> 02:47:26,100

Consciousness and uh I subscribe to the

4053

02:47:31,670 --> 02:47:28,020

Turing test in the sense that suppose

4054

02:47:33,889 --> 02:47:31,680

out of a thousand people 900 199 of them

4055

02:47:37,130 --> 02:47:33,899

would think through a conversation

4056

02:47:39,530 --> 02:47:37,140

through interactions with an AI system

4057

02:47:41,750 --> 02:47:39,540

would believe that the AI system is a

4058

02:47:44,809 --> 02:47:41,760

human without us telling them in advance

4059

02:47:47,150 --> 02:47:44,819

that would be good enough as far as I'm

4060

02:47:50,570 --> 02:47:47,160

concerned for defining it as sentient

4061

02:47:53,630 --> 02:47:50,580

now even if the AI System is using data

4062

02:47:55,730 --> 02:47:53,640

sets from the internet to respond

4063

02:47:57,290 --> 02:47:55,740

to the human I don't care about it

4064

02:48:00,170 --> 02:47:57,300

because maybe the human brain is doing

4065

02:48:03,290 --> 02:48:00,180

the same as long as it appears to be

4066

02:48:06,230 --> 02:48:03,300

like a human that's all that matters

4067

02:48:07,969 --> 02:48:06,240

because we don't know when we interact

4068

02:48:11,389 --> 02:48:07,979

with another human we don't know how the

4069

02:48:13,550 --> 02:48:11,399

processing is done in the brain of

4070

02:48:16,130 --> 02:48:13,560

information and how how Consciousness

4071

02:48:18,650 --> 02:48:16,140

comes into play so I would say we should

4072

02:48:21,050 --> 02:48:18,660

just compare it to the experience with a

4073

02:48:24,770 --> 02:48:21,060

human and if it behaves in a way that is

4074

02:48:26,650 --> 02:48:24,780

indistinguishable to 999 people out of a

4075

02:48:30,170 --> 02:48:26,660

thousand I would say it's good enough

4076  
02:48:32,750 --> 02:48:30,180  
and at that point you know it would be

4077  
02:48:35,150 --> 02:48:32,760  
sentient and it would be clear that we

4078  
02:48:38,570 --> 02:48:35,160  
constructed this AI system out of

4079  
02:48:40,849 --> 02:48:38,580  
materials so it would make sense to say

4080  
02:48:43,790 --> 02:48:40,859  
the human body is similar it's

4081  
02:48:46,670 --> 02:48:43,800  
constructed of materials and yet it

4082  
02:48:47,950 --> 02:48:46,680  
displays what we call Consciousness or

4083  
02:48:51,530 --> 02:48:47,960  
free will

4084  
02:48:53,570 --> 02:48:51,540  
and that's a signature of very complex

4085  
02:48:55,670 --> 02:48:53,580  
systems complex enough and by the way

4086  
02:48:58,309 --> 02:48:55,680  
the AI system could learn from

4087  
02:49:01,610 --> 02:48:58,319  
experience so you can see it started

4088  
02:49:04,670 --> 02:49:01,620

just like you give birth to a child and

4089

02:49:06,349 --> 02:49:04,680

early on you educate the child so the AI

4090

02:49:07,790 --> 02:49:06,359

system could learn from experience

4091

02:49:09,950 --> 02:49:07,800

through machine learning and you can

4092

02:49:13,670 --> 02:49:09,960

educate it just like you educate a child

4093

02:49:15,889 --> 02:49:13,680

so early on it might imitate you but

4094

02:49:18,110 --> 02:49:15,899

eventually it will acquire the qualities

4095

02:49:20,929 --> 02:49:18,120

of a person an adult that goes into the

4096

02:49:24,770 --> 02:49:20,939

world and interacts with the world on

4097

02:49:27,170 --> 02:49:24,780

its own and so in that sense I would not

4098

02:49:31,670 --> 02:49:27,180

see a difference between a sentient AI

4099

02:49:33,110 --> 02:49:31,680

system and humans and and therefore I

4100

02:49:36,349 --> 02:49:33,120

would not think that there is a

4101  
02:49:40,490 --> 02:49:36,359  
non-material form of Consciousness and

4102  
02:49:43,429 --> 02:49:40,500  
therefore when seeking uh an explanation

4103  
02:49:45,770 --> 02:49:43,439  
for unidentified objects I would assume

4104  
02:49:48,230 --> 02:49:45,780  
that if they behave as sentient entities

4105  
02:49:50,450 --> 02:49:48,240  
that they are equipped with artificial

4106  
02:49:53,510 --> 02:49:50,460  
intelligence you know that it's just

4107  
02:49:56,270 --> 02:49:53,520  
devices that are even more sophisticated

4108  
02:49:58,910 --> 02:49:56,280  
the ones we can we will produce in the

4109  
02:50:01,790 --> 02:49:58,920  
next decade and it would be interesting

4110  
02:50:05,170 --> 02:50:01,800  
because it will open a new frontier of

4111  
02:50:07,490 --> 02:50:05,180  
artificial intelligence from our side

4112  
02:50:09,469 --> 02:50:07,500  
interacting with artificial intelligence

4113  
02:50:14,510 --> 02:50:09,479

from their side

4114

02:50:16,370 --> 02:50:14,520

and I call it a i a i interaction which

4115

02:50:18,710 --> 02:50:16,380

is a third category that was not

4116

02:50:21,469 --> 02:50:18,720

envisioned by the philosopher Martin

4117

02:50:25,010 --> 02:50:21,479

buber who talked about an interaction of

4118

02:50:27,130 --> 02:50:25,020

a human with an object he called it I it

4119

02:50:31,309 --> 02:50:27,140

interaction or relation

4120

02:50:32,929 --> 02:50:31,319

and he distinguished that from an i you

4121

02:50:35,690 --> 02:50:32,939

interaction an interaction of a human

4122

02:50:38,630 --> 02:50:35,700

with a human or of a human with God

4123

02:50:40,910 --> 02:50:38,640

which is the Eternal you and he did not

4124

02:50:45,590 --> 02:50:40,920

Envision back a century ago when he

4125

02:50:47,690 --> 02:50:45,600

wrote his book I and though in 1923 he

4126  
02:50:49,490 --> 02:50:47,700  
did not Envision a third category which

4127  
02:50:53,270 --> 02:50:49,500  
I think will might come into play with

4128  
02:50:56,050 --> 02:50:53,280  
which is AI interacting with AI which

4129  
02:50:58,010 --> 02:50:56,060  
may reflect our first interaction with

4130  
02:51:01,030 --> 02:50:58,020  
artificial intelligence from an

4131  
02:51:03,469 --> 02:51:01,040  
extraterrestrial origin so I can imagine

4132  
02:51:06,170 --> 02:51:03,479  
universities establishing new

4133  
02:51:08,929 --> 02:51:06,180  
departments instead of a department of

4134  
02:51:12,050 --> 02:51:08,939  
psychology it would be a department of

4135  
02:51:15,830 --> 02:51:12,060  
Interstate Stellar psychology meaning

4136  
02:51:18,410 --> 02:51:15,840  
trying to understand sentient beings

4137  
02:51:21,710 --> 02:51:18,420  
which are basically AI systems that were

4138  
02:51:24,469 --> 02:51:21,720

sent to us from an exoplanet

4139

02:51:26,510 --> 02:51:24,479

so what if your wife says to you Avi

4140

02:51:28,790 --> 02:51:26,520

just so you know come to this room she

4141

02:51:31,490 --> 02:51:28,800

opens the room it's a secret room in

4142

02:51:33,530 --> 02:51:31,500

your house cameras and TVs are revealed

4143

02:51:36,230 --> 02:51:33,540

then she says I've been appearing to

4144

02:51:38,809 --> 02:51:36,240

love you it's all fake I'm hired by the

4145

02:51:40,670 --> 02:51:38,819

government after this I will go continue

4146

02:51:41,929 --> 02:51:40,680

to show you love in the same way but

4147

02:51:44,150 --> 02:51:41,939

just so you know I don't actually feel

4148

02:51:45,469 --> 02:51:44,160

it I'm hired we're going to I'm going to

4149

02:51:47,270 --> 02:51:45,479

leave this room and everything will go

4150

02:51:50,450 --> 02:51:47,280

back to the exact same way it was before

4151  
02:51:52,130 --> 02:51:50,460  
I'll say the exact same words I'll give

4152  
02:51:53,809 --> 02:51:52,140  
the exact same facial expressions and

4153  
02:51:55,550 --> 02:51:53,819  
perform the same Acts

4154  
02:51:58,250 --> 02:51:55,560  
do you still think that the outward

4155  
02:52:00,530 --> 02:51:58,260  
Behavior implies the internal feeling or

4156  
02:52:02,330 --> 02:52:00,540  
do you have objections like hey wife

4157  
02:52:04,309 --> 02:52:02,340  
this is wait a minute this is no longer

4158  
02:52:06,710 --> 02:52:04,319  
authentic I can't continue in the same

4159  
02:52:09,590 --> 02:52:06,720  
way it was before

4160  
02:52:11,750 --> 02:52:09,600  
yeah so definitely the big picture makes

4161  
02:52:14,990 --> 02:52:11,760  
a difference for me because I always

4162  
02:52:16,969 --> 02:52:15,000  
think about the big picture if my wife

4163  
02:52:19,490 --> 02:52:16,979

would come to me and say that she was

4164

02:52:21,550 --> 02:52:19,500

just playing it like an actor that would

4165

02:52:24,230 --> 02:52:21,560

make a difference for me it's just like

4166

02:52:26,870 --> 02:52:24,240

participating in a play where you play a

4167

02:52:29,990 --> 02:52:26,880

role and that role does not represent

4168

02:52:32,809 --> 02:52:30,000

you necessarily so yes I would not be in

4169

02:52:36,410 --> 02:52:32,819

love with an actor who displays love to

4170

02:52:39,130 --> 02:52:36,420

me uh I would prefer to be in love with

4171

02:52:42,469 --> 02:52:39,140

a person who lives life

4172

02:52:44,929 --> 02:52:42,479

in an authentic way so definitely that

4173

02:52:47,809 --> 02:52:44,939

would make a difference and you can

4174

02:52:50,230 --> 02:52:47,819

generalize it to experiences we have and

4175

02:52:52,969 --> 02:52:50,240

like for example if

4176  
02:52:54,769 --> 02:52:52,979  
the government tricks us to believe in

4177  
02:52:57,590 --> 02:52:54,779  
some notion and it doesn't seem to be

4178  
02:53:00,349 --> 02:52:57,600  
real I would be upset about it and as a

4179  
02:53:02,590 --> 02:53:00,359  
scientist that's why I prefer not to pay

4180  
02:53:05,690 --> 02:53:02,600  
attention to social media

4181  
02:53:07,150 --> 02:53:05,700  
and focus on evidence and facts because

4182  
02:53:10,910 --> 02:53:07,160  
nature in my

4183  
02:53:12,410 --> 02:53:10,920  
view is authentic uh whatever you know

4184  
02:53:14,690 --> 02:53:12,420  
when I jog in the morning when I

4185  
02:53:17,630 --> 02:53:14,700  
interact with nature it always appears

4186  
02:53:19,730 --> 02:53:17,640  
to me as sincere straightforward whereas

4187  
02:53:23,090 --> 02:53:19,740  
people are not always that way they

4188  
02:53:25,670 --> 02:53:23,100

sometimes have an ulterior motive or a

4189

02:53:27,769 --> 02:53:25,680

hidden agenda that's why I prefer to use

4190

02:53:29,929 --> 02:53:27,779

instruments to learn about nature

4191

02:53:32,510 --> 02:53:29,939

because they don't have a hidden agenda

4192

02:53:35,450 --> 02:53:32,520

and they don't have a Prejudice or an

4193

02:53:40,790 --> 02:53:35,460

ego associated with them and moreover

4194

02:53:43,250 --> 02:53:40,800

you know I prefer to explore the facts

4195

02:53:45,950 --> 02:53:43,260

to guide us and just to give you an

4196

02:53:48,650 --> 02:53:45,960

example the expedition to Papua New

4197

02:53:51,349 --> 02:53:48,660

Guinea was based on three scientific

4198

02:53:53,510 --> 02:53:51,359

papers that we published submitted for

4199

02:53:56,389 --> 02:53:53,520

publication two of them but one of them

4200

02:53:57,490 --> 02:53:56,399

was accepted for publication already and

4201  
02:54:03,110 --> 02:53:57,500  
then

4202  
02:54:05,330 --> 02:54:03,120  
it was featured on NPR and as a result a

4203  
02:54:06,710 --> 02:54:05,340  
few non-scientists people who do not

4204  
02:54:10,269 --> 02:54:06,720  
Practice Science

4205  
02:54:14,030 --> 02:54:10,279  
uh decided to make

4206  
02:54:18,410 --> 02:54:14,040  
some ridiculing comments on Twitter on

4207  
02:54:20,570 --> 02:54:18,420  
this Expedition uh on a superficial

4208  
02:54:28,309 --> 02:54:20,580  
uh

4209  
02:54:30,410 --> 02:54:28,319  
myself is this really what they pretend

4210  
02:54:32,269 --> 02:54:30,420  
to be because they pretended to protect

4211  
02:54:34,610 --> 02:54:32,279  
science and argue that this Expedition

4212  
02:54:37,010 --> 02:54:34,620  
makes little sense but in fact they are

4213  
02:54:39,050 --> 02:54:37,020

anti-science because science is about

4214

02:54:41,570 --> 02:54:39,060

seeking evidence this Expedition is

4215

02:54:43,190 --> 02:54:41,580

funded by private donations it doesn't

4216

02:54:45,710 --> 02:54:43,200

take money from any other scientific

4217

02:54:48,710 --> 02:54:45,720

project so the only thing you can do if

4218

02:54:53,450 --> 02:54:48,720

you are pro-science is to upload that

4219

02:54:56,469 --> 02:54:53,460

um to to support it uh and then for

4220

02:55:01,250 --> 02:54:56,479

example if you look at mainstream

4221

02:55:04,130 --> 02:55:01,260

cases of us seeking evidence we looked

4222

02:55:06,710 --> 02:55:04,140

for the nature of dark matter in the

4223

02:55:09,370 --> 02:55:06,720

form of the lightest supersymmetric

4224

02:55:12,290 --> 02:55:09,380

particle by Smashing

4225

02:55:14,870 --> 02:55:12,300

uh Elementary particles at very high

4226  
02:55:18,889 --> 02:55:14,880  
energies at the Large Hadron Collider

4227  
02:55:22,670 --> 02:55:18,899  
and we haven't found it okay and so here

4228  
02:55:25,330 --> 02:55:22,680  
is an example for a search that didn't

4229  
02:55:29,030 --> 02:55:25,340  
turn out the way we expected it to be

4230  
02:55:32,389 --> 02:55:29,040  
and then a lot of astronomers are

4231  
02:55:35,570 --> 02:55:32,399  
investing many hours of on the biggest

4232  
02:55:39,530 --> 02:55:35,580  
telescopes in the search for planet nine

4233  
02:55:44,030 --> 02:55:39,540  
they haven't found it okay so why would

4234  
02:55:45,710 --> 02:55:44,040  
one ridicule an expedition that wants to

4235  
02:55:47,809 --> 02:55:45,720  
figure out the composition of the first

4236  
02:55:50,570 --> 02:55:47,819  
intestinal arm meteor which was

4237  
02:55:53,769 --> 02:55:50,580  
supported by a formal letter from the

4238  
02:55:56,929 --> 02:55:53,779

U.S space command while at the same time

4239

02:55:58,849 --> 02:55:56,939

supporting a search for the lightest

4240

02:56:00,969 --> 02:55:58,859

supersymmetric particle with the

4241

02:56:04,070 --> 02:56:00,979

investment of billions of dollars

4242

02:56:06,969 --> 02:56:04,080

support the search for planet nine with

4243

02:56:10,010 --> 02:56:06,979

the investment of huge telescope time

4244

02:56:11,450 --> 02:56:10,020

why are these different from the search

4245

02:56:14,330 --> 02:56:11,460

for the composition of the first

4246

02:56:18,050 --> 02:56:14,340

Interstellar meteor that is escaping me

4247

02:56:22,190 --> 02:56:18,060

the only way I can understand it is some

4248

02:56:25,130 --> 02:56:22,200

people out of jealousy trying to step on

4249

02:56:26,330 --> 02:56:25,140

any flower that rises above the grass

4250

02:56:28,550 --> 02:56:26,340

level

4251

02:56:30,230 --> 02:56:28,560

okay Lastly lastly now if you could run

4252

02:56:31,969 --> 02:56:30,240

the archive we spoke about the archive

4253

02:56:34,130 --> 02:56:31,979

before or if you could speak to the

4254

02:56:37,429 --> 02:56:34,140

moderators who are in charge what would

4255

02:56:43,370 --> 02:56:41,170

regarding the archive I would establish

4256

02:56:45,290 --> 02:56:43,380

categories different categories of

4257

02:56:46,550 --> 02:56:45,300

research that allow

4258

02:56:49,190 --> 02:56:46,560

for

4259

02:56:51,950 --> 02:56:49,200

aspects that go beyond the mainstream

4260

02:56:55,570 --> 02:56:51,960

beyond the conventional wisdom such that

4261

02:56:59,389 --> 02:56:55,580

you know ideas could be floated there

4262

02:57:02,450 --> 02:56:59,399

and let natural selection choose which

4263

02:57:06,610 --> 02:57:02,460

one is accepted by the mainstream

4264

02:57:09,590 --> 02:57:06,620

community so rather than block the

4265

02:57:11,330 --> 02:57:09,600

interaction among scientists of course

4266

02:57:13,309 --> 02:57:11,340

there should be a certain threshold for

4267

02:57:15,950 --> 02:57:13,319

the content you don't want things that

4268

02:57:17,809 --> 02:57:15,960

are not scientific but it's you know

4269

02:57:21,349 --> 02:57:17,819

above some threshold there should be

4270

02:57:23,570 --> 02:57:21,359

free exchange of ideas and by

4271

02:57:26,630 --> 02:57:23,580

establishing those categories that allow

4272

02:57:28,790 --> 02:57:26,640

for that free exchange you could

4273

02:57:30,710 --> 02:57:28,800

accelerate the progress of science

4274

02:57:33,309 --> 02:57:30,720

because you are not blocking you're not

4275

02:57:36,889 --> 02:57:33,319

moderating Innovation

4276

02:57:40,250 --> 02:57:36,899

there is no way for us to know in

4277

02:57:42,370 --> 02:57:40,260

advance which path leads to the truth

4278

02:57:45,710 --> 02:57:42,380

and therefore we should encourage

4279

02:57:48,530 --> 02:57:45,720

rethinking the other risk I see is that

4280

02:57:51,010 --> 02:57:48,540

by blocking deviations from the beaten

4281

02:57:53,450 --> 02:57:51,020

path we are discouraging young people

4282

02:57:57,769 --> 02:57:53,460

from thinking independently because

4283

02:58:00,170 --> 02:57:57,779

those young Scholars realize that you

4284

02:58:02,330 --> 02:58:00,180

know if in order for them to get a job

4285

02:58:04,730 --> 02:58:02,340

they need to subscribe to the main theme

4286

02:58:07,370 --> 02:58:04,740

in order for them to post their papers

4287

02:58:09,889 --> 02:58:07,380

to get their papers published they must

4288

02:58:12,349 --> 02:58:09,899

adhere to whatever guidelines they

4289

02:58:14,330 --> 02:58:12,359

receive from the senior people and that

4290

02:58:15,550 --> 02:58:14,340

to me goes against the spirit of

4291

02:58:17,690 --> 02:58:15,560

innovation

4292

02:58:19,610 --> 02:58:17,700

insides against the spirit of the

4293

02:58:21,830 --> 02:58:19,620

history of science if you look at the

4294

02:58:24,830 --> 02:58:21,840

most important Revelations that we had

4295

02:58:27,950 --> 02:58:24,840

they came from unexpected directions and

4296

02:58:30,769 --> 02:58:27,960

by blocking those we are limiting the

4297

02:58:33,830 --> 02:58:30,779

rate of progress in science so instead

4298

02:58:36,170 --> 02:58:33,840

of that let's allow uh sort of natural

4299

02:58:40,070 --> 02:58:36,180

selection of ideas let's allow the

4300

02:58:44,450 --> 02:58:40,080

community to filter out which ideas are

4301  
02:58:46,969 --> 02:58:44,460  
worthwhile and which not and host all of

4302  
02:58:49,250 --> 02:58:46,979  
these suggestions on some categories of

4303  
02:58:52,250 --> 02:58:49,260  
the archive that allow for Innovation

4304  
02:58:54,290 --> 02:58:52,260  
which currently do not exist the way

4305  
02:58:56,510 --> 02:58:54,300  
that I think about this is that if an

4306  
02:58:57,950 --> 02:58:56,520  
open category exists then it would

4307  
02:59:00,410 --> 02:58:57,960  
automatically become labeled as

4308  
02:59:01,790 --> 02:59:00,420  
pseudoscience even if it's not so for

4309  
02:59:03,889 --> 02:59:01,800  
example there's vixra which is the

4310  
02:59:05,929 --> 02:59:03,899  
opposite of archive that has I imagine

4311  
02:59:08,950 --> 02:59:05,939  
valid ideas and then some invalid ones

4312  
02:59:11,269 --> 02:59:08,960  
but almost all are classified as

4313  
02:59:12,830 --> 02:59:11,279

unscientific and vixra is considered to

4314

02:59:15,410 --> 02:59:12,840

be the place where one goes when one

4315

02:59:17,630 --> 02:59:15,420

thinks they have an a scientific idea

4316

02:59:21,290 --> 02:59:17,640

yeah but they actually don't so is there

4317

02:59:30,469 --> 02:59:24,429

no there should be of course a certain

4318

02:59:32,990 --> 02:59:30,479

uh threshold for allowing postings but

4319

02:59:35,330 --> 02:59:33,000

that threshold should not be established

4320

02:59:38,030 --> 02:59:35,340

but by what is accepted by the

4321

02:59:41,510 --> 02:59:38,040

mainstream so in other words if we are

4322

02:59:44,090 --> 02:59:41,520

dealing for example with dark matter so

4323

02:59:45,730 --> 02:59:44,100

um we should not just post papers that

4324

02:59:48,290 --> 02:59:45,740

give

4325

02:59:50,389 --> 02:59:48,300

various suggestions for what the Dark

4326  
02:59:52,670 --> 02:59:50,399  
Matter might be but we should also allow

4327  
02:59:55,969 --> 02:59:52,680  
papers that talk about modified gravity

4328  
02:59:57,349 --> 02:59:55,979  
in various forms and not block them and

4329  
03:00:00,230 --> 02:59:57,359  
so um

4330  
03:00:02,809 --> 03:00:00,240  
the way to proceed is to allow a

4331  
03:00:04,490 --> 03:00:02,819  
conversation among professional

4332  
03:00:08,690 --> 03:00:04,500  
scientists so I'm not talking about

4333  
03:00:10,490 --> 03:00:08,700  
allowing you know uh people crackpots

4334  
03:00:13,370 --> 03:00:10,500  
people that you find often on Twitter

4335  
03:00:16,550 --> 03:00:13,380  
people that do not publish in science so

4336  
03:00:21,170 --> 03:00:16,560  
for example one threshold could be that

4337  
03:00:23,929 --> 03:00:21,180  
uh the the need the paper needs to be

4338  
03:00:27,349 --> 03:00:23,939

submitted and reviewed in a respectable

4339

03:00:29,349 --> 03:00:27,359

publication or considered at least in a

4340

03:00:32,269 --> 03:00:29,359

respectable publication and not being

4341

03:00:35,570 --> 03:00:32,279

rejected uh all together because it has

4342

03:00:37,969 --> 03:00:35,580

no substance another approach would be

4343

03:00:40,849 --> 03:00:37,979

to have

4344

03:00:44,290 --> 03:00:40,859

um people with established track record

4345

03:00:45,969 --> 03:00:44,300

on the archive that do not only publish

4346

03:00:48,530 --> 03:00:45,979

uh

4347

03:00:51,349 --> 03:00:48,540

unsubstantiated claims but have also

4348

03:00:53,090 --> 03:00:51,359

other papers of that belong to the

4349

03:00:58,910 --> 03:00:53,100

mainstream so for example if a person

4350

03:01:01,730 --> 03:00:58,920

has let's say 90 or 80 of of their posts

4351  
03:01:04,130 --> 03:01:01,740  
uh in the mainstream but then 10 to 20

4352  
03:01:07,490 --> 03:01:04,140  
percent are out of the mainstream one

4353  
03:01:10,309 --> 03:01:07,500  
should allow such a person to post the

4354  
03:01:13,790 --> 03:01:10,319  
out of the mainstream ideas because the

4355  
03:01:16,130 --> 03:01:13,800  
same person is also contributing to the

4356  
03:01:18,290 --> 03:01:16,140  
mainstream so it's clear that the person

4357  
03:01:21,410 --> 03:01:18,300  
is trying to figure out solutions to

4358  
03:01:23,630 --> 03:01:21,420  
some anomalies by deviating every now

4359  
03:01:26,330 --> 03:01:23,640  
and then from the mainstream so in my

4360  
03:01:29,510 --> 03:01:26,340  
mind a certain percentage should be

4361  
03:01:32,269 --> 03:01:29,520  
tolerated let's say 10 20 percent is a

4362  
03:01:34,730 --> 03:01:32,279  
very reasonable portion of a publication

4363  
03:01:37,190 --> 03:01:34,740

record of a person to be allocated to

4364

03:01:39,530 --> 03:01:37,200

risky propositions one should allow for

4365

03:01:42,170 --> 03:01:39,540

that and one can establish such a metric

4366

03:01:46,490 --> 03:01:42,180

and therefore that would filter out all

4367

03:01:49,670 --> 03:01:46,500

the crackpots that would put the older

4368

03:01:52,849 --> 03:01:49,680

papers or other postings on on ideas

4369

03:01:54,710 --> 03:01:52,859

that are completely unsubstantiated

4370

03:01:56,389 --> 03:01:54,720

I imagine that those who are rejecting

4371

03:01:58,190 --> 03:01:56,399

on the archive they wouldn't say well

4372

03:02:00,170 --> 03:01:58,200

I'm doing so because it's not mainstream

4373

03:02:02,990 --> 03:02:00,180

enough they just wouldn't use that word

4374

03:02:04,550 --> 03:02:03,000

or justification they would say that

4375

03:02:07,849 --> 03:02:04,560

it's unscientific or some other synonym

4376  
03:02:09,170 --> 03:02:07,859  
for unscientific like pseudoscience so I

4377  
03:02:12,230 --> 03:02:09,180  
know that your solution was about

4378  
03:02:14,870 --> 03:02:12,240  
mainstream just like in Venture Capital

4379  
03:02:19,130 --> 03:02:14,880  
Investments I think it does make sense

4380  
03:02:22,250 --> 03:02:19,140  
to allocate let's say between 10 and 30

4381  
03:02:24,469 --> 03:02:22,260  
percent of the resources to risky

4382  
03:02:26,809 --> 03:02:24,479  
propositions and a simple solution in

4383  
03:02:30,469 --> 03:02:26,819  
the context of the archive would be

4384  
03:02:34,070 --> 03:02:30,479  
to allow scientists who publish more

4385  
03:02:37,250 --> 03:02:34,080  
than 70 percent of their papers to allow

4386  
03:02:41,150 --> 03:02:37,260  
them to deviate from the beaten path so

4387  
03:02:44,150 --> 03:02:41,160  
if anyone can produce you know seven or

4388  
03:02:46,910 --> 03:02:44,160

eight papers that are within the

4389

03:02:48,410 --> 03:02:46,920

mainstream every time they post one or

4390

03:02:49,610 --> 03:02:48,420

two papers that are out of the

4391

03:02:52,490 --> 03:02:49,620

mainstream

4392

03:02:55,010 --> 03:02:52,500

then I would allow those people to to to

4393

03:02:57,650 --> 03:02:55,020

make these postings I think that would

4394

03:03:00,530 --> 03:02:57,660

be a very simple approach to take

4395

03:03:04,130 --> 03:03:00,540

because it means that they are thinking

4396

03:03:06,469 --> 03:03:04,140

outside the bitten path and uh

4397

03:03:09,110 --> 03:03:06,479

creatively and these are people who are

4398

03:03:11,570 --> 03:03:09,120

contributing to the mainstream and I

4399

03:03:14,570 --> 03:03:11,580

don't think it will be regarded as

4400

03:03:17,510 --> 03:03:14,580

unscientific on their behalf uh because

4401

03:03:19,790 --> 03:03:17,520

they are doing most of the work in a

4402

03:03:22,370 --> 03:03:19,800

scientific fashion so so that's one

4403

03:03:25,610 --> 03:03:22,380

solution and of course another way is to

4404

03:03:29,690 --> 03:03:25,620

filter in their affiliation the their

4405

03:03:32,030 --> 03:03:29,700

current professional uh credentials so

4406

03:03:35,030 --> 03:03:32,040

if they went through all the degrees you

4407

03:03:38,570 --> 03:03:35,040

know of scientific practice if they have

4408

03:03:41,330 --> 03:03:38,580

a PhD they may be a professor in a in in

4409

03:03:44,230 --> 03:03:41,340

a university that should lend more

4410

03:03:47,750 --> 03:03:44,240

credibility to their discussion because

4411

03:03:51,889 --> 03:03:47,760

obviously by practicing science you know

4412

03:03:54,710 --> 03:03:51,899

the details you are more alert to all

4413

03:03:57,170 --> 03:03:54,720

the nuances and you are more worried

4414

03:04:00,050 --> 03:03:57,180

about your scientific stature and

4415

03:04:03,410 --> 03:04:00,060

reputation so it would be natural to

4416

03:04:06,170 --> 03:04:03,420

provide credit points to those who have

4417

03:04:08,809 --> 03:04:06,180

some professional expertise

4418

03:04:11,269 --> 03:04:08,819

Professor I just sent a chat what this

4419

03:04:13,070 --> 03:04:11,279

chat is are you able to see it uh

4420

03:04:14,630 --> 03:04:13,080

managing a project with more than 100

4421

03:04:16,610 --> 03:04:14,640

members

4422

03:04:18,830 --> 03:04:16,620

please go ahead read it it's just a

4423

03:04:20,389 --> 03:04:18,840

quote that I found inspiring from your

4424

03:04:23,090 --> 03:04:20,399

blog and I thought it would be great to

4425

03:04:26,150 --> 03:04:23,100

end with it says and I will leave a link

4426

03:04:28,010 --> 03:04:26,160

to your medium it says

4427

03:04:30,410 --> 03:04:28,020

managing a project with more than 100

4428

03:04:32,090 --> 03:04:30,420

members is not trivial I never served as

4429

03:04:33,590 --> 03:04:32,100

a marriage counselor but the best advice

4430

03:04:35,809 --> 03:04:33,600

I can imagine giving couples is simple

4431

03:04:37,250 --> 03:04:35,819

focus on what you agree on and avoid

4432

03:04:39,830 --> 03:04:37,260

getting distracted by peripheral

4433

03:04:41,450 --> 03:04:39,840

disputes for the Galileo project this

4434

03:04:43,550 --> 03:04:41,460

translates to the advice basketball

4435

03:04:45,710 --> 03:04:43,560

coaches often give their team members

4436

03:04:47,450 --> 03:04:45,720

which is keep your eye on the ball and

4437

03:04:48,889 --> 03:04:47,460

ignore the audience there are historic

4438

03:04:50,510 --> 03:04:48,899

precedents of communities that were

4439

03:04:53,030 --> 03:04:50,520

destroyed by not adhering to the simple

4440

03:04:54,650 --> 03:04:53,040

principle like the story of Babel for

4441

03:04:56,570 --> 03:04:54,660

which construction was supposedly never

4442

03:04:58,849 --> 03:04:56,580

completed because its City members lost

4443

03:05:01,130 --> 03:04:58,859

a Common Language the fundamental task

4444

03:05:04,250 --> 03:05:01,140

of good leadership is to maintain the

4445

03:05:06,710 --> 03:05:04,260

unifying thread within its community

4446

03:05:08,630 --> 03:05:06,720

yes

4447

03:05:13,309 --> 03:05:08,640

um I rest my case

4448

03:05:15,830 --> 03:05:13,319

um the point is that we need to focus on

4449

03:05:17,570 --> 03:05:15,840

the goal that all of us believe in in

4450

03:05:20,330 --> 03:05:17,580

the case of the Galileo project it's

4451  
03:05:22,550 --> 03:05:20,340  
collecting evidence and I brought Under

4452  
03:05:25,130 --> 03:05:22,560  
the Tent of the Galileo project both

4453  
03:05:26,750 --> 03:05:25,140  
Advocates and Skeptics

4454  
03:05:29,929 --> 03:05:26,760  
for a simple reason

4455  
03:05:32,510 --> 03:05:29,939  
that when the two camps agree on

4456  
03:05:35,330 --> 03:05:32,520  
something I know that the evidence is

4457  
03:05:38,630 --> 03:05:35,340  
strong enough so for example we have

4458  
03:05:41,269 --> 03:05:38,640  
Michael Shermer and he said that if we

4459  
03:05:42,769 --> 03:05:41,279  
find indisputable evidence he would be

4460  
03:05:47,090 --> 03:05:42,779  
glad to write

4461  
03:05:50,570 --> 03:05:47,100  
an essay in his magazine skeptic about

4462  
03:05:52,370 --> 03:05:50,580  
it and I said that's not enough I want

4463  
03:05:56,269 --> 03:05:52,380

you to change the name of the magazine

4464

03:06:01,070 --> 03:05:58,250

what did he say

4465

03:06:03,110 --> 03:06:01,080

he laughed

4466

03:06:05,990 --> 03:06:03,120

okay we'll hold them to that

4467

03:06:08,090 --> 03:06:06,000

thank you Professor I appreciate you

4468

03:06:09,710 --> 03:06:08,100

spending so much time with me

4469

03:06:11,690 --> 03:06:09,720

thank you for having me it was a real

4470

03:06:13,910 --> 03:06:11,700

pleasure

4471

03:06:15,290 --> 03:06:13,920

okay well congratulations for sitting

4472

03:06:17,570 --> 03:06:15,300

through a three hour

4473

03:06:19,550 --> 03:06:17,580

video again it's astounding thank you

4474

03:06:21,170 --> 03:06:19,560

for sticking around for so long to find

4475

03:06:22,849 --> 03:06:21,180

out more about anything that's mentioned

4476

03:06:25,370 --> 03:06:22,859

in the podcast then do click on the

4477

03:06:27,710 --> 03:06:25,380

description there are fastidiously time

4478

03:06:29,870 --> 03:06:27,720

stamped themes and catalog references if

4479

03:06:33,950 --> 03:06:29,880

any are missing just comments in my wife

4480

03:06:35,690 --> 03:06:33,960

or I we read each comment so if you say

4481

03:06:37,130 --> 03:06:35,700

that hey at this time stamp you said so

4482

03:06:38,809 --> 03:06:37,140

and so would be included but it's not

4483

03:06:40,610 --> 03:06:38,819

I'll include it

4484

03:06:43,190 --> 03:06:40,620

forgive me as I've spent almost all

4485

03:06:45,290 --> 03:06:43,200

night editing and I just need to record

4486

03:06:47,510 --> 03:06:45,300

this last bit if you'd like to support

4487

03:06:49,090 --> 03:06:47,520

the theories of everything podcast then

4488

03:06:51,849 --> 03:06:49,100

visit

4489

03:06:53,510 --> 03:06:51,859

theoriesofeverything.org that is

4490

03:06:55,610 --> 03:06:53,520

theoriesofeverything.org and become a

4491

03:06:57,170 --> 03:06:55,620

member if you're currently on the

4492

03:06:59,690 --> 03:06:57,180

patreon and you feel like switching

4493

03:07:01,309 --> 03:06:59,700

there are several benefits so for

4494

03:07:04,849 --> 03:07:01,319

example one you'll get the entire

4495

03:07:07,010 --> 03:07:04,859

podcast early sometimes 12 hours to 48

4496

03:07:09,650 --> 03:07:07,020

hours early an audio version without

4497

03:07:12,110 --> 03:07:09,660

sponsors or ads you'll get a phone

4498

03:07:15,110 --> 03:07:12,120

number to text me if you like you can

4499

03:07:16,610 --> 03:07:15,120

ask a question for the Curt AMA so the

4500

03:07:18,950 --> 03:07:16,620

Kurt ask me any things and I'll be

4501  
03:07:20,510 --> 03:07:18,960  
likely releasing them there first there

4502  
03:07:22,610 --> 03:07:20,520  
will be discounts on Live Events

4503  
03:07:24,769 --> 03:07:22,620  
sometimes even free once we eventually

4504  
03:07:26,690 --> 03:07:24,779  
do start them there's exclusive merch to

4505  
03:07:28,910 --> 03:07:26,700  
be offered there to be purchased only by

4506  
03:07:30,950 --> 03:07:28,920  
members again in the future I have this

4507  
03:07:33,170 --> 03:07:30,960  
idea for a notebook where I'm putting

4508  
03:07:34,790 --> 03:07:33,180  
mathematical quotes and quotes from

4509  
03:07:36,530 --> 03:07:34,800  
physicists and mathematicians and other

4510  
03:07:38,389 --> 03:07:36,540  
spiritual leaders and Consciousness

4511  
03:07:40,490 --> 03:07:38,399  
experts and so on

4512  
03:07:41,929 --> 03:07:40,500  
that serve as inspiration for what

4513  
03:07:43,730 --> 03:07:41,939

you're writing on that page whether it's

4514

03:07:45,950 --> 03:07:43,740

a Daily Journal or just note taking

4515

03:07:48,290 --> 03:07:45,960

there's also the eventual theories of

4516

03:07:49,610 --> 03:07:48,300

everything book okay it's not simply a

4517

03:07:51,410 --> 03:07:49,620

book I'm not interested in writing

4518

03:07:53,750 --> 03:07:51,420

novels and so on it's more an inventory

4519

03:07:55,490 --> 03:07:53,760

of the different toes explaining the

4520

03:07:57,410 --> 03:07:55,500

terminology behind each and relating

4521

03:07:59,150 --> 03:07:57,420

them to one another also when you become

4522

03:08:00,730 --> 03:07:59,160

a member or if you like you can place a

4523

03:08:02,809 --> 03:08:00,740

one-time donation at

4524

03:08:05,690 --> 03:08:02,819

theoriesofeverything.org more of the

4525

03:08:07,490 --> 03:08:05,700

money actually goes to Kurt Goes To Toe

4526

03:08:08,870 --> 03:08:07,500

like I mentioned in the beginning I

4527

03:08:11,030 --> 03:08:08,880

imagine that your supporting toe in

4528

03:08:13,610 --> 03:08:11,040

order to support toe not support toe

4529

03:08:15,050 --> 03:08:13,620

Plus patreon or to support toll plus

4530

03:08:17,750 --> 03:08:15,060

some other platform

4531

03:08:19,250 --> 03:08:17,760

even YouTube takes a huge cut these

4532

03:08:20,990 --> 03:08:19,260

podcasts take a great great deal of

4533

03:08:22,849 --> 03:08:21,000

preparation and I wouldn't be able to do

4534

03:08:25,130 --> 03:08:22,859

this without your support so thank you

4535

03:08:27,889 --> 03:08:25,140

so much there are many many many plans

4536

03:08:29,090 --> 03:08:27,899

for the future man okay well I can tell

4537

03:08:30,950 --> 03:08:29,100

you some I would like to hire a

4538

03:08:33,349 --> 03:08:30,960

full-time editor I'd like to hire a

4539

03:08:35,150 --> 03:08:33,359

full-time researcher to help me with

4540

03:08:36,950 --> 03:08:35,160

studying for the different toes as well

4541

03:08:38,990 --> 03:08:36,960

as to help with the eventual toe manual

4542

03:08:42,469 --> 03:08:39,000

there's also plans for different types

4543

03:08:44,870 --> 03:08:42,479

of content and different guests and well

4544

03:08:47,389 --> 03:08:44,880

that will be announced when it's ready

4545

03:08:48,830 --> 03:08:47,399

thank you thank you so much I may be

4546

03:08:51,590 --> 03:08:48,840

live streaming right now if you're

4547

03:08:53,809 --> 03:08:51,600

interested you can go to toe clipping so

4548

03:08:56,630 --> 03:08:53,819

type in toe clippings on YouTube I know

4549

03:08:58,010 --> 03:08:56,640

that's abhorrent to most and I think you

4550

03:08:59,809 --> 03:08:58,020

should avert your gaze to most of those

4551  
03:09:01,790 --> 03:08:59,819  
thumbnails because well you can imagine

4552  
03:09:03,769 --> 03:09:01,800  
the repugnancy that follows once you

4553  
03:09:05,630 --> 03:09:03,779  
search something like that however that

4554  
03:09:07,309 --> 03:09:05,640  
is the name of a fairly clever name for

4555  
03:09:09,590 --> 03:09:07,319  
the eclipse version of the theories of

4556  
03:09:11,030 --> 03:09:09,600  
everything podcast sometimes people

4557  
03:09:12,410 --> 03:09:11,040  
aren't like you they're not Troopers

4558  
03:09:15,050 --> 03:09:12,420  
they don't have it they don't have the

4559  
03:09:17,450 --> 03:09:15,060  
time to sit through three hours of a

4560  
03:09:20,090 --> 03:09:17,460  
video and then some they want to watch

4561  
03:09:22,250 --> 03:09:20,100  
five minute to ten minute at most maybe

4562  
03:09:24,349 --> 03:09:22,260  
20 minute chunks and those are where the

4563  
03:09:26,210 --> 03:09:24,359

shareable clips go I also made live

4564

03:09:27,769 --> 03:09:26,220

stream there either right now or at some

4565

03:09:29,809 --> 03:09:27,779

point or take different guests or other

4566

03:09:31,130 --> 03:09:29,819

podcast hosts just if we want to talk

4567

03:09:32,990 --> 03:09:31,140

about some topic without much

4568

03:09:34,610 --> 03:09:33,000

preparation without feeling the pressure

4569

03:09:36,110 --> 03:09:34,620

of it being on the main toe Channel

4570

03:09:37,910 --> 03:09:36,120

because I don't want to dilute the

4571

03:09:39,530 --> 03:09:37,920

quality of the main toe channel so other

4572

03:09:41,389 --> 03:09:39,540

side content will go on the toe

4573

03:09:43,070 --> 03:09:41,399

clippings Channel a link to that is also

4574

03:09:44,809 --> 03:09:43,080

in the description you can visit there

4575

03:09:46,490 --> 03:09:44,819

like I mentioned I may be live streaming

4576  
03:09:48,469 --> 03:09:46,500  
there and we can discuss this episode

4577  
03:09:50,330 --> 03:09:48,479  
together if you like lastly I'm running

4578  
03:09:53,510 --> 03:09:50,340  
a physics contest

4579  
03:09:57,170 --> 03:09:53,520  
it's a Consciousness and physics contest

4580  
03:09:58,849 --> 03:09:57,180  
called Pace one so p-a-c-e so physics

4581  
03:10:00,530 --> 03:09:58,859  
and Consciousness Explorations number

4582  
03:10:01,969 --> 03:10:00,540  
one because it's the first time there's

4583  
03:10:04,130 --> 03:10:01,979  
a video about that in the description

4584  
03:10:05,690 --> 03:10:04,140  
Brilliance has come on board to sponsor

4585  
03:10:07,610 --> 03:10:05,700  
one thousand dollars to each of the five

4586  
03:10:09,730 --> 03:10:07,620  
winners so that is five thousand dollars

4587  
03:10:11,929 --> 03:10:09,740  
in total distributed among the top five

4588  
03:10:14,030 --> 03:10:11,939

essentially you create your physics

4589

03:10:15,410 --> 03:10:14,040

explainer or Consciousness explainer it

4590

03:10:18,230 --> 03:10:15,420

doesn't need to be both if it

4591

03:10:19,670 --> 03:10:18,240

incorporates both that's well great but

4592

03:10:22,130 --> 03:10:19,680

it doesn't need to there's a distinct

4593

03:10:25,130 --> 03:10:22,140

lack of advanced physics and

4594

03:10:27,650 --> 03:10:25,140

Consciousness Concepts so if you have an

4595

03:10:32,150 --> 03:10:27,660

idea for how to explain let's say mirror

4596

03:10:35,030 --> 03:10:32,160

symmetry or some ctmu concept or yosha

4597

03:10:38,030 --> 03:10:35,040

box idea of computational Consciousness

4598

03:10:40,309 --> 03:10:38,040

slash simulation Consciousness then do

4599

03:10:42,530 --> 03:10:40,319

consider making a video and submitting

4600

03:10:44,570 --> 03:10:42,540

to that contest okay I think that's

4601  
03:10:45,950 --> 03:10:44,580  
everything thank you so much and again

4602  
03:10:48,610 --> 03:10:45,960  
thank you to the sponsors that's

4603  
03:10:52,610 --> 03:10:48,620  
butcherbox if you want some Quality Meat

4604  
03:10:54,230 --> 03:10:52,620  
butcherbox.com theories if you you would

4605  
03:10:58,190 --> 03:10:54,240  
like to learn some more about math and

4606  
03:10:59,929 --> 03:10:58,200  
physics that's brilliant.org toe thank

4607  
03:11:03,230 --> 03:10:59,939  
you

4608  
03:11:04,790 --> 03:11:03,240  
all right take care last comment thank

4609  
03:11:06,650 --> 03:11:04,800  
you to Boris Costello for creating the

4610  
03:11:08,269 --> 03:11:06,660  
photos on the website he's a talented

4611  
03:11:10,150 --> 03:11:08,279  
photographer and composer here's his

4612  
03:11:14,510 --> 03:11:10,160  
Instagram instagram.com

4613  
03:11:18,530 --> 03:11:17,030

the upcoming guests are John viveki and

4614

03:11:21,170 --> 03:11:18,540

Ian mcgilchrist coming together for

4615

03:11:24,170 --> 03:11:21,180

theologian Stephen Greer is coming up

4616

03:11:26,269 --> 03:11:24,180

in October Nick Lane is coming up next

4617

03:11:28,969 --> 03:11:26,279

to talk about the origins of life being

4618

03:11:31,010 --> 03:11:28,979

predicated on metabolism rather than

4619

03:11:32,870 --> 03:11:31,020

genes being the precursor to metabolism

4620

03:11:34,610 --> 03:11:32,880

Tim Maudlin is coming on to talk about

4621

03:11:37,250 --> 03:11:34,620

the interpretations of quantum mechanics

4622

03:11:39,349 --> 03:11:37,260

and of course Salvatore Pious is coming

4623

03:11:41,330 --> 03:11:39,359

on with Stefan Alexander a string

4624

03:11:43,250 --> 03:11:41,340

theorist slash Loop quantum gravity

4625

03:11:45,650 --> 03:11:43,260

theorist to talk about quantum gravity

