



**MATTHEW  
SZYDAGIS**

1  
00:00:24,470 --> 00:00:13,440

[Music]

2  
00:00:29,640 --> 00:00:27,240

hello and welcome to the show I'm Martin

3  
00:00:33,000 --> 00:00:29,650

Willis your host and I'm really excited

4  
00:00:35,220 --> 00:00:33,010

about this evenings show we have I guess

5  
00:00:39,360 --> 00:00:35,230

which we'd call sort of a science II

6  
00:00:42,660 --> 00:00:39,370

show and so if you like physics you like

7  
00:00:44,670 --> 00:00:42,670

astronomy and you like UFOs you're in

8  
00:00:47,790 --> 00:00:44,680

for a treat

9  
00:00:49,770 --> 00:00:47,800

I met this gentleman through the scu

10  
00:00:54,210 --> 00:00:49,780

which is the scientific Coalition for

11  
00:00:58,110 --> 00:00:54,220

UAP studies if you're new to this topic

12  
00:01:00,000 --> 00:00:58,120

you ap UFO kind of interchangeable well

13  
00:01:03,740 --> 00:01:00,010

I'll be welcoming in in just a minute

14

00:01:06,870 --> 00:01:03,750

professor Matthew showed Auguste and I

15

00:01:08,790 --> 00:01:06,880

have to caution everyone out there that

16

00:01:12,120 --> 00:01:08,800

I'm not a scientist I'm not an

17

00:01:13,920 --> 00:01:12,130

astronomer or a physicist so I am going

18

00:01:16,800 --> 00:01:13,930

to be asking probably some layman

19

00:01:20,430 --> 00:01:16,810

questions I do contemplate these type of

20

00:01:22,050 --> 00:01:20,440

things a bit here and there so hopefully

21

00:01:24,030 --> 00:01:22,060

there'll be some good questions but I

22

00:01:27,840 --> 00:01:24,040

can guarantee you this it's going to be

23

00:01:30,000 --> 00:01:27,850

an interesting evening for sure

24

00:01:33,330 --> 00:01:30,010

so also if you look in the show notes or

25

00:01:36,600 --> 00:01:33,340

you look below YouTube you will see that

26

00:01:38,940 --> 00:01:36,610

there is a link to a slideshow of the

27

00:01:44,219 --> 00:01:38,950

things that Matthew is going to be

28

00:01:45,510 --> 00:01:44,229

talking about also I do want to say to

29

00:01:48,270 --> 00:01:45,520

everyone I don't want to sound like a

30

00:01:50,550 --> 00:01:48,280

teaser out there but I think there's

31

00:01:52,830 --> 00:01:50,560

something that's going to be coming out

32

00:01:55,050 --> 00:01:52,840

fairly soon I wanted to you know tell

33

00:01:59,429 --> 00:01:55,060

you to keep your eyes open in the UFO

34

00:02:01,289 --> 00:01:59,439

world I don't have the details I'm sorry

35

00:02:04,080 --> 00:02:01,299

if I did I would definitely share them

36

00:02:06,719 --> 00:02:04,090

with you but I can tell you whatever is

37

00:02:08,310 --> 00:02:06,729

going to be happening is going to be

38

00:02:11,100 --> 00:02:08,320

noteworthy some people are speculating

39

00:02:13,170 --> 00:02:11,110

has to do with the Wilson leaked

40

00:02:16,650 --> 00:02:13,180

documents um I've talked about that a

41

00:02:18,390 --> 00:02:16,660

number of times I don't you know might

42

00:02:19,650 --> 00:02:18,400

have something to do with some part of

43

00:02:22,199 --> 00:02:19,660

it but I don't

44

00:02:24,330 --> 00:02:22,209

I personally don't buy that story but

45

00:02:26,100 --> 00:02:24,340

you know what if I'm wrong I will just

46

00:02:28,949 --> 00:02:26,110

say hey look everyone I was wrong so

47

00:02:30,030 --> 00:02:28,959

anyway just keep your eyes out something

48

00:02:31,860 --> 00:02:30,040

is

49

00:02:34,229 --> 00:02:31,870

something's happening I do want to thank

50

00:02:36,990 --> 00:02:34,239

everyone who listens to the show and

51  
00:02:39,020 --> 00:02:37,000  
also everyone behind the scenes we have

52  
00:02:44,190 --> 00:02:39,030  
Peggy helping us out on Facebook and

53  
00:02:46,920 --> 00:02:44,200  
that is facebook.com slash podcast UFO

54  
00:02:49,589 --> 00:02:46,930  
and by the way we're doing our very

55  
00:02:51,000 --> 00:02:49,599  
first simulcast over there you know that

56  
00:02:52,319 --> 00:02:51,010  
might catch on I don't know if there's a

57  
00:02:52,679 --> 00:02:52,329  
lot of people watching it over there or

58  
00:02:55,530 --> 00:02:52,689  
not

59  
00:02:58,259 --> 00:02:55,540  
but that may catch on over there so that

60  
00:03:01,770 --> 00:02:58,269  
is just one other way you can watch the

61  
00:03:04,589 --> 00:03:01,780  
show we also have Bill skywatcher over

62  
00:03:06,420 --> 00:03:04,599  
at kgr a radio I want to thank him and

63  
00:03:09,089 --> 00:03:06,430

other people that helped out in

64

00:03:11,190 --> 00:03:09,099

countless ways and if you support the

65

00:03:13,800 --> 00:03:11,200

show I want to thank you very much and

66

00:03:17,940 --> 00:03:13,810

anyone can do that the patreon link is

67

00:03:19,530 --> 00:03:17,950

over at our website podcast UFO calm and

68

00:03:22,229 --> 00:03:19,540

while you're there check out the latest

69

00:03:26,159 --> 00:03:22,239

blog by charles lear it's called ufos

70

00:03:28,050 --> 00:03:26,169

over Finland and he really goes into

71

00:03:31,289 --> 00:03:28,060

some great detail on all these blogs and

72

00:03:37,409 --> 00:03:31,299

this one is extra-special really good so

73

00:03:40,140 --> 00:03:37,419

I have a few paintings that I actually

74

00:03:42,839 --> 00:03:40,150

sold the winter triangle and for those

75

00:03:44,280 --> 00:03:42,849

of you on youtube you're gonna hear my

76

00:03:46,589 --> 00:03:44,290

commercial it might be better than

77

00:03:47,879 --> 00:03:46,599

silence I don't know but anyway during

78

00:03:49,589 --> 00:03:47,889

the commercial break at the top of the

79

00:03:51,809 --> 00:03:49,599

hour I have a little another art

80

00:03:53,670 --> 00:03:51,819

commercial for you but anyone can check

81

00:03:56,009 --> 00:03:53,680

out Martin Willis art calm and there's a

82

00:03:58,439 --> 00:03:56,019

special link below kind of a secret link

83

00:04:01,559 --> 00:03:58,449

and the show notes and also down below

84

00:04:03,659 --> 00:04:01,569

YouTube that'll get you just to the UFO

85

00:04:06,240 --> 00:04:03,669

paintings remember the code UFO get you

86

00:04:10,080 --> 00:04:06,250

50% off at checkout I want to work out a

87

00:04:14,479 --> 00:04:10,090

deal so anyway you can always contact me

88

00:04:17,460 --> 00:04:14,489

at podcast martinet podcast UFO comm so

89

00:04:20,610 --> 00:04:17,470

let's see about our guest professor

90

00:04:23,129 --> 00:04:20,620

Matthew sudakis and I'm trying to say

91

00:04:25,500 --> 00:04:23,139

his name right he received a PhD from

92

00:04:27,300 --> 00:04:25,510

the University of Chicago he is now an

93

00:04:29,610 --> 00:04:27,310

assistant professor at the University of

94

00:04:32,969 --> 00:04:29,620

Albany studying experimental particle

95

00:04:36,029 --> 00:04:32,979

astrophysics Wow and particular the

96

00:04:41,550 --> 00:04:36,039

direct detection of dark matter wimps

97

00:04:43,260 --> 00:04:41,560

wim P s weakly well that he'll go over

98

00:04:44,020 --> 00:04:43,270

all that stuff and I don't want to get

99

00:04:46,090 --> 00:04:44,030

too

100

00:04:47,170 --> 00:04:46,100

carried away in his background because

101  
00:04:50,680 --> 00:04:47,180  
he's gonna be talking about it I'm sure

102  
00:04:53,770 --> 00:04:50,690  
but he you know he's another one of

103  
00:04:57,880 --> 00:04:53,780  
these scientists who got into the whole

104  
00:05:00,040 --> 00:04:57,890  
idea of the UFO topic by science fiction

105  
00:05:02,230 --> 00:05:00,050  
Star Trek and stuff like that

106  
00:05:03,820 --> 00:05:02,240  
and how many this has happened to many

107  
00:05:05,950 --> 00:05:03,830  
many many people I've talked to over the

108  
00:05:09,880 --> 00:05:05,960  
years so I think it's really great and

109  
00:05:12,070 --> 00:05:09,890  
welcome to the show Matthew can you hear

110  
00:05:12,640 --> 00:05:12,080  
me Matthew I can hear you it's great to

111  
00:05:16,030 --> 00:05:12,650  
be here

112  
00:05:18,520 --> 00:05:16,040  
thanks for inviting me yeah yeah I was

113  
00:05:20,170 --> 00:05:18,530

really loved your talk over at the SCU

114

00:05:22,210 --> 00:05:20,180

it was just fantastic

115

00:05:25,150 --> 00:05:22,220

and I kind of gave a little bit of your

116

00:05:27,790 --> 00:05:25,160

background but so right away

117

00:05:29,890 --> 00:05:27,800

science fiction got you hooked on the

118

00:05:31,450 --> 00:05:29,900

science topic and you've done quite an

119

00:05:34,840 --> 00:05:31,460

amazing job all the way over to the dark

120

00:05:36,700 --> 00:05:34,850

matter and a lot more so you want to

121

00:05:37,930 --> 00:05:36,710

talk about your your background and and

122

00:05:40,540 --> 00:05:37,940

you know what

123

00:05:42,150 --> 00:05:40,550

how young did you think you were going

124

00:05:44,440 --> 00:05:42,160

to be getting into this

125

00:05:49,240 --> 00:05:44,450

that's a great question yeah I actually

126

00:05:52,530 --> 00:05:49,250

it's very rare but I actually knew what

127

00:05:57,610 --> 00:05:52,540

I wanted to do but at the age of five I

128

00:06:01,390 --> 00:05:57,620

and it all started with a book called

129

00:06:04,500 --> 00:06:01,400

what's up there our children's astronomy

130

00:06:08,920 --> 00:06:04,510

book that's how it all started Wow and

131

00:06:12,340 --> 00:06:08,930

since age 5 to 1015 I would change my

132

00:06:14,580 --> 00:06:12,350

mind about what type of scientist I

133

00:06:18,010 --> 00:06:14,590

wanted to be physicists astronomer

134

00:06:20,320 --> 00:06:18,020

astrophysicist right but I never wavered

135

00:06:22,300 --> 00:06:20,330

from knowing I was going to be a

136

00:06:23,770 --> 00:06:22,310

scientist which i think is rare right

137

00:06:25,990 --> 00:06:23,780

people go through go through doctor

138

00:06:28,240 --> 00:06:26,000

lawyer keep changing your mind what I

139

00:06:29,980 --> 00:06:28,250

already knew all along through high

140

00:06:31,990 --> 00:06:29,990

school I'm like I'm gonna major in

141

00:06:34,659 --> 00:06:32,000

physics in college and the University of

142

00:06:36,120 --> 00:06:34,669

Chicago sat down with my adviser we're

143

00:06:38,590 --> 00:06:36,130

talking I'm like no no there's no

144

00:06:40,510 --> 00:06:38,600

discussing options here I'm a physics

145

00:06:42,760 --> 00:06:40,520

major I flipped through the course

146

00:06:44,740 --> 00:06:42,770

catalog and here are the courses I'm

147

00:06:46,360 --> 00:06:44,750

taking for the next four years so can

148

00:06:52,029 --> 00:06:46,370

you take care of that so she was like

149

00:06:55,360 --> 00:06:52,039

wow so I was set like I just so I really

150

00:06:58,620 --> 00:06:55,370

knew that's what I wanted to do that

151

00:07:00,900 --> 00:06:58,630

book started it but what dee

152

00:07:02,790 --> 00:07:00,910

would deepen things with Star Trek

153

00:07:05,370 --> 00:07:02,800

I actually Star Trek The Next Generation

154

00:07:07,529 --> 00:07:05,380

cuz as you can see probably a little too

155

00:07:11,040 --> 00:07:07,539

young for the original series but next

156

00:07:12,930 --> 00:07:11,050

gen came out when I was in preschool or

157

00:07:15,809 --> 00:07:12,940

kindergarten you know that age and I

158

00:07:18,390 --> 00:07:15,819

watched next generation season 1 through

159

00:07:21,779 --> 00:07:18,400

7 and then I watched Star Trek Voyager

160

00:07:25,830 --> 00:07:21,789

in junior high in high school and it was

161

00:07:29,430 --> 00:07:25,840

so I felt it was so captivating not just

162

00:07:32,490 --> 00:07:29,440

the science but also a future where

163

00:07:36,360 --> 00:07:32,500

humanity has their problems behind them

164

00:07:37,680 --> 00:07:36,370

and work together peacefully well you

165

00:07:42,600 --> 00:07:37,690

know i i've talked about this before

166

00:07:44,960 --> 00:07:42,610

I've had I had an astrophysicist on he

167

00:07:50,189 --> 00:07:44,970

was a visiting scientists at NASA and he

168

00:07:54,029 --> 00:07:50,199

said now I'm I'm not probably quoting

169

00:07:56,339 --> 00:07:54,039

this completely accurately but he said

170

00:07:59,790 --> 00:07:56,349

something along the lines that he and

171

00:08:02,520 --> 00:07:59,800

his colleagues agreed on the fact that

172

00:08:04,830 --> 00:08:02,530

if a civilisation can get through the

173

00:08:06,779 --> 00:08:04,840

bottleneck of technology without blowing

174

00:08:08,790 --> 00:08:06,789

themselves up that they will be

175

00:08:11,399 --> 00:08:08,800

exploring the Stars and I wonder what

176

00:08:13,800 --> 00:08:11,409

you thought about that comment yeah I

177

00:08:16,969 --> 00:08:13,810

think that we we just have to look at

178

00:08:22,320 --> 00:08:16,979

our own example of humanity to see that

179

00:08:25,830 --> 00:08:22,330

we see in recent months how much how

180

00:08:28,080 --> 00:08:25,840

many problems we still have we still

181

00:08:31,409 --> 00:08:28,090

have you know we have we have racism

182

00:08:34,920 --> 00:08:31,419

alive and well in the 21st century right

183

00:08:38,490 --> 00:08:34,930

now year 2020 is mind-boggling so I I do

184

00:08:40,290 --> 00:08:38,500

think that that's that's been echoed

185

00:08:42,600 --> 00:08:40,300

similar sentiments have been echoed by

186

00:08:44,340 --> 00:08:42,610

both scientists as well as like science

187

00:08:47,190 --> 00:08:44,350

fiction authors for example for for

188

00:08:53,190 --> 00:08:47,200

decades and I think that is very true

189

00:08:55,889 --> 00:08:53,200

that we have to get past our own hatreds

190

00:08:57,800 --> 00:08:55,899

divisions and conflicts as a race before

191

00:08:59,790 --> 00:08:57,810

we would be able to really achieve

192

00:09:02,880 --> 00:08:59,800

interstellar travel and that would

193

00:09:04,920 --> 00:09:02,890

probably be true of any sentient

194

00:09:07,829 --> 00:09:04,930

intelligent race that could potentially

195

00:09:11,190 --> 00:09:07,839

be out there yeah one of the things I'm

196

00:09:13,320 --> 00:09:11,200

I I think I see a lot out there

197

00:09:15,750 --> 00:09:13,330

and when it comes to and I want to say

198

00:09:17,700 --> 00:09:15,760

it's more on the skeptic side and I know

199

00:09:23,190 --> 00:09:17,710

you're you're healthy skeptic of course

200

00:09:25,980 --> 00:09:23,200

but I hear a lot of skeptics say and and

201  
00:09:28,350 --> 00:09:25,990  
think of travel of the possibility of

202  
00:09:30,900 --> 00:09:28,360  
travel from another solar system which

203  
00:09:33,390 --> 00:09:30,910  
is is mind-boggling I know the distances

204  
00:09:37,140 --> 00:09:33,400  
are just so vast but they think that

205  
00:09:40,920 --> 00:09:37,150  
they know all there is to know about the

206  
00:09:42,120 --> 00:09:40,930  
physics on on travel and how things get

207  
00:09:42,960 --> 00:09:42,130  
here and they say it's just plain

208  
00:09:45,840 --> 00:09:42,970  
impossible

209  
00:09:48,240 --> 00:09:45,850  
and I heard you say something like we

210  
00:09:50,600 --> 00:09:48,250  
know about 5% of the universe well don't

211  
00:09:54,270 --> 00:09:50,610  
we do you think we also know a very

212  
00:09:57,090 --> 00:09:54,280  
miniscule amount about physics that

213  
00:09:59,880 --> 00:09:57,100

there is so much more to learn oh that's

214

00:10:02,040 --> 00:09:59,890

a good question I actually have many of

215

00:10:03,240 --> 00:10:02,050

my colleagues will disagree with me on

216

00:10:06,680 --> 00:10:03,250

this so you have to know either of

217

00:10:10,680 --> 00:10:06,690

course this is my personal opinion but

218

00:10:12,960 --> 00:10:10,690

it's I would not go so extremists to say

219

00:10:16,830 --> 00:10:12,970

that we know minuscule because if it was

220

00:10:18,540 --> 00:10:16,840

miniscule this computer the computer and

221

00:10:22,230 --> 00:10:18,550

technology were we're using right now

222

00:10:24,330 --> 00:10:22,240

wouldn't work so it's getting harder to

223

00:10:27,150 --> 00:10:24,340

be wrong so what I mean by that is it

224

00:10:29,520 --> 00:10:27,160

was easier centuries ago before they had

225

00:10:31,710 --> 00:10:29,530

telescopes and microscopes and computers

226

00:10:33,270 --> 00:10:31,720

I'm not saying there isn't a lot more

227

00:10:34,770 --> 00:10:33,280

discovered there obviously is I'm

228

00:10:36,750 --> 00:10:34,780

looking for dark matter there's also

229

00:10:39,990 --> 00:10:36,760

dark energy these unknown forces the

230

00:10:42,060 --> 00:10:40,000

universe and what I'm trying to say is

231

00:10:45,240 --> 00:10:42,070

that what's left to discover even if

232

00:10:47,460 --> 00:10:45,250

it's a great deal will not erase what we

233

00:10:49,920 --> 00:10:47,470

currently know right oh yeah because

234

00:10:52,950 --> 00:10:49,930

basically so we should not think of the

235

00:10:54,990 --> 00:10:52,960

way I tell my students is that we don't

236

00:10:56,430 --> 00:10:55,000

have the same kind of paradigm shifts as

237

00:10:58,740 --> 00:10:56,440

we had hundreds of years ago there's

238

00:11:00,870 --> 00:10:58,750

still plenty to learn but it's not going

239

00:11:03,660 --> 00:11:00,880

to be like tomorrow we learn Stein is

240

00:11:06,270 --> 00:11:03,670

wrong for example crackpots Einstein was

241

00:11:08,490 --> 00:11:06,280

wrong because XYZ it's too late for that

242

00:11:10,260 --> 00:11:08,500

it's too late for that because your GPS

243

00:11:12,860 --> 00:11:10,270

wouldn't work without relativity it said

244

00:11:17,250 --> 00:11:12,870

right like no it is impossible

245

00:11:19,530 --> 00:11:17,260

impossible period Einstein and Newton to

246

00:11:23,130 --> 00:11:19,540

be wrong what they are were incomplete

247

00:11:24,750 --> 00:11:23,140

our knowledge is absolutely incomplete

248

00:11:27,930 --> 00:11:24,760

there's a difference we

249

00:11:29,970 --> 00:11:27,940

mean incomplete and wrong you know it's

250

00:11:33,540 --> 00:11:29,980

possible we know only a miniscule amount

251  
00:11:35,910 --> 00:11:33,550  
if that's possible but of that miniscule

252  
00:11:37,800 --> 00:11:35,920  
amount I think we do know it well but

253  
00:11:40,470 --> 00:11:37,810  
unfortunately sometimes that does lead

254  
00:11:42,510 --> 00:11:40,480  
to arrogance we sometimes mistake

255  
00:11:45,570 --> 00:11:42,520  
knowing the minuscule amount we know

256  
00:11:48,780 --> 00:11:45,580  
very well we mistake that for knowing

257  
00:11:51,060 --> 00:11:48,790  
the whole pie very well right right I

258  
00:11:54,030 --> 00:11:51,070  
get exactly what you're saying

259  
00:11:56,550 --> 00:11:54,040  
now so I'm going to be asking like I

260  
00:11:58,440 --> 00:11:56,560  
mentioned earlier a lot of questions and

261  
00:12:00,590 --> 00:11:58,450  
of course some you know we are going to

262  
00:12:03,570 --> 00:12:00,600  
be talking about you know how UFOs

263  
00:12:05,850 --> 00:12:03,580

taiented all this but I just feel like I

264

00:12:07,320 --> 00:12:05,860

have so many questions and also relating

265

00:12:09,300 --> 00:12:07,330

to dark matter as well but I want to

266

00:12:13,410 --> 00:12:09,310

start out at the beginning of the

267

00:12:16,590 --> 00:12:13,420

beginning which is the Big Bang and do

268

00:12:17,760 --> 00:12:16,600

you now I know a lot of scientists do

269

00:12:19,980 --> 00:12:17,770

they don't like to theorize about

270

00:12:21,360 --> 00:12:19,990

certain things but do you think I'm

271

00:12:25,860 --> 00:12:21,370

gonna ask it this way do you think it's

272

00:12:29,520 --> 00:12:25,870

possible that some part of the Big Bang

273

00:12:31,740 --> 00:12:29,530

could be incorrect of the theory that's

274

00:12:34,260 --> 00:12:31,750

out there bleeding theory well it

275

00:12:37,290 --> 00:12:34,270

depends it depends what you mean by

276

00:12:40,700 --> 00:12:37,300

incorrect so but we have to break it

277

00:12:44,250 --> 00:12:40,710

down in the following way there is

278

00:12:47,010 --> 00:12:44,260

incontrovertible mountains of evidence

279

00:12:51,450 --> 00:12:47,020

that our universe had a finite beginning

280

00:12:53,400 --> 00:12:51,460

in time so so for example the steady

281

00:12:56,640 --> 00:12:53,410

state theory that the universe is

282

00:12:58,110 --> 00:12:56,650

eternal is extremely dead I think there

283

00:12:59,400 --> 00:12:58,120

are two more proponents left in their

284

00:13:01,170 --> 00:12:59,410

80s or something that they may have

285

00:13:03,110 --> 00:13:01,180

passed away and that's because we've

286

00:13:05,670 --> 00:13:03,120

made so many discoveries in astronomy

287

00:13:07,950 --> 00:13:05,680

like the cosmic microwave radio

288

00:13:11,100 --> 00:13:07,960

radiation which was a prediction of the

289

00:13:16,620 --> 00:13:11,110

Big Bang Theory so the the Big Bang

290

00:13:18,390 --> 00:13:16,630

Theory at this point cannot be wrong in

291

00:13:20,700 --> 00:13:18,400

the sense that there's mountains of

292

00:13:23,040 --> 00:13:20,710

evidence what can be wrong is the

293

00:13:25,500 --> 00:13:23,050

details so we still haven't found direct

294

00:13:27,660 --> 00:13:25,510

evidence for example of inflation which

295

00:13:29,580 --> 00:13:27,670

is the accelerated expansion of the

296

00:13:33,180 --> 00:13:29,590

universe after the Big Bang we don't

297

00:13:34,770 --> 00:13:33,190

have direct evidence of that so so it

298

00:13:37,410 --> 00:13:34,780

depends what you mean by the big bang

299

00:13:38,190 --> 00:13:37,420

theory the generic most generic version

300

00:13:41,340 --> 00:13:38,200

of it that you

301  
00:13:44,150 --> 00:13:41,350  
say in one sentence is that the universe

302  
00:13:47,220 --> 00:13:44,160  
had a finite beginning in time is

303  
00:13:49,980 --> 00:13:47,230  
extremely unlikely to be wrong but the

304  
00:13:52,290 --> 00:13:49,990  
details there are all kinds of details

305  
00:13:54,420 --> 00:13:52,300  
we can layer in like what actually

306  
00:13:57,420 --> 00:13:54,430  
happens in the first few fractions of a

307  
00:14:00,570 --> 00:13:57,430  
second and so thin things like that so

308  
00:14:02,250 --> 00:14:00,580  
the details absolutely that we have

309  
00:14:04,220 --> 00:14:02,260  
right now can be incorrect we need to

310  
00:14:07,350 --> 00:14:04,230  
take more data we're taking astronomical

311  
00:14:08,940 --> 00:14:07,360  
cosmological data but it would be you

312  
00:14:11,130 --> 00:14:08,950  
know there's no hundred percents in

313  
00:14:12,960 --> 00:14:11,140

science but I would say to hunt very

314

00:14:15,180 --> 00:14:12,970

close to hundred percent that the

315

00:14:17,280 --> 00:14:15,190

universe had a beginning in time

316

00:14:20,460 --> 00:14:17,290

our best estimate our best current

317

00:14:22,830 --> 00:14:20,470

estimate of the ages 13.8 billion years

318

00:14:25,740 --> 00:14:22,840

it had a finite beginning in time but

319

00:14:28,380 --> 00:14:25,750

the details we don't obviously were very

320

00:14:34,980 --> 00:14:28,390

far from having all the details of that

321

00:14:39,660 --> 00:14:34,990

sure and so if if this began 13.8

322

00:14:41,700 --> 00:14:39,670

billion years ago was there do you does

323

00:14:44,640 --> 00:14:41,710

two people our scientists speculate that

324

00:14:47,250 --> 00:14:44,650

there was time before that or did time

325

00:14:50,250 --> 00:14:47,260

start there and if there was no time

326

00:14:53,760 --> 00:14:50,260

what could have been before that or is

327

00:14:56,340 --> 00:14:53,770

that time so yeah no this is one of

328

00:14:58,440 --> 00:14:56,350

those famous infamous questions ya know

329

00:15:00,330 --> 00:14:58,450

the question of before the Big Bang just

330

00:15:03,830 --> 00:15:00,340

doesn't make sense that we may never

331

00:15:06,930 --> 00:15:03,840

know the answer not in a reliable

332

00:15:09,450 --> 00:15:06,940

scientifically verifiable fashion there

333

00:15:12,870 --> 00:15:09,460

are those like Roger Penrose very famous

334

00:15:13,680 --> 00:15:12,880

physicists who are speculating about you

335

00:15:16,050 --> 00:15:13,690

know what could have happened

336

00:15:17,970 --> 00:15:16,060

quote-unquote before the Big Bang the

337

00:15:20,970 --> 00:15:17,980

idea that there's maybe a cyclical or

338

00:15:22,860 --> 00:15:20,980

oscillating cosmology but I really very

339

00:15:25,470 --> 00:15:22,870

much like to stay away from that kind of

340

00:15:28,790 --> 00:15:25,480

thing because in in in my opinion even

341

00:15:32,370 --> 00:15:28,800

if there is an answer it may be

342

00:15:35,760 --> 00:15:32,380

unknowable to us all right I may not be

343

00:15:37,800 --> 00:15:35,770

able to penetrate our no matter what

344

00:15:40,680 --> 00:15:37,810

technology your ideas are invented it

345

00:15:42,660 --> 00:15:40,690

may be something we we will only be able

346

00:15:46,380 --> 00:15:42,670

to speculate about but that we may not

347

00:15:48,120 --> 00:15:46,390

be able to get concrete data on so I

348

00:15:50,340 --> 00:15:48,130

like staying away from questions of

349

00:15:51,900 --> 00:15:50,350

before the big and now you made a very

350

00:15:54,900 --> 00:15:51,910

good point we may not understand

351

00:15:57,450 --> 00:15:54,910

and even if it was explained to us it

352

00:15:58,890 --> 00:15:57,460

still may not it's possible it may not

353

00:16:00,660 --> 00:15:58,900

make any sense

354

00:16:02,610 --> 00:16:00,670

now I remember Carl Sagan had a saying

355

00:16:04,080 --> 00:16:02,620

and I can't remember exactly how it goes

356

00:16:05,850 --> 00:16:04,090

and I certainly had time to look it up

357

00:16:10,050 --> 00:16:05,860

but I didn't but he said something like

358

00:16:13,620 --> 00:16:10,060

if there was never a supernova you could

359

00:16:15,690 --> 00:16:13,630

never have the apple pie come out of the

360

00:16:18,960 --> 00:16:15,700

oven and or something along those lines

361

00:16:23,070 --> 00:16:18,970

and along those lines if there was never

362

00:16:24,780 --> 00:16:23,080

a supernova would we have life no that's

363

00:16:26,520 --> 00:16:24,790

an excellent point you bring up a

364

00:16:29,670 --> 00:16:26,530

saint's point it's because in the Big

365

00:16:32,100 --> 00:16:29,680

Bang the Big Bang is only capable of

366

00:16:34,380 --> 00:16:32,110

making the lightest elements you need

367

00:16:37,530 --> 00:16:34,390

the universe to grow and evolve and form

368

00:16:40,530 --> 00:16:37,540

stars and then those stars cook or

369

00:16:42,870 --> 00:16:40,540

basically cook up the heavier elements

370

00:16:44,640 --> 00:16:42,880

and then supernova explosions which are

371

00:16:46,530 --> 00:16:44,650

only part we're learning are only part

372

00:16:49,290 --> 00:16:46,540

of the story there's also neutron star

373

00:16:52,140 --> 00:16:49,300

collisions and other types of stellar

374

00:16:54,900 --> 00:16:52,150

phenomena that generate the heavier

375

00:16:57,150 --> 00:16:54,910

elements so the Big Bang only generates

376

00:16:59,490 --> 00:16:57,160

hydrogen helium smattering of lithium

377

00:17:01,980 --> 00:16:59,500

and the lighter elements too to breathe

378

00:17:03,990 --> 00:17:01,990

the heavier elements you need stellar

379

00:17:07,110 --> 00:17:04,000

furnaces you need the cores of stars you

380

00:17:10,170 --> 00:17:07,120

nuclear fusion you need stars exploding

381

00:17:12,900 --> 00:17:10,180

stars colliding in order to produce all

382

00:17:16,800 --> 00:17:12,910

those heavier elements including carbon

383

00:17:19,620 --> 00:17:16,810

nitrogen oxygen the ones that are in you

384

00:17:23,520 --> 00:17:19,630

know sugar salt right not salt I'm sorry

385

00:17:25,500 --> 00:17:23,530

that's NaCl but sugar and fats

386

00:17:30,200 --> 00:17:25,510

you know proteins or get all organic

387

00:17:33,150 --> 00:17:30,210

molecules well and along those lines if

388

00:17:38,190 --> 00:17:33,160

saying there was a solar system that

389

00:17:41,220 --> 00:17:38,200

developed very early and and it had one

390

00:17:42,720 --> 00:17:41,230

of the stars that last for you know

391

00:17:45,210 --> 00:17:42,730

billions and billions and billions of

392

00:17:47,730 --> 00:17:45,220

years I know there is a one type of star

393

00:17:52,200 --> 00:17:47,740

that does that at least um so they've

394

00:17:54,090 --> 00:17:52,210

never had a super nova in that part of

395

00:17:57,870 --> 00:17:54,100

their neighborhood does that mean that

396

00:18:00,210 --> 00:17:57,880

they are to remain lifeless no because

397

00:18:02,780 --> 00:18:00,220

over billions of years

398

00:18:05,070 --> 00:18:02,790

very slowly of course nowhere near the

399

00:18:05,590 --> 00:18:05,080

speed of light but slowly you know the

400

00:18:08,830 --> 00:18:05,600

super

401  
00:18:10,900 --> 00:18:08,840  
/ remnants the gas and dust disperses so

402  
00:18:13,210 --> 00:18:10,910  
so when you said near behind I had no

403  
00:18:15,630 --> 00:18:13,220  
supernova nearby that's a very relative

404  
00:18:18,340 --> 00:18:15,640  
term because nearby could mean you know

405  
00:18:20,830 --> 00:18:18,350  
many light-years so I don't think that's

406  
00:18:22,900 --> 00:18:20,840  
the case because you have to think about

407  
00:18:25,510 --> 00:18:22,910  
the fact that over billions of years you

408  
00:18:27,940 --> 00:18:25,520  
have you know supernova explosions

409  
00:18:32,169 --> 00:18:27,950  
neutron star mergers collisions that are

410  
00:18:34,840 --> 00:18:32,179  
seeding the interstellar seeding the

411  
00:18:36,460 --> 00:18:34,850  
interstellar medium right we have a

412  
00:18:38,549 --> 00:18:36,470  
question I just popped up on there did

413  
00:18:43,049 --> 00:18:38,559

Gold exist this is from the chat room

414

00:18:49,870 --> 00:18:43,059

did Gold exists as a gas back then

415

00:18:52,570 --> 00:18:49,880

initially I would say probably yes or is

416

00:18:53,740 --> 00:18:52,580

a plasma even within stars I can't say

417

00:18:55,630 --> 00:18:53,750

with complete certainty because I'm not

418

00:18:58,480 --> 00:18:55,640

a stellar astronomer and remember that

419

00:19:01,149 --> 00:18:58,490

so scientists are very you know we have

420

00:19:02,470 --> 00:19:01,159

very highly specialized areas so I wanna

421

00:19:04,899 --> 00:19:02,480

be careful that I don't see something

422

00:19:07,120 --> 00:19:04,909

wrong if it's outside of my area but I

423

00:19:09,460 --> 00:19:07,130

think that it would be more correct even

424

00:19:12,010 --> 00:19:09,470

to say not just as a gas but originally

425

00:19:15,760 --> 00:19:12,020

is like individual atoms and before that

426  
00:19:17,399 --> 00:19:15,770  
is individual nuclei without electrons

427  
00:19:19,860 --> 00:19:17,409  
around them so it goes even further

428  
00:19:25,529 --> 00:19:19,870  
deeper than that further back in time

429  
00:19:29,350 --> 00:19:25,539  
okay so if if you if we could travel to

430  
00:19:32,610 --> 00:19:29,360  
say the universe is expanding and we

431  
00:19:36,039 --> 00:19:32,620  
could actually travel to the very end of

432  
00:19:38,710 --> 00:19:36,049  
you know when it began what's there what

433  
00:19:43,330 --> 00:19:38,720  
could be there I mean I I can't picture

434  
00:19:46,330 --> 00:19:43,340  
a wall I mean how does how does the

435  
00:19:48,310 --> 00:19:46,340  
universe end not end in a way of you

436  
00:19:50,590 --> 00:19:48,320  
know dying or anything like that but you

437  
00:19:52,299 --> 00:19:50,600  
mean physically specifically the

438  
00:19:54,580 --> 00:19:52,309

universe is probably infinite there is

439

00:19:56,830 --> 00:19:54,590

no end or wall or border you said

440

00:20:02,200 --> 00:19:56,840

there's no edge it just keeps going

441

00:20:05,110 --> 00:20:02,210

forever if it's positively curved then

442

00:20:08,169 --> 00:20:05,120

what could happen is that if you went

443

00:20:10,000 --> 00:20:08,179

forever in one direction or long for a

444

00:20:10,930 --> 00:20:10,010

long time one direction you'd come back

445

00:20:12,789 --> 00:20:10,940

where you started you would

446

00:20:16,000 --> 00:20:12,799

circumnavigate the universe so the

447

00:20:17,919 --> 00:20:16,010

outside of a balloon exactly exactly

448

00:20:19,360 --> 00:20:17,929

through the balloon analogy is often

449

00:20:21,760 --> 00:20:19,370

used in astronomy I don't like

450

00:20:23,980 --> 00:20:21,770

because it's it's only positive

451  
00:20:25,570 --> 00:20:23,990  
curvature that it shows a better analogy

452  
00:20:26,049 --> 00:20:25,580  
I like to use my students that is not

453  
00:20:28,180 --> 00:20:26,059  
mine

454  
00:20:30,070 --> 00:20:28,190  
I found it online from collies is the

455  
00:20:31,900 --> 00:20:30,080  
raisin bread so imagine that the

456  
00:20:33,880 --> 00:20:31,910  
universe is an infinite raisin bread

457  
00:20:36,130 --> 00:20:33,890  
every raisin is a cluster of galaxies

458  
00:20:38,650 --> 00:20:36,140  
and as the bread Rises with the yeast

459  
00:20:40,240 --> 00:20:38,660  
there's more space between the raisins

460  
00:20:42,700 --> 00:20:40,250  
but there's no edge to the raisin bread

461  
00:20:45,310 --> 00:20:42,710  
goes to infinity in X Y Z length width

462  
00:20:46,600 --> 00:20:45,320  
and height so though regardless of the

463  
00:20:48,880 --> 00:20:46,610

shape of the universe whether it's

464

00:20:51,669 --> 00:20:48,890

positively curved or flat or negatively

465

00:20:54,820 --> 00:20:51,679

curved there's no there's very likely no

466

00:20:57,430 --> 00:20:54,830

edge or wall and so you should not

467

00:20:59,650 --> 00:20:57,440

picture it's very tempting so you should

468

00:21:02,169 --> 00:20:59,660

not picture the universe as a as a ball

469

00:21:03,700 --> 00:21:02,179

that's expanding that analogy only works

470

00:21:05,530 --> 00:21:03,710

if you look at the surface of the

471

00:21:07,240 --> 00:21:05,540

balloon in the balloon analogy the scent

472

00:21:09,430 --> 00:21:07,250

the central volume of the balloon

473

00:21:11,049 --> 00:21:09,440

doesn't exist and it's a common mistake

474

00:21:13,360 --> 00:21:11,059

you cannot think of the universe as a

475

00:21:16,360 --> 00:21:13,370

ball that just keeps expanding there's

476  
00:21:19,660 --> 00:21:16,370  
so there's nothing outside yeah okay I

477  
00:21:21,820 --> 00:21:19,670  
get that yeah I'm going back for just a

478  
00:21:25,000 --> 00:21:21,830  
second to the Big Bang and then I'm

479  
00:21:27,960 --> 00:21:25,010  
gonna move on to dark matter but going

480  
00:21:31,930 --> 00:21:27,970  
back to the Big Bang

481  
00:21:33,490 --> 00:21:31,940  
how can someone actually picture

482  
00:21:35,760 --> 00:21:33,500  
something coming from nothing I mean

483  
00:21:38,950 --> 00:21:35,770  
that's basically what the Big Bang is I

484  
00:21:40,870 --> 00:21:38,960  
mean that's just unfathomable is is that

485  
00:21:42,250 --> 00:21:40,880  
does echo along with something we just

486  
00:21:44,500 --> 00:21:42,260  
can't understand as well

487  
00:21:46,570 --> 00:21:44,510  
yeah this is where I like I said we're

488  
00:21:50,070 --> 00:21:46,580

hitting up you know on the border of our

489

00:21:52,870 --> 00:21:50,080

understanding but many physicists won't

490

00:21:55,299 --> 00:21:52,880

accept that so for example the late

491

00:21:58,660 --> 00:21:55,309

Stephen Hawking did try to find a way

492

00:22:00,850 --> 00:21:58,670

around something from nothing but in my

493

00:22:02,680 --> 00:22:00,860

in my opinion again this is not going to

494

00:22:05,350 --> 00:22:02,690

be the majority opinion of my colleagues

495

00:22:06,970 --> 00:22:05,360

but the way I like to look at it is you

496

00:22:09,280 --> 00:22:06,980

know there are philosophers have

497

00:22:10,299 --> 00:22:09,290

something like 9 I think I saw or maybe

498

00:22:12,250 --> 00:22:10,309

it's more than that probably a dozen

499

00:22:14,200 --> 00:22:12,260

definitions of nothing so it really

500

00:22:16,210 --> 00:22:14,210

depends what you mean by nothing because

501  
00:22:19,360 --> 00:22:16,220  
I think to sum something from nothing is

502  
00:22:21,549 --> 00:22:19,370  
a little extreme because one possibility

503  
00:22:23,200 --> 00:22:21,559  
is to look at it the following ways that

504  
00:22:26,470 --> 00:22:23,210  
the laws of physics are always there

505  
00:22:30,220 --> 00:22:26,480  
they're eternal in some way and so you

506  
00:22:32,780 --> 00:22:30,230  
could have the Big Bang come as what you

507  
00:22:35,210 --> 00:22:32,790  
might consider as from nothing

508  
00:22:37,610 --> 00:22:35,220  
from void not as opposed to vacuum which

509  
00:22:40,220 --> 00:22:37,620  
is you know far from nothing has has

510  
00:22:41,630 --> 00:22:40,230  
particles in it and so I I think that

511  
00:22:43,820 --> 00:22:41,640  
yeah that really depends on your

512  
00:22:45,230 --> 00:22:43,830  
definition of nothing not because

513  
00:22:47,540 --> 00:22:45,240

there's so many different levels of

514

00:22:50,660 --> 00:22:47,550

nothing right nothing is a very loaded

515

00:22:53,930 --> 00:22:50,670

word like the word conscious or the word

516

00:22:56,450 --> 00:22:53,940

you know or it's a very loaded word that

517

00:22:59,800 --> 00:22:56,460

a philosopher versus a scientists have

518

00:23:03,260 --> 00:22:59,810

extremely different definitions of

519

00:23:06,380 --> 00:23:03,270

uh-huh you know I think you know I was

520

00:23:08,990 --> 00:23:06,390

going to ask and I have I have some dark

521

00:23:10,490 --> 00:23:09,000

Meritor questions because I know it's

522

00:23:13,340 --> 00:23:10,500

just one of those things that we don't

523

00:23:16,400 --> 00:23:13,350

understand but if you would please tell

524

00:23:18,770 --> 00:23:16,410

the listener audience of what we know as

525

00:23:21,620 --> 00:23:18,780

far as the matter that's out there and

526

00:23:22,970 --> 00:23:21,630

the percentages you know and I know dark

527

00:23:25,130 --> 00:23:22,980

energy something like seventy six

528

00:23:27,620 --> 00:23:25,140

percent or something of but anyway if

529

00:23:29,630 --> 00:23:27,630

you don't mind just going into that sure

530

00:23:33,830 --> 00:23:29,640

so we have what's called the standard

531

00:23:36,260 --> 00:23:33,840

cosmological model is it perfect no but

532

00:23:39,140 --> 00:23:36,270

we are sure of the basics of it because

533

00:23:40,730 --> 00:23:39,150

of many independent datasets many

534

00:23:42,890 --> 00:23:40,740

independent aanchal measurements that

535

00:23:45,800 --> 00:23:42,900

come together and according to all

536

00:23:47,150 --> 00:23:45,810

putting all of our best astronomical as

537

00:23:49,400 --> 00:23:47,160

their physical and cosmological

538

00:23:51,590 --> 00:23:49,410

measurements together we get an estimate

539

00:23:53,810 --> 00:23:51,600

of the fight that five percent of the

540

00:23:56,270 --> 00:23:53,820

universe's atomic matter you know that

541

00:23:58,010 --> 00:23:56,280

makes up you and me and then twenty five

542

00:24:01,850 --> 00:23:58,020

percent is this dark matter and seventy

543

00:24:02,930 --> 00:24:01,860

percent is is dark energy sorry I made a

544

00:24:05,810 --> 00:24:02,940

mistake that doesn't add up to hundred

545

00:24:07,820 --> 00:24:05,820

percent so it's about no that was right

546

00:24:09,380 --> 00:24:07,830

because seventy not seventy five seventy

547

00:24:11,870 --> 00:24:09,390

percent dark energy approximately like

548

00:24:14,390 --> 00:24:11,880

sixty nine point something so so how do

549

00:24:17,420 --> 00:24:14,400

we know that comes from so these are

550

00:24:21,440 --> 00:24:17,430

labels for our ignorance so the dark

551

00:24:23,690 --> 00:24:21,450

matter is a label it means it's a form

552

00:24:26,080 --> 00:24:23,700

of matter that interacts primarily

553

00:24:28,100 --> 00:24:26,090

gravitationally or perhaps only

554

00:24:29,810 --> 00:24:28,110

gravitationally but at least primarily

555

00:24:32,750 --> 00:24:29,820

gravitationally it doesn't have

556

00:24:35,180 --> 00:24:32,760

electromagnetic and nuclear forces like

557

00:24:37,190 --> 00:24:35,190

ordinary matter and dark energy we know

558

00:24:39,950 --> 00:24:37,200

even less about all we know is that

559

00:24:42,820 --> 00:24:39,960

there's something within the energy

560

00:24:44,940 --> 00:24:42,830

density of the universe that has an

561

00:24:47,250 --> 00:24:44,950

anti-gravity like a

562

00:24:49,440 --> 00:24:47,260

fact that is causing the expansion rate

563

00:24:51,450 --> 00:24:49,450

to accelerate we don't know it's you

564

00:24:53,310 --> 00:24:51,460

know particle or a field or energy what

565

00:24:55,050 --> 00:24:53,320

the heck it is Dark Matter we know a

566

00:24:57,240 --> 00:24:55,060

little bit more we still know very very

567

00:25:01,200 --> 00:24:57,250

little because we have not obtained

568

00:25:03,750 --> 00:25:01,210

direct detection of it but it what we do

569

00:25:05,460 --> 00:25:03,760

know is that it at this point with the

570

00:25:08,190 --> 00:25:05,470

amount of evidence we have that it's

571

00:25:10,350 --> 00:25:08,200

very unlikely that oh it's just a

572

00:25:12,060 --> 00:25:10,360

mistake and most of them universe is

573

00:25:14,400 --> 00:25:12,070

just an ordinary matter we see and we're

574

00:25:16,110 --> 00:25:14,410

just misunderstanding gravity that's not

575

00:25:18,570 --> 00:25:16,120

it that's getting increasingly unlikely

576

00:25:20,100 --> 00:25:18,580

the more measurements we take the more

577

00:25:22,050 --> 00:25:20,110

measurements and more observations when

578

00:25:23,850 --> 00:25:22,060

we make an astronomy even though we

579

00:25:26,430 --> 00:25:23,860

still don't have conclusive detection

580

00:25:28,200 --> 00:25:26,440

from particle physics in astronomy we

581

00:25:31,710 --> 00:25:28,210

have a lot of what you could call

582

00:25:34,530 --> 00:25:31,720

indirect or observational evidence that

583

00:25:37,260 --> 00:25:34,540

there's matter out there but it's unseen

584

00:25:38,910 --> 00:25:37,270

it produces gravity but it doesn't

585

00:25:42,330 --> 00:25:38,920

interact through the other forces that

586

00:25:43,890 --> 00:25:42,340

ordinary matter does well they're so

587

00:25:46,140 --> 00:25:43,900

confusing first I want to just give a

588

00:25:48,090 --> 00:25:46,150

quick little shout-out to a friend of

589

00:25:50,280 --> 00:25:48,100

mine over in Vienna hung out with him

590

00:25:53,760 --> 00:25:50,290

when I was over there Eduardo good to

591

00:25:56,160 --> 00:25:53,770

see you in the chat room so as far is

592

00:25:58,050 --> 00:25:56,170

now you just made a point about not

593

00:25:59,490 --> 00:25:58,060

interacting and that just kind of threw

594

00:26:02,280 --> 00:25:59,500

the wrench and a couple things I was

595

00:26:06,960 --> 00:26:02,290

going to say but do you think it's

596

00:26:09,420 --> 00:26:06,970

possible that now I I know nothing about

597

00:26:11,190 --> 00:26:09,430

any of this really to speak of but do

598

00:26:13,890 --> 00:26:11,200

you think it's possible that you know

599

00:26:16,590 --> 00:26:13,900

since astronomy is basically by

600

00:26:19,470 --> 00:26:16,600

observation that it's possible that

601  
00:26:24,510 --> 00:26:19,480  
there's a spectra that were unaware of

602  
00:26:29,070 --> 00:26:24,520  
that dark matter is in is that a is that

603  
00:26:32,330 --> 00:26:29,080  
is that a real layman's question well so

604  
00:26:37,020 --> 00:26:32,340  
it could be yet there could be an entire

605  
00:26:40,350 --> 00:26:37,030  
Dark Sector of particles that have their

606  
00:26:42,660 --> 00:26:40,360  
own self interactions as well as

607  
00:26:44,490 --> 00:26:42,670  
interactions with ordinary matter rare

608  
00:26:46,890 --> 00:26:44,500  
ones but still have some interaction

609  
00:26:48,420 --> 00:26:46,900  
ordinary matter other than gravity so

610  
00:26:50,610 --> 00:26:48,430  
there are models out there they're

611  
00:26:54,390 --> 00:26:50,620  
called Dark Sector models and I like

612  
00:26:58,670 --> 00:26:54,400  
them a lot because I think that it's a

613  
00:27:01,040 --> 00:26:58,680

it's not I don't like the idea that

614

00:27:03,290 --> 00:27:01,050

like Oh Dark Matters probably one thing

615

00:27:05,900 --> 00:27:03,300

cuz that's the easiest thing to say I

616

00:27:09,650 --> 00:27:05,910

think it's more likely there's an entire

617

00:27:11,360 --> 00:27:09,660

rich sector that were unaware of which

618

00:27:15,290 --> 00:27:11,370

if I understood you correctly which I

619

00:27:17,420 --> 00:27:15,300

think addresses your question yes and

620

00:27:20,930 --> 00:27:17,430

then this other thing I started thinking

621

00:27:25,610 --> 00:27:20,940

about become I started thinking which is

622

00:27:28,850 --> 00:27:25,620

always dangerous but about the atomic

623

00:27:31,670 --> 00:27:28,860

what's it called the atomic spacing our

624

00:27:33,380 --> 00:27:31,680

I think it's called our inner spacing

625

00:27:36,020 --> 00:27:33,390

something like that you know I

626

00:27:38,300 --> 00:27:36,030

understand like when a black hole occurs

627

00:27:40,460 --> 00:27:38,310

or down to a neutron star like

628

00:27:43,700 --> 00:27:40,470

everything is compressed and I think I

629

00:27:46,610 --> 00:27:43,710

saw somewhere where if they took all the

630

00:27:49,040 --> 00:27:46,620

space from the atoms of a human he'd fit

631

00:27:51,020 --> 00:27:49,050

on a a head of a pin something like that

632

00:27:53,810 --> 00:27:51,030

you know it's really it's really quite

633

00:27:58,010 --> 00:27:53,820

amazing and I started to wonder if you

634

00:28:02,030 --> 00:27:58,020

know Dark Matter may not be a black hole

635

00:28:05,690 --> 00:28:02,040

but somewhat compressed you know atoms

636

00:28:07,280 --> 00:28:05,700

in some type of form along the way that

637

00:28:09,530 --> 00:28:07,290

we're just unaware of that type of

638

00:28:11,510 --> 00:28:09,540

matter I know I'm really reaching for

639

00:28:13,520 --> 00:28:11,520

straws but do you understand where I'm

640

00:28:15,620 --> 00:28:13,530

going I think so yeah no but I should

641

00:28:17,420 --> 00:28:15,630

clarify Dark Matters not necessarily

642

00:28:19,940 --> 00:28:17,430

black holes they might have nothing no I

643

00:28:21,710 --> 00:28:19,950

know yeah they're yeah yeah no but Dark

644

00:28:23,690 --> 00:28:21,720

Matter is all around us so I think what

645

00:28:26,600 --> 00:28:23,700

you're getting at is actually is that

646

00:28:28,070 --> 00:28:26,610

the standard idea of dark matter it's

647

00:28:30,410 --> 00:28:28,080

everywhere it's right now it's all

648

00:28:32,600 --> 00:28:30,420

around us it's passing through us it's

649

00:28:34,580 --> 00:28:32,610

just not interacting very often we

650

00:28:36,140 --> 00:28:34,590

already have a particle like that it

651  
00:28:38,210 --> 00:28:36,150  
doesn't fit the bill to explain dark

652  
00:28:40,220 --> 00:28:38,220  
matter but there's the neutrino there

653  
00:28:41,480 --> 00:28:40,230  
are I forget how many trillions in a

654  
00:28:41,900 --> 00:28:41,490  
thumbnail I should know it's a huge

655  
00:28:43,820 --> 00:28:41,910  
number

656  
00:28:45,770 --> 00:28:43,830  
you're constantly bathed in neutrinos

657  
00:28:48,200 --> 00:28:45,780  
right now from for example from the Sun

658  
00:28:51,200 --> 00:28:48,210  
since neutrinos are a byproduct of

659  
00:28:53,660 --> 00:28:51,210  
nuclear fusion reactions and so dark

660  
00:28:56,120 --> 00:28:53,670  
matter shouldn't be any more unusual

661  
00:28:58,340 --> 00:28:56,130  
than particles we already know and love

662  
00:29:00,800 --> 00:28:58,350  
like the neutrino we're just bathed in a

663  
00:29:02,720 --> 00:29:00,810

sea of it harmlessly all the time right

664

00:29:04,580 --> 00:29:02,730

now there's a great many property of

665

00:29:08,000 --> 00:29:04,590

dark matter particles passing through

666

00:29:11,270 --> 00:29:08,010

you and me doing nothing at the moment

667

00:29:12,409 --> 00:29:11,280

even so I hope I'm not positive of that

668

00:29:14,570 --> 00:29:12,419

addressed your

669

00:29:19,729 --> 00:29:14,580

your point well it was kind of a strange

670

00:29:22,639 --> 00:29:19,739

pointing but uh if if let me also put

671

00:29:26,509 --> 00:29:22,649

the scenario past your to you know we

672

00:29:29,060 --> 00:29:26,519

have matter and antimatter is there

673

00:29:33,399 --> 00:29:29,070

could there possibly be any correlation

674

00:29:36,099 --> 00:29:33,409

between matter and dark energy and I

675

00:29:40,279 --> 00:29:36,109

mean I'm sorry in dark matter and

676  
00:29:42,560 --> 00:29:40,289  
antimatter and dark energy yeah actually

677  
00:29:46,460 --> 00:29:42,570  
yeah that's a great question so one of

678  
00:29:49,190 --> 00:29:46,470  
the greatest mysteries in physics is why

679  
00:29:51,049 --> 00:29:49,200  
we exist at all because the Big Bang

680  
00:29:54,769 --> 00:29:51,059  
should have made equal amounts of matter

681  
00:29:58,009 --> 00:29:54,779  
and antimatter but it didn't it made a

682  
00:30:00,950 --> 00:29:58,019  
tiny little bit something like one part

683  
00:30:03,619 --> 00:30:00,960  
in a billion extra matter so when matter

684  
00:30:06,680 --> 00:30:03,629  
and antimatter annihilating into energy

685  
00:30:09,289 --> 00:30:06,690  
the universe wasn't completely erased

686  
00:30:11,570 --> 00:30:09,299  
into energy from matter into completing

687  
00:30:13,580 --> 00:30:11,580  
energy but matter was leftover and that

688  
00:30:16,159 --> 00:30:13,590

tiny leftover but then became all the

689

00:30:17,840 --> 00:30:16,169

stars and galaxies it is a great mystery

690

00:30:18,950 --> 00:30:17,850

in physics and actually the neutrinos I

691

00:30:20,810 --> 00:30:18,960

mentioned are one of the ways we're

692

00:30:22,340 --> 00:30:20,820

probing that mystery try and understand

693

00:30:24,619 --> 00:30:22,350

differences between neutrinos and

694

00:30:28,129 --> 00:30:24,629

antineutrinos are they the same particle

695

00:30:31,129 --> 00:30:28,139

are they not and so that's a big mystery

696

00:30:33,950 --> 00:30:31,139

and kind of a second mystery which may

697

00:30:37,009 --> 00:30:33,960

or may not be related is why is the

698

00:30:38,479 --> 00:30:37,019

ratio so this is one ratio I just have

699

00:30:42,739 --> 00:30:38,489

matter and antimatter so much more

700

00:30:45,529 --> 00:30:42,749

matter by a huge fat source or a tiny

701  
00:30:47,210 --> 00:30:45,539  
factor you know there's vastly there was

702  
00:30:49,580 --> 00:30:47,220  
almost equal amounts of matter and

703  
00:30:51,830 --> 00:30:49,590  
antimatter born in the Big Bang but then

704  
00:30:53,989 --> 00:30:51,840  
another mystery is why is dark matter to

705  
00:30:55,519 --> 00:30:53,999  
ordinary matter approximately five to

706  
00:30:58,489 --> 00:30:55,529  
one then where does that come from and

707  
00:31:01,430 --> 00:30:58,499  
so there are these questions of ratios

708  
00:31:03,799 --> 00:31:01,440  
of where do those ratios or different

709  
00:31:06,799 --> 00:31:03,809  
forms of matter come from and are they

710  
00:31:08,359 --> 00:31:06,809  
related possibly I know there is work in

711  
00:31:11,269 --> 00:31:08,369  
this area by theoretical physicists

712  
00:31:13,789 --> 00:31:11,279  
trying to relate these ratios between

713  
00:31:16,639 --> 00:31:13,799

matter and antimatter dark matter and

714

00:31:19,810 --> 00:31:16,649

matter but to be clear dark matter would

715

00:31:22,369 --> 00:31:19,820

also have anti dark matter

716

00:31:24,649 --> 00:31:22,379

so so one of the ways we look for dark

717

00:31:25,760 --> 00:31:24,659

matter actually not the way I do which

718

00:31:27,500 --> 00:31:25,770

is called direct attack

719

00:31:29,660 --> 00:31:27,510

but another method in which is an

720

00:31:33,140 --> 00:31:29,670

astronomy called indirect detection

721

00:31:35,840 --> 00:31:33,150

looks for matter I'm dark matter meeting

722

00:31:37,700 --> 00:31:35,850

anti dark matter boom annihilating into

723

00:31:39,230 --> 00:31:37,710

energy and that energy converts into

724

00:31:41,450 --> 00:31:39,240

particles we know and love

725

00:31:43,580 --> 00:31:41,460

gamma rays neutrinos as we look for

726

00:31:47,720 --> 00:31:43,590

those in astronomy and so there's there

727

00:31:49,430 --> 00:31:47,730

may be matter dark matter and anti dark

728

00:31:51,740 --> 00:31:49,440

matter just like there is with a with

729

00:31:54,050 --> 00:31:51,750

with regular matter Wow

730

00:31:56,390 --> 00:31:54,060

and I'm sure you've looked into the

731

00:31:58,310 --> 00:31:56,400

topic of the multiverse and a lot of

732

00:32:01,430 --> 00:31:58,320

times people trying to explain away you

733

00:32:04,670 --> 00:32:01,440

know dark matter in in that way what are

734

00:32:06,290 --> 00:32:04,680

your thoughts on that the brain yeah so

735

00:32:08,450 --> 00:32:06,300

we have to yeah we have to separate

736

00:32:09,770 --> 00:32:08,460

there are two ideas and science

737

00:32:14,630 --> 00:32:09,780

fiction's gets mixed up all the time

738

00:32:17,300 --> 00:32:14,640

there's this all extra dimensions and X

739

00:32:19,220 --> 00:32:17,310

and multiple universes are two

740

00:32:22,220 --> 00:32:19,230

completely different things

741

00:32:24,980 --> 00:32:22,230

Star Trek mixes this up teenage me Ninja

742

00:32:27,440 --> 00:32:24,990

Turtles mixes this up so the brain idea

743

00:32:29,540 --> 00:32:27,450

that's not exactly the same thing as a

744

00:32:31,610 --> 00:32:29,550

multiverse that's just saying that

745

00:32:34,580 --> 00:32:31,620

there's an extra direction in which to

746

00:32:36,350 --> 00:32:34,590

move that we cannot perceive so imagine

747

00:32:38,330 --> 00:32:36,360

we all lived in flatland right that

748

00:32:41,330 --> 00:32:38,340

classic story there would be no word in

749

00:32:43,430 --> 00:32:41,340

our language for up or down so the idea

750

00:32:46,910 --> 00:32:43,440

behind extra dimensions is that perhaps

751

00:32:49,130 --> 00:32:46,920

for example dark matter is ordinary

752

00:32:51,440 --> 00:32:49,140

matter but it's in an extra dimension

753

00:32:55,040 --> 00:32:51,450

this is called the Randle syndrome

754

00:32:58,250 --> 00:32:55,050

modeled by a famous physicist Lisa

755

00:33:00,800 --> 00:32:58,260

Randall and Sundaram so this is a one

756

00:33:02,270 --> 00:33:00,810

possibility I don't like it because if

757

00:33:04,250 --> 00:33:02,280

it's right that means we'll never find

758

00:33:07,460 --> 00:33:04,260

dark matter now with the techniques I'm

759

00:33:10,580 --> 00:33:07,470

I'm using so but it is a valid idea a

760

00:33:13,130 --> 00:33:10,590

suggestion but that's not related to the

761

00:33:15,200 --> 00:33:13,140

multiverse a multiverse is the idea that

762

00:33:17,240 --> 00:33:15,210

you have multiple completely separate

763

00:33:19,820 --> 00:33:17,250

universes each with its own set of

764

00:33:22,700 --> 00:33:19,830

dimensions length and height and what

765

00:33:24,320 --> 00:33:22,710

else but those two like parallel

766

00:33:27,590 --> 00:33:24,330

dimension and parallel universes get

767

00:33:29,450 --> 00:33:27,600

very badly conflated I see this on a

768

00:33:31,190 --> 00:33:29,460

regular basis so yeah we have to

769

00:33:33,560 --> 00:33:31,200

separate those two they're both

770

00:33:35,840 --> 00:33:33,570

extremely interesting and ideas in

771

00:33:39,740 --> 00:33:35,850

science fiction and in real science book

772

00:33:42,080 --> 00:33:39,750

we should try to keep them

773

00:33:43,789 --> 00:33:42,090

yeah I did a pretty good job of mixing

774

00:33:46,639 --> 00:33:43,799

them up there no it's okay yeah you'd

775

00:33:49,039 --> 00:33:46,649

let you want yeah yeah I remember

776

00:33:52,639 --> 00:33:49,049

reading something about that all the

777

00:33:56,810 --> 00:33:52,649

energy that will ever be it was all

778

00:33:58,870 --> 00:33:56,820

created at once and and it just changes

779

00:34:02,659 --> 00:33:58,880

or something like that is that is that

780

00:34:04,370 --> 00:34:02,669

semi accurate well it depends because I

781

00:34:06,049 --> 00:34:04,380

think if the universe is infinite that

782

00:34:08,000 --> 00:34:06,059

makes no sense because then you have an

783

00:34:10,129 --> 00:34:08,010

infinite amount of energy and matter so

784

00:34:13,760 --> 00:34:10,139

that's why in astronomy we often talk

785

00:34:16,609 --> 00:34:13,770

about the energy density how much mass

786

00:34:19,129 --> 00:34:16,619

how much energy is there per unit volume

787

00:34:21,440 --> 00:34:19,139

in the universe because if the universe

788

00:34:23,300 --> 00:34:21,450

is truly infinite with an infinite

789

00:34:25,730 --> 00:34:23,310

number of stars and galaxies an infant

790

00:34:27,619 --> 00:34:25,740

number of atoms it makes no sense to say

791

00:34:30,109 --> 00:34:27,629

well that infinite amount of energy was

792

00:34:31,760 --> 00:34:30,119

born at once and changes form but

793

00:34:33,079 --> 00:34:31,770

furthermore there's another issue it's

794

00:34:36,680 --> 00:34:33,089

saying that which is energy is

795

00:34:39,470 --> 00:34:36,690

constantly lost so what what we learn is

796

00:34:42,109 --> 00:34:39,480

conservation of energy like in you know

797

00:34:44,919 --> 00:34:42,119

sixth grade science class is almost

798

00:34:47,809 --> 00:34:44,929

correct it works on very small scales

799

00:34:50,569 --> 00:34:47,819

but since the universe is expanding it's

800

00:34:53,960 --> 00:34:50,579

actually constantly losing energy so

801  
00:34:57,260 --> 00:34:53,970  
energy is still conserved but not in the

802  
00:34:59,480 --> 00:34:57,270  
like this the the the the simple way

803  
00:35:00,800 --> 00:34:59,490  
that we learned in the nineteenth early

804  
00:35:03,410 --> 00:35:00,810  
twentieth century that's a good

805  
00:35:06,440 --> 00:35:03,420  
approximation for everyday lives but

806  
00:35:09,260 --> 00:35:06,450  
energy is actually as a whole is is

807  
00:35:12,400 --> 00:35:09,270  
constantly just disappearing because as

808  
00:35:15,859 --> 00:35:12,410  
the universe expands and cools down

809  
00:35:17,839 --> 00:35:15,869  
energy is being lost in the traditional

810  
00:35:19,579 --> 00:35:17,849  
sense so in one way of looking at it is

811  
00:35:25,329 --> 00:35:19,589  
that actually we're constantly losing

812  
00:35:33,829 --> 00:35:25,339  
energy as the universe cools down I see

813  
00:35:36,170 --> 00:35:33,839

so if as far as traveling from I've

814

00:35:41,750 --> 00:35:36,180

heard it said by another astronomer that

815

00:35:43,190 --> 00:35:41,760

if the if the earth was the size of the

816

00:35:45,920 --> 00:35:43,200

ball on a ballpoint pen

817

00:35:49,190 --> 00:35:45,930

and it was in Washington DC the nearest

818

00:35:51,470 --> 00:35:49,200

star would be San Francisco and that's

819

00:35:52,890 --> 00:35:51,480

to give kind of because we can't really

820

00:35:56,040 --> 00:35:52,900

fathom do

821

00:35:59,070 --> 00:35:56,050

since when it comes to all that do you

822

00:36:01,140 --> 00:35:59,080

think that at some point you think would

823

00:36:05,280 --> 00:36:01,150

ever actually be able to get a craft to

824

00:36:08,400 --> 00:36:05,290

another solar system yes I think it will

825

00:36:10,500 --> 00:36:08,410

be easier to do unmanned which is

826

00:36:12,150 --> 00:36:10,510

unfortunate I'm a lover of Star Trek as

827

00:36:15,180 --> 00:36:12,160

you know it'd be great to travel in

828

00:36:17,130 --> 00:36:15,190

ships but I've resisted this for many

829

00:36:20,160 --> 00:36:17,140

years no you know we got to have manned

830

00:36:23,820 --> 00:36:20,170

exploration but unfortunately those who

831

00:36:25,590 --> 00:36:23,830

say you know that it would be easier to

832

00:36:28,050 --> 00:36:25,600

do it with small objects like a little

833

00:36:30,240 --> 00:36:28,060

like little cameras automated things

834

00:36:32,880 --> 00:36:30,250

here's the reason why it's because so

835

00:36:35,790 --> 00:36:32,890

those distances you speak of are really

836

00:36:37,380 --> 00:36:35,800

not so bad if you can travel

837

00:36:40,470 --> 00:36:37,390

significantly close to the speed of

838

00:36:42,420 --> 00:36:40,480

light but how do you do that that's much

839

00:36:45,630 --> 00:36:42,430

easier if you have a smaller mass it

840

00:36:48,360 --> 00:36:45,640

takes less force then to accelerate so

841

00:36:49,980 --> 00:36:48,370

it's much easier to take a swab jerk and

842

00:36:52,470 --> 00:36:49,990

even then it's not easy youself to

843

00:36:54,720 --> 00:36:52,480

account for if you're traveling at high

844

00:36:56,880 --> 00:36:54,730

speeds you know a piece of dust is fatal

845

00:36:59,370 --> 00:36:56,890

you know destroys even a tiny craft so

846

00:37:02,610 --> 00:36:59,380

you have to there still extreme

847

00:37:05,040 --> 00:37:02,620

challenges but I think the challenges of

848

00:37:06,870 --> 00:37:05,050

engineering not challenges of physics so

849

00:37:10,260 --> 00:37:06,880

I always tell my students is there's not

850

00:37:12,720 --> 00:37:10,270

there's no flaw of physics that is

851  
00:37:15,150 --> 00:37:12,730  
stopping us from space exploration in

852  
00:37:16,530 --> 00:37:15,160  
fact physics works in our favor you know

853  
00:37:18,300 --> 00:37:16,540  
I mentioned it so many times always

854  
00:37:21,330 --> 00:37:18,310  
reminding people about time dilation

855  
00:37:23,820 --> 00:37:21,340  
it's so often forgotten in fiction and

856  
00:37:26,370 --> 00:37:23,830  
science fiction is that you know the

857  
00:37:28,620 --> 00:37:26,380  
time dilation works in your favor the

858  
00:37:30,900 --> 00:37:28,630  
slowing of time as you approach the

859  
00:37:33,240 --> 00:37:30,910  
speed of light and so I think the

860  
00:37:36,120 --> 00:37:33,250  
problem of interstellar exploration is

861  
00:37:38,430 --> 00:37:36,130  
not one of physics it's one of

862  
00:37:39,990 --> 00:37:38,440  
engineering how do you get fuel how do

863  
00:37:41,850 --> 00:37:40,000

you get the shielding but there's

864

00:37:44,640 --> 00:37:41,860

nothing in the laws of physics as we

865

00:37:48,390 --> 00:37:44,650

know them that would say interstellar

866

00:37:50,370 --> 00:37:48,400

exploration is impossible it's difficult

867

00:37:53,550 --> 00:37:50,380

but there's a big difference between

868

00:37:55,500 --> 00:37:53,560

difficult and impossible even extremely

869

00:38:00,750 --> 00:37:55,510

difficult is not the same thing as

870

00:38:04,440 --> 00:38:00,760

impossible right so let's let's touch a

871

00:38:06,870 --> 00:38:04,450

little bit on the the UFO topic you know

872

00:38:10,770 --> 00:38:06,880

you mentioned just a second ago that

873

00:38:13,650 --> 00:38:10,780

maybe unmanned would be the way to go if

874

00:38:15,900 --> 00:38:13,660

we are you know things are happening

875

00:38:17,580 --> 00:38:15,910

people are seeing things we don't know

876

00:38:19,440 --> 00:38:17,590

exactly what they are you know maybe

877

00:38:21,960 --> 00:38:19,450

there's explanations for some of them

878

00:38:25,260 --> 00:38:21,970

but some there's absolutely no

879

00:38:30,330 --> 00:38:25,270

explanations for what people have seen

880

00:38:32,880 --> 00:38:30,340

that we that we know of so I guess the

881

00:38:35,850 --> 00:38:32,890

question is do you think that if we are

882

00:38:39,390 --> 00:38:35,860

being visited it's most likely by some

883

00:38:41,400 --> 00:38:39,400

type of drone or something exploring if

884

00:38:44,520 --> 00:38:41,410

you again I'm asking you theorize I

885

00:38:46,230 --> 00:38:44,530

don't know yeah no yeah absolutely yeah

886

00:38:47,760 --> 00:38:46,240

no I'm very I know even though this

887

00:38:50,340 --> 00:38:47,770

isn't your great animation at the

888

00:38:53,160 --> 00:38:50,350

beginning of your of the podcast I'm

889

00:38:55,230 --> 00:38:53,170

extremely skeptical you know like the

890

00:38:59,940 --> 00:38:55,240

gray skin you know humanoid I think it's

891

00:39:02,580 --> 00:38:59,950

much more likely that there are a drones

892

00:39:05,370 --> 00:39:02,590

with no beings would probably be a more

893

00:39:07,650 --> 00:39:05,380

likely first encounter just given how

894

00:39:11,100 --> 00:39:07,660

much easier it would be to just take a

895

00:39:12,690 --> 00:39:11,110

small object that's you know remote

896

00:39:15,240 --> 00:39:12,700

controls the wrong word can form own

897

00:39:16,620 --> 00:39:15,250

control for that distance because of the

898

00:39:18,270 --> 00:39:16,630

speed of light but you know you may be

899

00:39:20,940 --> 00:39:18,280

some sort of artificially intelligent

900

00:39:23,460 --> 00:39:20,950

robot like a von Neumann probe or

901  
00:39:25,680 --> 00:39:23,470  
something like that from that vine or me

902  
00:39:30,330 --> 00:39:25,690  
said I think that that is much more

903  
00:39:34,110 --> 00:39:30,340  
probable than that then craft with

904  
00:39:36,930 --> 00:39:34,120  
beings I would be tho thrilled to be

905  
00:39:39,390 --> 00:39:36,940  
wrong on that I will be very thrilled to

906  
00:39:41,820 --> 00:39:39,400  
be long I would love to have you know a

907  
00:39:44,820 --> 00:39:41,830  
gray humanoid or some other you know

908  
00:39:47,280 --> 00:39:44,830  
alien ships you see on TV say hey you

909  
00:39:48,960 --> 00:39:47,290  
know here we are and and and we're

910  
00:39:50,940 --> 00:39:48,970  
aliens and we're real and we've traveled

911  
00:39:53,400 --> 00:39:50,950  
this you know distance I would be

912  
00:39:57,030 --> 00:39:53,410  
thrilled if that was the case but I

913  
00:39:59,760 --> 00:39:57,040

think that it's more probable and easier

914

00:40:02,180 --> 00:39:59,770

to imagine that just like with the same

915

00:40:04,410 --> 00:40:02,190

problems we have you know radiation

916

00:40:06,150 --> 00:40:04,420

traveling through space shielding I

917

00:40:08,160 --> 00:40:06,160

mentioned against you know just you know

918

00:40:09,540 --> 00:40:08,170

you know a speck of dust hits your ship

919

00:40:12,000 --> 00:40:09,550

and it's toast because you're traveling

920

00:40:14,010 --> 00:40:12,010

so fast right you know so it's because

921

00:40:17,880 --> 00:40:14,020

of because of those things I I think

922

00:40:19,440 --> 00:40:17,890

that on that that that probes with you

923

00:40:21,270 --> 00:40:19,450

know unmanned is the wrong word

924

00:40:23,460 --> 00:40:21,280

not just you know men and and women but

925

00:40:24,840 --> 00:40:23,470

also so it's it's also we're not talking

926

00:40:28,530 --> 00:40:24,850

about humans right so I don't know

927

00:40:31,800 --> 00:40:28,540

unpeopled uh you know it's possible that

928

00:40:35,550 --> 00:40:31,810

I think that that's more probable of a

929

00:40:37,260 --> 00:40:35,560

scenario of first contact yeah and you

930

00:40:38,550 --> 00:40:37,270

know the James Webb telescope is gonna

931

00:40:40,080 --> 00:40:38,560

go up there and you know maybe it'll

932

00:40:44,670 --> 00:40:40,090

teach us a lot more I think that's

933

00:40:46,650 --> 00:40:44,680

really fascinating do you I asked this

934

00:40:48,450 --> 00:40:46,660

question of a lot of people that do come

935

00:40:52,200 --> 00:40:48,460

on the show with your type of background

936

00:40:54,570 --> 00:40:52,210

and that is why us why do you think if

937

00:40:58,950 --> 00:40:54,580

we are in fact being visited I'm not

938

00:41:01,800 --> 00:40:58,960

sure if we are not from another say

939

00:41:04,650 --> 00:41:01,810

intelligence of some kind what would

940

00:41:07,800 --> 00:41:04,660

make us so special out there and and

941

00:41:12,750 --> 00:41:07,810

let's just say our own galaxy well

942

00:41:15,630 --> 00:41:12,760

that's a great question I think my best

943

00:41:18,210 --> 00:41:15,640

answer is is that perhaps perhaps life

944

00:41:22,530 --> 00:41:18,220

is rare so it's perhaps that we're not

945

00:41:24,510 --> 00:41:22,540

alone but what if there are only I don't

946

00:41:25,590 --> 00:41:24,520

know ten civilizations in the entire

947

00:41:27,450 --> 00:41:25,600

galaxy I'm messing with the entire

948

00:41:29,790 --> 00:41:27,460

universe you're saying to our galaxy so

949

00:41:32,070 --> 00:41:29,800

it's potentially possible that if

950

00:41:36,120 --> 00:41:32,080

intelligent life exists in the galaxy

951  
00:41:39,950 --> 00:41:36,130  
other than Earth it's still relatively

952  
00:41:42,420 --> 00:41:39,960  
rare and also we also have to realize

953  
00:41:44,400 --> 00:41:42,430  
that if there are other intelligent

954  
00:41:48,420 --> 00:41:44,410  
races why would they why would they not

955  
00:41:51,000 --> 00:41:48,430  
have the same spirit of curiosity and

956  
00:41:53,040 --> 00:41:51,010  
adventure and exploration as we do

957  
00:41:56,640 --> 00:41:53,050  
because let's turn the tables on your

958  
00:41:58,170 --> 00:41:56,650  
question if we found some alien race you

959  
00:41:59,910 --> 00:41:58,180  
bet your butt we would probably be

960  
00:42:01,440 --> 00:41:59,920  
spying on them before saying hello we

961  
00:42:03,480 --> 00:42:01,450  
wouldn't say hello we'd spy on them like

962  
00:42:05,370 --> 00:42:03,490  
they do on Star Trek right to not

963  
00:42:07,110 --> 00:42:05,380

violate the prime directive at everybody

964

00:42:10,500 --> 00:42:07,120

we have our little station with the

965

00:42:13,020 --> 00:42:10,510

cloak so you can't see so if the tables

966

00:42:16,110 --> 00:42:13,030

were turned you know we would we would

967

00:42:19,530 --> 00:42:16,120

have some highly classified you know

968

00:42:22,560 --> 00:42:19,540

listening posts for up early and for for

969

00:42:26,280 --> 00:42:22,570

the others and so but I think a spirit

970

00:42:28,080 --> 00:42:26,290

of curiosity really really cuts to the

971

00:42:30,960 --> 00:42:28,090

heart of that as well as like I said the

972

00:42:32,880 --> 00:42:30,970

rareness what if it is only you know 10

973

00:42:34,800 --> 00:42:32,890

or 20 civilizations with

974

00:42:37,830 --> 00:42:34,810

like a lot since we have only evidence

975

00:42:39,990 --> 00:42:37,840

right now just one us but that's a very

976  
00:42:42,120 --> 00:42:40,000  
small number given the huge distances

977  
00:42:44,460 --> 00:42:42,130  
you mentioned earlier if it is only 10

978  
00:42:46,950 --> 00:42:44,470  
or 20 which it could be they're very

979  
00:42:48,420 --> 00:42:46,960  
very normally separated then on average

980  
00:42:50,910 --> 00:42:48,430  
if they're spread randomly throughout

981  
00:42:53,850 --> 00:42:50,920  
the galaxy do you think that we will

982  
00:42:54,930 --> 00:42:53,860  
find intelligent life within a certain

983  
00:42:57,590 --> 00:42:54,940  
amount of time have you ever

984  
00:43:00,030 --> 00:42:57,600  
contemplated that I'm positive I'm

985  
00:43:02,730 --> 00:43:00,040  
positive I don't know if I don't know

986  
00:43:05,970 --> 00:43:02,740  
how I don't know if it will be SETI will

987  
00:43:07,860 --> 00:43:05,980  
be successful finding a signal or is it

988  
00:43:10,290 --> 00:43:07,870

that some spoor ssin of the UFO

989

00:43:12,060 --> 00:43:10,300

phenomenon is genuine I think that's

990

00:43:14,160 --> 00:43:12,070

actually possible that's why I'm here

991

00:43:16,830 --> 00:43:14,170

right on your pockets and and and some

992

00:43:20,190 --> 00:43:16,840

and and just and more full disclosure I

993

00:43:23,190 --> 00:43:20,200

will come out speaking of which uh-huh

994

00:43:26,190 --> 00:43:23,200

you're gonna get really excited when you

995

00:43:29,460 --> 00:43:26,200

mentioned the big thing coming yeah if

996

00:43:31,560 --> 00:43:29,470

I'm not mistaken I may be at least

997

00:43:35,190 --> 00:43:31,570

partially responsible for it if it's

998

00:43:37,140 --> 00:43:35,200

what if it's what I'm thinking um so we

999

00:43:38,790 --> 00:43:37,150

shall see and if it is I'll let you know

1000

00:43:41,160 --> 00:43:38,800

after the pockets even I'll be like oh

1001  
00:43:43,950 --> 00:43:41,170  
yeah this is so yeah cuz I've been

1002  
00:43:46,530 --> 00:43:43,960  
pushing for very hard not as hard as my

1003  
00:43:48,510 --> 00:43:46,540  
colleague Kevin you know Kevin truth -

1004  
00:43:51,930 --> 00:43:48,520  
lets get all the secrets out of what we

1005  
00:43:54,000 --> 00:43:51,940  
know because even if it's not you know

1006  
00:43:56,730 --> 00:43:54,010  
if some of these unknown craft were

1007  
00:43:58,350 --> 00:43:56,740  
allegedly saying let's say it's it's

1008  
00:44:00,960 --> 00:43:58,360  
it's not aliens but it's you know

1009  
00:44:02,400 --> 00:44:00,970  
another country what if it's Russian or

1010  
00:44:04,080 --> 00:44:02,410  
Chinese technology this is a threat to

1011  
00:44:07,410 --> 00:44:04,090  
national security we should stop

1012  
00:44:09,390 --> 00:44:07,420  
laughing off all of this and take and

1013  
00:44:11,940 --> 00:44:09,400

and just not and and take it more

1014

00:44:15,030 --> 00:44:11,950

seriously even if the percentage chance

1015

00:44:17,460 --> 00:44:15,040

is small that something's real it's

1016

00:44:19,320 --> 00:44:17,470

worth the risk because the gain is

1017

00:44:23,130 --> 00:44:19,330

enormous I like to call this the zero

1018

00:44:26,250 --> 00:44:23,140

times infinity gamble right that yeah

1019

00:44:28,440 --> 00:44:26,260

that the chances of close to zero but

1020

00:44:32,100 --> 00:44:28,450

not zero but close that you know we're

1021

00:44:35,910 --> 00:44:32,110

being visited by aliens in crafts but if

1022

00:44:40,050 --> 00:44:35,920

we are the gains in human knowledge are

1023

00:44:41,940 --> 00:44:40,060

so vast there should outweigh the risks

1024

00:44:44,190 --> 00:44:41,950

of wasting time quote unquote

1025

00:44:46,610 --> 00:44:44,200

as a scientist treating it seriously I

1026

00:44:49,660 --> 00:44:46,620

think that the games are so mass

1027

00:44:52,280 --> 00:44:49,670

that they outweigh I'll weigh the risk

1028

00:44:54,880 --> 00:44:52,290

well you know it's really really

1029

00:44:58,100 --> 00:44:54,890

difficult for me to not push you on what

1030

00:45:01,490 --> 00:44:58,110

may be coming out that you can have

1031

00:45:03,350 --> 00:45:01,500

something involvement you probably could

1032

00:45:05,480 --> 00:45:03,360

be wrong I could be wrong but I was

1033

00:45:07,130 --> 00:45:05,490

pushing with Kevin for like we're trying

1034

00:45:10,780 --> 00:45:07,140

to get more stuff out because we're

1035

00:45:14,780 --> 00:45:10,790

frustrated with how the um the immense

1036

00:45:17,690 --> 00:45:14,790

all the secrecy because I think that in

1037

00:45:19,520 --> 00:45:17,700

in as a scientist I'll tell you that so

1038

00:45:24,650 --> 00:45:19,530

open science is a great thing

1039

00:45:26,030 --> 00:45:24,660

secrecy is so incredibly detrimental to

1040

00:45:28,550 --> 00:45:26,040

scientific progress

1041

00:45:31,370 --> 00:45:28,560

so let me speculate this is speculation

1042

00:45:32,990 --> 00:45:31,380

let's pretend let's say what if Roswell

1043

00:45:35,780 --> 00:45:33,000

or something else what if one of the

1044

00:45:38,060 --> 00:45:35,790

claims of crash craft is real right

1045

00:45:41,300 --> 00:45:38,070

let's say it's one at least one claim is

1046

00:45:43,700 --> 00:45:41,310

real where's all the great technology

1047

00:45:45,290 --> 00:45:43,710

reverse engineer for the alien craft why

1048

00:45:48,320 --> 00:45:45,300

don't we have anti-gravity flying around

1049

00:45:50,090 --> 00:45:48,330

do you know why because this is again

1050

00:45:54,110 --> 00:45:50,100

I'm speculating I'm saying for the sake

1051  
00:45:55,760 --> 00:45:54,120  
of argument let's assume some claim of a

1052  
00:45:59,570 --> 00:45:55,770  
crashed craft kept by the US government

1053  
00:46:01,070 --> 00:45:59,580  
is true do you know why I imagine we

1054  
00:46:03,380 --> 00:46:01,080  
wouldn't have made no progress then is

1055  
00:46:05,240 --> 00:46:03,390  
because the way you make progress in

1056  
00:46:06,980 --> 00:46:05,250  
science is you get thousands of

1057  
00:46:09,380 --> 00:46:06,990  
scientists together you don't have your

1058  
00:46:10,820 --> 00:46:09,390  
five or your ten who are you know have

1059  
00:46:13,340 --> 00:46:10,830  
the national security clearance

1060  
00:46:14,960 --> 00:46:13,350  
they will make no progress not because

1061  
00:46:17,330 --> 00:46:14,970  
they're they're dumb or inexperienced

1062  
00:46:19,340 --> 00:46:17,340  
absolutely not I know many of the people

1063  
00:46:21,680 --> 00:46:19,350

people have come out who have worked on

1064

00:46:23,540 --> 00:46:21,690

project highly intelligent people who

1065

00:46:25,760 --> 00:46:23,550

are laughed at for being crackpots but

1066

00:46:29,660 --> 00:46:25,770

many of them are not however the issue

1067

00:46:33,980 --> 00:46:29,670

is is that you even 5 or 10 geniuses is

1068

00:46:36,080 --> 00:46:33,990

not enough imagine Sherlock Holmes or a

1069

00:46:40,520 --> 00:46:36,090

non fictional character imagine a

1070

00:46:43,670 --> 00:46:40,530

scientist in 1895 imagine them trying to

1071

00:46:46,280 --> 00:46:43,680

deconstruct my laptop they wouldn't have

1072

00:46:48,890 --> 00:46:46,290

the faintest idea where to begin the

1073

00:46:50,900 --> 00:46:48,900

only way we would make progress would be

1074

00:46:53,660 --> 00:46:50,910

we would need thousand we would need

1075

00:46:55,430 --> 00:46:53,670

like a Manhattan Project level thing so

1076  
00:46:57,470 --> 00:46:55,440  
Manhattan Project I know is classified

1077  
00:46:59,210 --> 00:46:57,480  
so that seems to defeat my argument but

1078  
00:47:03,170 --> 00:46:59,220  
I I think that the more Oh

1079  
00:47:05,870 --> 00:47:03,180  
that science is the more progress the

1080  
00:47:08,210 --> 00:47:05,880  
more progress we make we if we were in

1081  
00:47:09,530 --> 00:47:08,220  
it all together but right now we don't

1082  
00:47:11,720 --> 00:47:09,540  
know what's right and what's wrong right

1083  
00:47:13,790 --> 00:47:11,730  
what's information was disinformation or

1084  
00:47:17,240 --> 00:47:13,800  
misinformation right it's just such a

1085  
00:47:19,099 --> 00:47:17,250  
mixed bag right now yeah yeah and and

1086  
00:47:21,800 --> 00:47:19,109  
you're right and there is there is a lot

1087  
00:47:23,390 --> 00:47:21,810  
a lot going around there's a little bit

1088  
00:47:25,190 --> 00:47:23,400

I don't know if you pay attention at all

1089

00:47:27,559 --> 00:47:25,200

there's a little bit of friction in the

1090

00:47:31,520 --> 00:47:27,569

UFO community you know here and there

1091

00:47:33,890 --> 00:47:31,530

has a lot of faith yeah oh really yeah

1092

00:47:38,500 --> 00:47:33,900

yeah there's some Facebook battles going

1093

00:47:42,079 --> 00:47:38,510

on I kind of pulled out of one yesterday

1094

00:47:43,990 --> 00:47:42,089

just and it kind of ended it with okay

1095

00:47:49,309 --> 00:47:44,000

I'll keep an open mind just to stop the

1096

00:47:52,460 --> 00:47:49,319

just about the fighting but anyway so

1097

00:47:55,180 --> 00:47:52,470

pointless though if aliens are real that

1098

00:47:57,440 --> 00:47:55,190

is so much more important than our petty

1099

00:48:00,109 --> 00:47:57,450

disagreements on social media on Twitter

1100

00:48:02,510 --> 00:48:00,119

Facebook it's just this is so much

1101  
00:48:06,050 --> 00:48:02,520  
bigger and more important that it makes

1102  
00:48:10,670 --> 00:48:06,060  
our squabbling look so petty by

1103  
00:48:13,160 --> 00:48:10,680  
comparison if even 0.1% of the claims

1104  
00:48:16,819 --> 00:48:13,170  
made about UFOs and alleged alien even

1105  
00:48:19,040 --> 00:48:16,829  
if 0.1% was was true there's so

1106  
00:48:21,950 --> 00:48:19,050  
important that we should come together

1107  
00:48:24,859 --> 00:48:21,960  
not argue and come together to research

1108  
00:48:26,510 --> 00:48:24,869  
this yeah what do you think it would do

1109  
00:48:29,390 --> 00:48:26,520  
you know we have a let's see we have

1110  
00:48:31,849 --> 00:48:29,400  
about six minutes until the break so

1111  
00:48:35,990 --> 00:48:31,859  
what do you think all of a sudden we

1112  
00:48:38,900 --> 00:48:36,000  
said hey there's intelligent life and we

1113  
00:48:41,240 --> 00:48:38,910

can interact with it out there what do

1114

00:48:43,099 --> 00:48:41,250

you think that would do to society and

1115

00:48:46,730 --> 00:48:43,109

the world do you think would pull us

1116

00:48:49,970 --> 00:48:46,740

together possibly I used to think that I

1117

00:48:52,670 --> 00:48:49,980

used to think that a crisis would pull

1118

00:48:55,670 --> 00:48:52,680

us together and then came the kovat

1119

00:48:57,890 --> 00:48:55,680

pandemic yeah and then came George Floyd

1120

00:49:01,040 --> 00:48:57,900

and then and then the riots and then the

1121

00:49:03,829 --> 00:49:01,050

president tweeting and then like we got

1122

00:49:05,690 --> 00:49:03,839

we are so polarized that I'm actually

1123

00:49:08,349 --> 00:49:05,700

starting to change my mind I used to

1124

00:49:11,150 --> 00:49:08,359

think that we would be pulled together

1125

00:49:13,370 --> 00:49:11,160

immediately like all there's aliens out

1126

00:49:15,140 --> 00:49:13,380

there no I

1127

00:49:17,360 --> 00:49:15,150

fear that what the pandemic has taught

1128

00:49:20,330 --> 00:49:17,370

me is they actually know ik right I used

1129

00:49:22,670 --> 00:49:20,340

to think naively I think that a crisis

1130

00:49:24,500 --> 00:49:22,680

would pull humanity together but

1131

00:49:26,660 --> 00:49:24,510

unfortunately what I'm seeing more and

1132

00:49:29,360 --> 00:49:26,670

more is that there's more that it

1133

00:49:32,000 --> 00:49:29,370

fractures things even worse I I think

1134

00:49:35,450 --> 00:49:32,010

that what would it be it would still be

1135

00:49:36,680 --> 00:49:35,460

that but here's the catch I still think

1136

00:49:39,110 --> 00:49:36,690

it would be the right thing to do

1137

00:49:41,330 --> 00:49:39,120

like if the US government or some other

1138

00:49:41,660 --> 00:49:41,340

government knows the truths not telling

1139

00:49:44,300 --> 00:49:41,670

us

1140

00:49:46,460 --> 00:49:44,310

I still think will be for the best for

1141

00:49:48,530 --> 00:49:46,470

immediate full disclosure even though

1142

00:49:51,290 --> 00:49:48,540

there would be problems there would be

1143

00:49:53,060 --> 00:49:51,300

chaos and also disbelief

1144

00:49:57,410 --> 00:49:53,070

oh that's course that's nonsense you

1145

00:49:59,000 --> 00:49:57,420

know Kevin says is that there were my

1146

00:50:00,290 --> 00:49:59,010

you know my good friend Kevin Knuth once

1147

00:50:03,110 --> 00:50:00,300

said that you know there will be people

1148

00:50:05,440 --> 00:50:03,120

the where you could drag an alien out of

1149

00:50:07,970 --> 00:50:05,450

a spaceship on live TV into a

1150

00:50:10,610 --> 00:50:07,980

vivisection and they would still be like

1151

00:50:13,010 --> 00:50:10,620

oh it's Photoshop you know so like there

1152

00:50:15,950 --> 00:50:13,020

there's nothing you could do to convince

1153

00:50:18,110 --> 00:50:15,960

some people the president tomorrow could

1154

00:50:20,150 --> 00:50:18,120

call press conference and say hey

1155

00:50:22,040 --> 00:50:20,160

everybody aliens are real and people get

1156

00:50:24,350 --> 00:50:22,050

like whatever and you more than even

1157

00:50:25,850 --> 00:50:24,360

have one beside him yes and have one

1158

00:50:26,480 --> 00:50:25,860

beside him and people be like yeah

1159

00:50:27,680 --> 00:50:26,490

that's fake

1160

00:50:29,030 --> 00:50:27,690

that's photoshopped oh good night

1161

00:50:33,110 --> 00:50:29,040

special the Hollywood special-effects so

1162

00:50:34,940 --> 00:50:33,120

there is such um so I think that what I

1163

00:50:38,060 --> 00:50:34,950

think it's for the best in the long run

1164

00:50:40,730 --> 00:50:38,070

but in the short run if intelligent life

1165

00:50:44,060 --> 00:50:40,740

is real out there and we already know

1166

00:50:47,390 --> 00:50:44,070

about it I think that despite short term

1167

00:50:49,160 --> 00:50:47,400

negativity of chaos vers disbelief than

1168

00:50:50,780 --> 00:50:49,170

chaos then you know you'd have religious

1169

00:50:52,820 --> 00:50:50,790

fanaticism all kinds of crazy stuff

1170

00:50:56,000 --> 00:50:52,830

happening but I think it would be best

1171

00:50:58,700 --> 00:50:56,010

for the long run so that we put humanity

1172

00:51:01,490 --> 00:50:58,710

can finally put on you know some you

1173

00:51:02,780 --> 00:51:01,500

know grow up and become an adult right

1174

00:51:04,880 --> 00:51:02,790

you know I think it was arthur c clarke

1175

00:51:07,760 --> 00:51:04,890

right end of childhood right so i think

1176  
00:51:09,530 --> 00:51:07,770  
that for the long run it would be better

1177  
00:51:12,590 --> 00:51:09,540  
just like the crises i mentioned which

1178  
00:51:15,710 --> 00:51:12,600  
are polarizing i'm still hoping that

1179  
00:51:17,770 --> 00:51:15,720  
they'll make change that they'll still

1180  
00:51:21,190 --> 00:51:17,780  
be long-term change like police reform

1181  
00:51:24,320 --> 00:51:21,200  
health care i'm still holding out hope

1182  
00:51:24,790 --> 00:51:24,330  
that that there are recent problems with

1183  
00:51:28,330 --> 00:51:24,800  
Kove

1184  
00:51:30,340 --> 00:51:28,340  
and racism that they still lead to a

1185  
00:51:33,220 --> 00:51:30,350  
more positive outcome in the long run

1186  
00:51:35,320 --> 00:51:33,230  
but in the short-term causes way more

1187  
00:51:37,120 --> 00:51:35,330  
polarization that's exactly what would

1188  
00:51:38,440 --> 00:51:37,130

happen if tomorrow government came out

1189

00:51:41,140 --> 00:51:38,450

and said hey everybody aliens are real

1190

00:51:45,070 --> 00:51:41,150

there would be first short term very

1191

00:51:46,930 --> 00:51:45,080

very negative things riots etc but in

1192

00:51:48,760 --> 00:51:46,940

the long term it's the for the best of

1193

00:51:50,530 --> 00:51:48,770

humanity I think I think it's worse the

1194

00:51:52,990 --> 00:51:50,540

longer we keep it because then I'll be

1195

00:51:55,930 --> 00:51:53,000

like oh yeah we knew 75 years ago we

1196

00:51:58,530 --> 00:51:55,940

knew 105 years ago I would be angry I

1197

00:52:01,300 --> 00:51:58,540

would be pissed citizen and and

1198

00:52:04,180 --> 00:52:01,310

scientists so I think that's putting it

1199

00:52:08,770 --> 00:52:04,190

off if it's real putting off disclosure

1200

00:52:10,870 --> 00:52:08,780

in the end this is a bad bad gamble it's

1201

00:52:13,870 --> 00:52:10,880

a lot it's a bigger detriment in the

1202

00:52:16,060 --> 00:52:13,880

long term to everyone right um you know

1203

00:52:17,620 --> 00:52:16,070

I've often said of the show that you

1204

00:52:19,300 --> 00:52:17,630

know maybe the government knows

1205

00:52:22,000 --> 00:52:19,310

something is going on but doesn't know

1206

00:52:24,610 --> 00:52:22,010

really much more than we do but I do

1207

00:52:27,610 --> 00:52:24,620

want to just say one thing also along

1208

00:52:29,020 --> 00:52:27,620

the polarization of what you just said

1209

00:52:31,660 --> 00:52:29,030

about what we're going through there's

1210

00:52:33,400 --> 00:52:31,670

also some really you know mixed in with

1211

00:52:36,670 --> 00:52:33,410

that there's some wonderful acts of

1212

00:52:40,360 --> 00:52:36,680

human humanity out there as well yeah

1213

00:52:43,690 --> 00:52:40,370

you know you do see that and a lot so it

1214

00:52:46,540 --> 00:52:43,700

is mixed in but unfortunately you know I

1215

00:52:49,900 --> 00:52:46,550

don't know if the media focuses more on

1216

00:52:51,760 --> 00:52:49,910

I don't really know you know that's why

1217

00:52:53,740 --> 00:52:51,770

we see you know you're absolutely right

1218

00:52:57,250 --> 00:52:53,750

there are so many acts of kindness there

1219

00:53:01,210 --> 00:52:57,260

are our people who you know we've seen

1220

00:53:03,370 --> 00:53:01,220

where the police for example joining

1221

00:53:05,080 --> 00:53:03,380

with protesters as I'm saying look we're

1222

00:53:06,970 --> 00:53:05,090

not against you when your side will

1223

00:53:08,800 --> 00:53:06,980

reform it's good there are those

1224

00:53:11,080 --> 00:53:08,810

glimmers you're right but I think that

1225

00:53:13,660 --> 00:53:11,090

the media focuses on the negative

1226

00:53:15,610 --> 00:53:13,670

because it's a better story conflict

1227

00:53:18,550 --> 00:53:15,620

sells you're not going to have a

1228

00:53:19,780 --> 00:53:18,560

headline on the the New York Times it

1229

00:53:22,060 --> 00:53:19,790

says kittens

1230

00:53:24,300 --> 00:53:22,070

you know puppies or like you know you

1231

00:53:26,440 --> 00:53:24,310

don't write you don't write peace

1232

00:53:29,170 --> 00:53:26,450

exclamation point you write or

1233

00:53:31,570 --> 00:53:29,180

exclamation point and I've know and I've

1234

00:53:34,180 --> 00:53:31,580

said this to my wife for years right I I

1235

00:53:37,540 --> 00:53:34,190

hate that I hate that the news is always

1236

00:53:38,360 --> 00:53:37,550

bad I hate that because there's so much

1237

00:53:40,700 --> 00:53:38,370

good in the world

1238

00:53:44,870 --> 00:53:40,710

- you're right it's mixed in and it's

1239

00:53:46,910 --> 00:53:44,880

hidden but in in the 21st century we

1240

00:53:50,120 --> 00:53:46,920

have YouTube we have more independent

1241

00:53:54,710 --> 00:53:50,130

media when I was a child you watch CBS

1242

00:53:55,430 --> 00:53:54,720

NBC ABC fox write CNN those are your

1243

00:53:57,100 --> 00:53:55,440

options

1244

00:53:59,720 --> 00:53:57,110

yeah but now we have more and more

1245

00:54:02,450 --> 00:53:59,730

independent and I think that that a

1246

00:54:05,930 --> 00:54:02,460

plurality of perspectives is good it

1247

00:54:08,930 --> 00:54:05,940

keeps us honest with ourselves yeah yeah

1248

00:54:12,440 --> 00:54:08,940

we're going into a break and writing

1249

00:54:14,090 --> 00:54:12,450

about yeah just about one minute so I

1250

00:54:15,200 --> 00:54:14,100

just want to I don't know if you can

1251

00:54:17,900 --> 00:54:15,210

make it assist quickly

1252

00:54:20,630 --> 00:54:17,910

I heard you mentioned earlier something

1253

00:54:22,550 --> 00:54:20,640

along the lines were maybe in my

1254

00:54:24,590 --> 00:54:22,560

lifetime not knowing about dark matter

1255

00:54:26,900 --> 00:54:24,600

do you think you will know again we only

1256

00:54:28,460 --> 00:54:26,910

have a minute here do you think in your

1257

00:54:31,550 --> 00:54:28,470

lifetime you will know what dark matter

1258

00:54:32,930 --> 00:54:31,560

is in my opinion yes yes but it's gonna

1259

00:54:34,490 --> 00:54:32,940

take longer than we think everyone's

1260

00:54:36,740 --> 00:54:34,500

always quoting five or ten years I think

1261

00:54:39,350 --> 00:54:36,750

those are way too optimistic so I think

1262

00:54:41,090 --> 00:54:39,360

we're still decades away but I feel it's

1263

00:54:42,980 --> 00:54:41,100

this is an opinion it's not a scientific

1264

00:54:45,170 --> 00:54:42,990

statement in my opinion we're gonna get

1265

00:54:48,920 --> 00:54:45,180

there by in within my lifetime Wow

1266

00:54:50,570 --> 00:54:48,930

excellent well all right so we are going

1267

00:54:53,060 --> 00:54:50,580

to head right into the break right now

1268

00:54:54,380 --> 00:54:53,070

so everyone hang in there and for those

1269

00:54:56,870 --> 00:54:54,390

of you in youtube you're gonna have to

1270

00:55:01,070 --> 00:54:56,880

put up with my commercial and thank you

1271

00:55:03,650 --> 00:55:01,080

and we'll be right back hello everyone

1272

00:55:06,050 --> 00:55:03,660

well this is another podcast commercial

1273

00:55:08,090 --> 00:55:06,060

I hope it's better than just dead

1274

00:55:10,820 --> 00:55:08,100

silence this is for a course of people

1275

00:55:14,270 --> 00:55:10,830

over at YouTube and now over at Facebook

1276

00:55:16,550 --> 00:55:14,280

as well so I'm painting away as I've

1277

00:55:19,010 --> 00:55:16,560

mentioned many other times since I'm not

1278

00:55:21,890 --> 00:55:19,020

working and I'm gonna show you a couple

1279

00:55:26,330 --> 00:55:21,900

things here first of all I have to say

1280

00:55:31,190 --> 00:55:26,340

that I was pretty happy because I I did

1281

00:55:34,850 --> 00:55:31,200

this this artwork and in just one single

1282

00:55:35,750 --> 00:55:34,860

day I sold it so that was that was

1283

00:55:43,330 --> 00:55:35,760

pretty exciting

1284

00:55:47,240 --> 00:55:43,340

and last week I had shown an image of

1285

00:55:51,230 --> 00:55:47,250

what I had painted and that was the

1286

00:55:51,740 --> 00:55:51,240

winter triangle and guess what that sold

1287

00:55:56,630 --> 00:55:51,750

to

1288

00:55:58,280 --> 00:55:56,640

so I am selling I am selling some pieces

1289

00:56:01,820 --> 00:55:58,290

now I will tell you that I worked out a

1290

00:56:04,609 --> 00:56:01,830

really good deal and I'm actually very

1291

00:56:07,339 --> 00:56:04,619

willing to work out really good deals so

1292

00:56:11,120 --> 00:56:07,349

if there's something over there that you

1293

00:56:14,750 --> 00:56:11,130

like and that's over at Martin Willis

1294

00:56:16,339 --> 00:56:14,760

art comm go check that out if there's

1295

00:56:18,500 --> 00:56:16,349

something over there that you want and

1296

00:56:22,300 --> 00:56:18,510

you are looking for even more than 50%

1297

00:56:27,410 --> 00:56:22,310

off because that's what happens if you

1298

00:56:30,589 --> 00:56:27,420

actually enter the code UFO so if you

1299

00:56:33,020 --> 00:56:30,599

enter that code UFO on checkout you will

1300

00:56:35,630 --> 00:56:33,030

get 50% off showing you a couple things

1301

00:56:38,120 --> 00:56:35,640

that I'm doing now pictures aren't

1302

00:56:40,790 --> 00:56:38,130

exactly straight here but what that just

1303

00:56:41,930 --> 00:56:40,800

went by so I started doing a little bit

1304

00:56:43,940 --> 00:56:41,940

what's called trompe l'oeil

1305

00:56:46,520 --> 00:56:43,950

which means it kind of fools the eye

1306

00:56:48,170 --> 00:56:46,530

that's French for fooling the eye I'll

1307

00:56:51,740 --> 00:56:48,180

get back to that this is a landscape I

1308

00:56:54,530 --> 00:56:51,750

did last week and here are some of the

1309

00:56:57,170 --> 00:56:54,540

UFO paintings that I have lapped I'll

1310

00:56:59,030 --> 00:56:57,180

work a great deal with you I have a

1311

00:57:01,609 --> 00:56:59,040

couple more in the works probably not

1312

00:57:03,410 --> 00:57:01,619

going to do any more after that unless

1313

00:57:05,960 --> 00:57:03,420

someone wants something in particular

1314

00:57:07,579 --> 00:57:05,970

and if you do want something in

1315

00:57:10,790 --> 00:57:07,589

particular it's very easy all you have

1316

00:57:12,620 --> 00:57:10,800

to do is just tell me what it is and I

1317

00:57:15,440 --> 00:57:12,630

will try to work that I also did this

1318

00:57:18,020 --> 00:57:15,450

this lighthouse piece next week well

1319

00:57:20,210 --> 00:57:18,030

here are the trompe l'oeil that i did

1320

00:57:24,470 --> 00:57:20,220

the crystal ball a larger crystal ball

1321

00:57:26,420 --> 00:57:24,480

and anyway I think yeah and then there

1322

00:57:29,930 --> 00:57:26,430

are two this one is already gone it's

1323

00:57:31,970 --> 00:57:29,940

already sold and anyway I just want to

1324

00:57:35,030 --> 00:57:31,980

thank everyone for paying attention and

1325

00:57:40,700 --> 00:57:35,040

remember to go to Martin Willis art calm

1326

00:57:43,849 --> 00:57:40,710

and one other thing besides the UFO code

1327

00:57:46,760 --> 00:57:43,859

for 50% off I have a kind of a hidden

1328

00:57:49,490 --> 00:57:46,770

link it's not on my website it's only in

1329

00:57:52,370 --> 00:57:49,500

the show notes and also in the notes

1330

00:57:56,510 --> 00:57:52,380

below on youtube and that is a link

1331

00:57:58,040 --> 00:57:56,520

directly to just UFO paintings and so if

1332

00:58:01,849 --> 00:57:58,050

there's something there you want please

1333

00:58:05,270 --> 00:58:01,859

do contact me have Martin at podcast UFO

1334

00:58:08,210 --> 00:58:05,280

calm and we will work out a deal because

1335

00:58:11,120 --> 00:58:08,220

it's what I am looking to do is I need

1336

00:58:12,080 --> 00:58:11,130

to paint I love painting it really

1337

00:58:14,900 --> 00:58:12,090

relaxes me

1338

00:58:17,180 --> 00:58:14,910

and but I can't paint unless I get rid

1339

00:58:19,870 --> 00:58:17,190

of some of the paintings sell them so

1340

00:58:23,090 --> 00:58:19,880

anyway I hope you enjoyed this little

1341

00:58:29,070 --> 00:58:23,100

infomercial and we'll be back in a few

1342

00:58:36,940 --> 00:58:33,700

in three two one go

1343

00:58:40,150 --> 00:58:36,950

alright welcome back my name is martin

1344

00:58:43,750 --> 00:58:40,160

willis and my guest this evening is

1345

00:58:46,510 --> 00:58:43,760

matthew shah dogus and i hope I'm saying

1346

00:58:48,700 --> 00:58:46,520

that right Matthew is that close you're

1347

00:58:51,010 --> 00:58:48,710

doing extraordinarily well actually I

1348

00:58:53,170 --> 00:58:51,020

know that sincerely yeah you're you got

1349

00:58:54,760 --> 00:58:53,180

it yeah awesome

1350

00:59:02,230 --> 00:58:54,770

well that's great how long would take

1351  
00:59:04,590 --> 00:59:02,240  
you to learn that yeah anyway so I've

1352  
00:59:08,560 --> 00:59:04,600  
been really enjoying this conversation

1353  
00:59:10,300 --> 00:59:08,570  
immensely and you know there's just so

1354  
00:59:13,420 --> 00:59:10,310  
many question now we're basically

1355  
00:59:19,000 --> 00:59:13,430  
talking about intelligent life so we'll

1356  
00:59:21,160 --> 00:59:19,010  
get back to that and so the James Webb I

1357  
00:59:26,740 --> 00:59:21,170  
actually got to see the James Webb I was

1358  
00:59:29,650 --> 00:59:26,750  
at the NASA down in Baltimore Goddard

1359  
00:59:31,240 --> 00:59:29,660  
Space Center and saw people working on

1360  
00:59:33,070 --> 00:59:31,250  
it was great they were in these it was

1361  
00:59:36,370 --> 00:59:33,080  
in a still sterile room and they were in

1362  
00:59:39,940 --> 00:59:36,380  
you know white suits and working on this

1363  
00:59:41,859 --> 00:59:39,950

thing so many years go by that they're

1364

00:59:43,240 --> 00:59:41,869

working on this thing to make something

1365

00:59:45,190 --> 00:59:43,250

really special now I remember when the

1366

00:59:47,320 --> 00:59:45,200

Hubble went up they had to replace the

1367

00:59:49,510 --> 00:59:47,330

lens or something or a mirror or I can't

1368

00:59:51,160 --> 00:59:49,520

remember what it was but this this

1369

00:59:54,430 --> 00:59:51,170

should be good to go when it actually

1370

00:59:58,720 --> 00:59:54,440

goes and what what do we expect that

1371

01:00:02,349 --> 00:59:58,730

we're gonna learn from from this oh it's

1372

01:00:04,330 --> 01:00:02,359

it's gonna be a vast amount it's gonna

1373

01:00:06,160 --> 01:00:04,340

because better it's you know successors

1374

01:00:09,340 --> 01:00:06,170

or the Hubble Space Telescope but so

1375

01:00:11,170 --> 01:00:09,350

much more if I'm not mistaken I think

1376

01:00:13,030 --> 01:00:11,180

it'll also be able to look for

1377

01:00:15,760 --> 01:00:13,040

exoplanets continue the search for

1378

01:00:17,260 --> 01:00:15,770

exoplanets so the amount of astronomy

1379

01:00:19,660 --> 01:00:17,270

you must science you'll be able to do

1380

01:00:22,060 --> 01:00:19,670

will be immense it spreads the amount of

1381

01:00:23,740 --> 01:00:22,070

science will be able to be across many

1382

01:00:26,830 --> 01:00:23,750

different parts of astronomy and

1383

01:00:27,970 --> 01:00:26,840

cosmology so you know going back to my

1384

01:00:29,770 --> 01:00:27,980

reference you know the Hubble Space

1385

01:00:31,990 --> 01:00:29,780

Telescope right there that we think

1386

01:00:33,550 --> 01:00:32,000

about the pretty pictures right but it's

1387

01:00:37,120 --> 01:00:33,560

way more than just about pretty pictures

1388

01:00:39,849 --> 01:00:37,130

about doing really good science you know

1389

01:00:42,190 --> 01:00:39,859

seeing into the depths of the the

1390

01:00:44,380 --> 01:00:42,200

furthest reaches of the visible you

1391

01:00:46,540 --> 01:00:44,390

yeah I just want to I just want to

1392

01:00:47,950 --> 01:00:46,550

address this quick question here

1393

01:00:49,720 --> 01:00:47,960

Martin's trying to get out of the

1394

01:00:50,260 --> 01:00:49,730

podcast UFO I know he's probably just

1395

01:00:53,710 --> 01:00:50,270

joking

1396

01:00:57,010 --> 01:00:53,720

but I am painting because first of all

1397

01:00:59,920 --> 01:00:57,020

I'm not working and I used to paint they

1398

01:01:02,050 --> 01:00:59,930

used to be my job to paint and and

1399

01:01:04,180 --> 01:01:02,060

that's how I survived for at least three

1400

01:01:04,600 --> 01:01:04,190

years of my life and that's all I'm

1401

01:01:07,180 --> 01:01:04,610

doing

1402

01:01:08,440 --> 01:01:07,190

I it's a passion of mine and there's no

1403

01:01:10,420 --> 01:01:08,450

way that I'm looking to get out of

1404

01:01:12,160 --> 01:01:10,430

podcast UFO I've been doing this show

1405

01:01:15,160 --> 01:01:12,170

it's coming up on nine years in just a

1406

01:01:16,930 --> 01:01:15,170

couple months I love the topic I and I

1407

01:01:19,570 --> 01:01:16,940

love speaking to people like I am

1408

01:01:21,640 --> 01:01:19,580

tonight so I'm not going anywhere

1409

01:01:24,550 --> 01:01:21,650

I'm just painting that's all there is to

1410

01:01:27,120 --> 01:01:24,560

it seems like everything turns into a

1411

01:01:27,130 --> 01:01:34,320

yeah so do you

1412

01:01:39,970 --> 01:01:37,270

information that we could get from the

1413

01:01:42,220 --> 01:01:39,980

James Webb Space Telescope that's going

1414

01:01:46,560 --> 01:01:42,230

to tell us that there's an in life of

1415

01:01:50,500 --> 01:01:46,570

sometime a some type on by seeing a

1416

01:01:52,150 --> 01:01:50,510

planet not a planet directly but the

1417

01:01:57,670 --> 01:01:52,160

gases from a planet or something like

1418

01:02:02,200 --> 01:01:57,680

that so yeah atmospheric studies of

1419

01:02:05,770 --> 01:02:02,210

exoplanets is a really exciting new

1420

01:02:07,750 --> 01:02:05,780

future direction about but we have to be

1421

01:02:11,500 --> 01:02:07,760

so one thing you have to be careful of

1422

01:02:13,090 --> 01:02:11,510

is that even if we were if we detect the

1423

01:02:16,890 --> 01:02:13,100

you know so-called

1424

01:02:18,910 --> 01:02:16,900

right molecules or gases for life that

1425

01:02:21,640 --> 01:02:18,920

everything always has multiple

1426

01:02:25,450 --> 01:02:21,650

explanations so for example a planet

1427

01:02:28,030 --> 01:02:25,460

could be habitable but empty or it could

1428

01:02:30,490 --> 01:02:28,040

be inhabited we have evidence from the

1429

01:02:32,320 --> 01:02:30,500

atmosphere that there are life-forms

1430

01:02:35,350 --> 01:02:32,330

carbon-based life forms like us you know

1431

01:02:37,450 --> 01:02:35,360

but they're not necessarily intelligent

1432

01:02:40,150 --> 01:02:37,460

right could be plants and animals and so

1433

01:02:42,550 --> 01:02:40,160

we will know we will know a lot it'll be

1434

01:02:43,870 --> 01:02:42,560

exciting but we also have to be careful

1435

01:02:46,570 --> 01:02:43,880

that we're still not going to know as

1436

01:02:48,490 --> 01:02:46,580

much as we might like that we still

1437

01:02:51,730 --> 01:02:48,500

don't have you know a star trek level of

1438

01:02:55,410 --> 01:02:51,740

you know sensors of to remotely detect

1439

01:02:58,620 --> 01:02:55,420

things well so it will be nevertheless

1440

01:03:03,750 --> 01:02:58,630

extremely exciting if we are able to

1441

01:03:06,930 --> 01:03:03,760

detect and study not just the sizes and

1442

01:03:09,630 --> 01:03:06,940

orbits of extrasolar planets but also

1443

01:03:12,450 --> 01:03:09,640

their atmospheres so but but it'll still

1444

01:03:15,270 --> 01:03:12,460

be then it'll still be a tough sell a

1445

01:03:18,240 --> 01:03:15,280

tough leap to go from look we detected

1446

01:03:19,950 --> 01:03:18,250

all or the all these organic molecules

1447

01:03:22,280 --> 01:03:19,960

are clearly in the atmosphere of this

1448

01:03:24,990 --> 01:03:22,290

planet there's still there's still

1449

01:03:28,020 --> 01:03:25,000

another conceptual leap to connect the

1450

01:03:29,130 --> 01:03:28,030

dot from that to saying there life there

1451

01:03:31,890 --> 01:03:29,140

are life forms there and then another

1452

01:03:34,470 --> 01:03:31,900

leaf to say they're intelligent life

1453

01:03:37,349 --> 01:03:34,480

forms I'm still very excited of course

1454

01:03:39,630 --> 01:03:37,359

and very optimistic about the future of

1455

01:03:41,609 --> 01:03:39,640

astronomy especially in extrasolar

1456

01:03:44,970 --> 01:03:41,619

planetary research which as you know my

1457

01:03:49,319 --> 01:03:44,980

friend Kevin uses is a is a is a leading

1458

01:03:52,650 --> 01:03:49,329

expert in yeah yeah I think you know

1459

01:03:55,440 --> 01:03:52,660

we're it's just it's an exciting future

1460

01:03:57,559 --> 01:03:55,450

and then like to say if we did detect

1461

01:04:00,599 --> 01:03:57,569

something what would be our next step

1462

01:04:02,789 --> 01:04:00,609

you know like if we if we found

1463

01:04:04,380 --> 01:04:02,799

something that's it's possible that it's

1464

01:04:08,670 --> 01:04:04,390

intelligent life say they have

1465

01:04:10,289 --> 01:04:08,680

pollutants or whatever yeah well that's

1466

01:04:13,170 --> 01:04:10,299

a great question the next step is very

1467

01:04:15,120 --> 01:04:13,180

challenging because it again it depends

1468

01:04:17,760 --> 01:04:15,130

on distances right going back to your

1469

01:04:20,190 --> 01:04:17,770

ballpoint pen from earlier and DC the

1470

01:04:24,420 --> 01:04:20,200

problem is the speed of light the

1471

01:04:30,750 --> 01:04:24,430

problem is is if we detected let's say

1472

01:04:34,349 --> 01:04:30,760

um fairly strong evidence of intelligent

1473

01:04:37,289 --> 01:04:34,359

life 20 light years away if if we said

1474

01:04:39,780 --> 01:04:37,299

hello we take 20 years to get there and

1475

01:04:43,859 --> 01:04:39,790

20 years for response that's 40 years I

1476

01:04:44,789 --> 01:04:43,869

like how in the movie passengers they

1477

01:04:46,530 --> 01:04:44,799

got this right

1478

01:04:48,630 --> 01:04:46,540

rare science fellow yeah that's a great

1479

01:04:52,020 --> 01:04:48,640

day remember they're like tech support

1480

01:04:57,319 --> 01:04:52,030

we'll be back will will answer you in 17

1481

01:05:01,049 --> 01:04:57,329

years and and that's a very fundamental

1482

01:05:02,400 --> 01:05:01,059

it's a very fundamental limitation you

1483

01:05:05,339 --> 01:05:02,410

know it's all fun to speculate about

1484

01:05:07,540 --> 01:05:05,349

faster than light but every exception to

1485

01:05:10,150 --> 01:05:07,550

the speed of light we know about

1486

01:05:11,590 --> 01:05:10,160

the big catches no information can be

1487

01:05:14,440 --> 01:05:11,600

transferred faster than speed of light

1488

01:05:16,170 --> 01:05:14,450

so it's very very unlikely we will ever

1489

01:05:19,120 --> 01:05:16,180

have faster-than-light communication

1490

01:05:21,610 --> 01:05:19,130

that would be wonderful but it's very

1491

01:05:24,760 --> 01:05:21,620

unlikely so the next step would be very

1492

01:05:26,500 --> 01:05:24,770

tricky um depending on the distance

1493

01:05:28,870 --> 01:05:26,510

maybe what we would want to do I know I

1494

01:05:31,360 --> 01:05:28,880

think I've heard NASA's Kieron plans to

1495

01:05:33,880 --> 01:05:31,370

maybe send a very small spacecraft to

1496

01:05:37,690 --> 01:05:33,890

Alpha Centauri in 50 years or something

1497

01:05:40,060 --> 01:05:37,700

so if something is close enough to where

1498

01:05:42,820 --> 01:05:40,070

we could send some very tiny craft to

1499

01:05:46,750 --> 01:05:42,830

check it out I think that a logical next

1500

01:05:49,390 --> 01:05:46,760

step might be go take a picture rather

1501  
01:05:53,290 --> 01:05:49,400  
than try to send a signal you know send

1502  
01:05:54,940 --> 01:05:53,300  
a very tiny probe that you know again we

1503  
01:05:56,080 --> 01:05:54,950  
don't have the technology to do this yet

1504  
01:05:58,720 --> 01:05:56,090  
but we're getting there and I'm

1505  
01:06:01,240 --> 01:05:58,730  
confident we will that we have some sort

1506  
01:06:03,220 --> 01:06:01,250  
of tiny little robot probe that goes and

1507  
01:06:05,650 --> 01:06:03,230  
snaps a picture with enough resolution

1508  
01:06:09,010 --> 01:06:05,660  
obviously to see a of their cities on

1509  
01:06:10,420 --> 01:06:09,020  
the surface I think that especially also

1510  
01:06:12,550 --> 01:06:10,430  
given how cautious

1511  
01:06:14,680 --> 01:06:12,560  
you know humanity would be that's way

1512  
01:06:16,720 --> 01:06:14,690  
more likely so if you were looking if

1513  
01:06:18,460 --> 01:06:16,730

you were looking for me to say oh we

1514

01:06:20,410 --> 01:06:18,470

turn on the radio and try to say hello

1515

01:06:22,240 --> 01:06:20,420

that's unlikely for so many reasons

1516

01:06:25,240 --> 01:06:22,250

speed of light and also we'd also be

1517

01:06:27,160 --> 01:06:25,250

very cautious well what about you know

1518

01:06:31,210 --> 01:06:27,170

this is probably totally unrelated but

1519

01:06:34,720 --> 01:06:31,220

possibly I think it's called quantum

1520

01:06:36,850 --> 01:06:34,730

entanglement you did how did you know

1521

01:06:39,070 --> 01:06:36,860

because that is everyone always says

1522

01:06:41,530 --> 01:06:39,080

whenever I say no information travels

1523

01:06:44,380 --> 01:06:41,540

faster the speed of light before 10

1524

01:06:47,050 --> 01:06:44,390

seconds go by someone goes what about

1525

01:06:48,220 --> 01:06:47,060

quantum entanglement so but no I'm glad

1526

01:06:49,870 --> 01:06:48,230

you brought us out a little bit late

1527

01:06:51,880 --> 01:06:49,880

because no I want to put that to bed

1528

01:06:55,450 --> 01:06:51,890

once and for all

1529

01:06:58,510 --> 01:06:55,460

ok quantum entanglement is really

1530

01:07:02,740 --> 01:06:58,520

awesome really creepy and really weird

1531

01:07:05,080 --> 01:07:02,750

really cool however it's still not gonna

1532

01:07:07,630 --> 01:07:05,090

help you with communication the way

1533

01:07:09,970 --> 01:07:07,640

quantum entanglement works and so in

1534

01:07:13,030 --> 01:07:09,980

this case I enstein gets the last laugh

1535

01:07:15,340 --> 01:07:13,040

again because yes it looks like

1536

01:07:17,530 --> 01:07:15,350

information is being conveyed faster

1537

01:07:21,220 --> 01:07:17,540

than the speed of light instantaneously

1538

01:07:23,020 --> 01:07:21,230

in fact however big catch

1539

01:07:24,550 --> 01:07:23,030

so the way quantum entanglement works is

1540

01:07:26,380 --> 01:07:24,560

us I have two new particles and they are

1541

01:07:28,780 --> 01:07:26,390

spin caught their entangled where if

1542

01:07:30,490 --> 01:07:28,790

want to spin up the other spin down that

1543

01:07:32,440 --> 01:07:30,500

means that even if they're separated by

1544

01:07:34,240 --> 01:07:32,450

you know kilometers if I measure one is

1545

01:07:36,220 --> 01:07:34,250

spin up and this one's kilometres

1546

01:07:37,810 --> 01:07:36,230

light-years away it's spin down right

1547

01:07:41,260 --> 01:07:37,820

away it's gotta be that one spin up that

1548

01:07:41,980 --> 01:07:41,270

one spin down unfortunately you don't

1549

01:07:45,100 --> 01:07:41,990

know which

1550

01:07:46,630 --> 01:07:45,110

so basically quantum entanglement uses

1551

01:07:50,140 --> 01:07:46,640

for communication imagine a

1552

01:07:52,180 --> 01:07:50,150

communication system where you didn't

1553

01:07:54,880 --> 01:07:52,190

know the difference between 0 and 1

1554

01:07:57,580 --> 01:07:54,890

right it was binary or yes and no it's

1555

01:08:00,070 --> 01:07:57,590

completely useless for communication you

1556

01:08:02,470 --> 01:08:00,080

can you can transfer garbage information

1557

01:08:05,920 --> 01:08:02,480

random information you cannot use

1558

01:08:08,620 --> 01:08:05,930

quantum entanglement to convey you

1559

01:08:10,840 --> 01:08:08,630

useful information faster than the speed

1560

01:08:13,360 --> 01:08:10,850

of light not with our current

1561

01:08:14,980 --> 01:08:13,370

understanding of physics and as I said

1562

01:08:16,990 --> 01:08:14,990

earlier even though we still have a lot

1563

01:08:18,400 --> 01:08:17,000

to learn our current understanding on

1564

01:08:21,220 --> 01:08:18,410

the little bit we do know is pretty

1565

01:08:23,590 --> 01:08:21,230

solid so I hate to - those hopes because

1566

01:08:25,080 --> 01:08:23,600

trust me I would love to have you know

1567

01:08:28,480 --> 01:08:25,090

what's it's called in science fiction

1568

01:08:30,370 --> 01:08:28,490

for Ursula win and ansible write a radio

1569

01:08:32,440 --> 01:08:30,380

that's just instantaneous faster than

1570

01:08:36,220 --> 01:08:32,450

light that'll be great it's extremely

1571

01:08:37,630 --> 01:08:36,230

unlikely and even if it is workable it's

1572

01:08:39,370 --> 01:08:37,640

probably something else that we haven't

1573

01:08:41,950 --> 01:08:39,380

imagined yet has nothing to do with

1574

01:08:43,720 --> 01:08:41,960

quantum entanglement is not gonna help

1575

01:08:45,910 --> 01:08:43,730

you this is like the Einstein gets the

1576

01:08:48,160 --> 01:08:45,920

last laugh because yeah it looks like

1577

01:08:50,440 --> 01:08:48,170

information is transferred faster than

1578

01:08:52,900 --> 01:08:50,450

light it's garbage because it's random

1579

01:08:54,970 --> 01:08:52,910

it's spin up or spin down but you don't

1580

01:08:56,800 --> 01:08:54,980

know beforehand which ones up and which

1581

01:08:59,110 --> 01:08:56,810

ones down so in the end it's it's it's

1582

01:09:01,030 --> 01:08:59,120

useless information it's like imagine a

1583

01:09:03,280 --> 01:09:01,040

Morse code where all the letters were

1584

01:09:06,220 --> 01:09:03,290

the same or random right it's useless

1585

01:09:09,100 --> 01:09:06,230

yeah what about you here every now and

1586

01:09:11,590 --> 01:09:09,110

then and and science or comes out

1587

01:09:13,720 --> 01:09:11,600

somewhere that um they think there can

1588

01:09:16,480 --> 01:09:13,730

be speeds faster than the speed of light

1589

01:09:18,760 --> 01:09:16,490

is you ever look into any of that I mean

1590

01:09:21,880 --> 01:09:18,770

is that is that a possibility yeah it

1591

01:09:23,530 --> 01:09:21,890

always gets shot down either either one

1592

01:09:25,180 --> 01:09:23,540

either one it's a mistake

1593

01:09:26,680 --> 01:09:25,190

like when we thought we'd discovered

1594

01:09:29,470 --> 01:09:26,690

faster than light neutrinos it was a

1595

01:09:33,410 --> 01:09:29,480

loose cable so either it's just it's a

1596

01:09:36,229 --> 01:09:33,420

mistake or if it's correct and

1597

01:09:38,990 --> 01:09:36,239

drue and good science and then when you

1598

01:09:41,329 --> 01:09:39,000

read the paper the scientific paper not

1599

01:09:43,370 --> 01:09:41,339

the popular press article would you go

1600

01:09:45,769 --> 01:09:43,380

dig in the scientific paper you'll find

1601  
01:09:47,780 --> 01:09:45,779  
that the catch I just told you is right

1602  
01:09:49,220 --> 01:09:47,790  
there like oh but you can't convey

1603  
01:09:51,380 --> 01:09:49,230  
information faster than the speed of

1604  
01:09:53,720 --> 01:09:51,390  
light so what's a hack so those are the

1605  
01:09:57,260 --> 01:09:53,730  
two options for everything I've seen in

1606  
01:10:00,140 --> 01:09:57,270  
this category option one is always it's

1607  
01:10:04,010 --> 01:10:00,150  
just bad it's wrong it's bad science is

1608  
01:10:06,890 --> 01:10:04,020  
incorrect or the other option is it's

1609  
01:10:09,470 --> 01:10:06,900  
correct but it's hyped up in the media

1610  
01:10:11,930 --> 01:10:09,480  
and if you look at the truth the truth

1611  
01:10:14,180 --> 01:10:11,940  
is far less exciting now that being said

1612  
01:10:15,350 --> 01:10:14,190  
I should emphasize that you don't need

1613  
01:10:16,939 --> 01:10:15,360

faster-than-light to explore the

1614

01:10:18,560 --> 01:10:16,949

universe remember that the time dilation

1615

01:10:20,900 --> 01:10:18,570

that I mentioned earlier I mentioned

1616

01:10:22,970 --> 01:10:20,910

this in my OSEM is you talk I always

1617

01:10:25,370 --> 01:10:22,980

give my students this problem for

1618

01:10:27,890 --> 01:10:25,380

homework is you know you can reach the

1619

01:10:30,620 --> 01:10:27,900

end rahmatu galaxy which just two

1620

01:10:34,280 --> 01:10:30,630

million light do it in 50 years if you

1621

01:10:34,910 --> 01:10:34,290

traveled 0.1 m/s slower than the speed

1622

01:10:37,250 --> 01:10:34,920

of light

1623

01:10:39,320 --> 01:10:37,260

you don't need faster than light if you

1624

01:10:43,790 --> 01:10:39,330

can go arbitrarily close to the speed of

1625

01:10:45,380 --> 01:10:43,800

light 99.999999% you can go as far as

1626

01:10:48,140 --> 01:10:45,390

you want in the universe in a shorter

1627

01:10:51,740 --> 01:10:48,150

time period as you want so there's no

1628

01:10:53,209 --> 01:10:51,750

limit to exploring anywhere just because

1629

01:10:56,959 --> 01:10:53,219

you can't go faster than light it's a

1630

01:10:58,880 --> 01:10:56,969

huge huge mistake in science fiction to

1631

01:11:01,700 --> 01:10:58,890

be like oh you need faster than light to

1632

01:11:04,790 --> 01:11:01,710

go anywhere because the distances are so

1633

01:11:06,860 --> 01:11:04,800

big but the distances contract so just

1634

01:11:09,380 --> 01:11:06,870

like how time dilates so one another

1635

01:11:11,840 --> 01:11:09,390

relativistic effect is that the distance

1636

01:11:16,040 --> 01:11:11,850

appears to contract to the the traveler

1637

01:11:19,250 --> 01:11:16,050

so those distances contract as a space

1638

01:11:21,229 --> 01:11:19,260

time warps as you go near the speed of

1639

01:11:24,860 --> 01:11:21,239

light so going near the speed of light

1640

01:11:27,080 --> 01:11:24,870

is all you need to explore of the

1641

01:11:29,479 --> 01:11:27,090

universe you don't need any exotic

1642

01:11:31,310 --> 01:11:29,489

faster than light this and that it would

1643

01:11:33,260 --> 01:11:31,320

be more fun don't get me wrong because

1644

01:11:35,390 --> 01:11:33,270

if with faster than light you could be

1645

01:11:37,490 --> 01:11:35,400

back home for dinner with if you're less

1646

01:11:39,439 --> 01:11:37,500

if you're traveling just below the speed

1647

01:11:41,900 --> 01:11:39,449

of light and you do it I just did you go

1648

01:11:43,310 --> 01:11:41,910

to Andromeda in 50 years everyone on

1649

01:11:45,800 --> 01:11:43,320

earth is dead because it's been 2

1650

01:11:47,660 --> 01:11:45,810

million years have passed by on earth so

1651

01:11:49,939 --> 01:11:47,670

there is a downside definitely

1652

01:11:51,740 --> 01:11:49,949

not having faster than light but faster

1653

01:11:54,350 --> 01:11:51,750

than light so think of faster-than-light

1654

01:11:57,740 --> 01:11:54,360

is the cherry on top but it is

1655

01:12:00,979 --> 01:11:57,750

absolutely not a requirement for

1656

01:12:03,459 --> 01:12:00,989

interstellar travel being a reality yeah

1657

01:12:05,750 --> 01:12:03,469

I had someone on with the science of

1658

01:12:07,630 --> 01:12:05,760

very good science background real nice

1659

01:12:12,770 --> 01:12:07,640

guy and I can't remember exactly what

1660

01:12:16,490 --> 01:12:12,780

his his theory of travel had something

1661

01:12:18,590 --> 01:12:16,500

to do with space-time folding or you

1662

01:12:21,500 --> 01:12:18,600

know like coming together and folding

1663

01:12:23,030 --> 01:12:21,510

and going through it that way I really

1664

01:12:24,640 --> 01:12:23,040

am you know I'm kind of butchering what

1665

01:12:27,290 --> 01:12:24,650

he said but it was really fascinating

1666

01:12:29,720 --> 01:12:27,300

other other theories you know I know

1667

01:12:31,189 --> 01:12:29,730

there's the wormhole theory and and and

1668

01:12:33,680 --> 01:12:31,199

things like that what do you think about

1669

01:12:35,780 --> 01:12:33,690

all those different types of theories so

1670

01:12:39,080 --> 01:12:35,790

all a lot of them fall into the same

1671

01:12:40,189 --> 01:12:39,090

category which is they they they have

1672

01:12:42,320 --> 01:12:40,199

the same difficulty that

1673

01:12:44,570 --> 01:12:42,330

faster-than-light does which is it would

1674

01:12:46,550 --> 01:12:44,580

they would require negative energy we

1675

01:12:48,919 --> 01:12:46,560

don't know how to make that so you would

1676  
01:12:51,350 --> 01:12:48,929  
need some sort of substance that would

1677  
01:12:53,870 --> 01:12:51,360  
have an anti-gravitational like a fact

1678  
01:12:55,850 --> 01:12:53,880  
that could hold open like the throat of

1679  
01:12:58,189 --> 01:12:55,860  
the wormhole for example so all these

1680  
01:13:01,490 --> 01:12:58,199  
space folding and wormhole ideas they

1681  
01:13:04,760 --> 01:13:01,500  
all require something then and a lot of

1682  
01:13:08,330 --> 01:13:04,770  
it a lot of energy of a form of energy

1683  
01:13:10,760 --> 01:13:08,340  
that we not only have no evidence of we

1684  
01:13:13,310 --> 01:13:10,770  
don't even have a theory that says it

1685  
01:13:15,350 --> 01:13:13,320  
should exist and and not in large

1686  
01:13:17,180 --> 01:13:15,360  
quantities that are practically usable

1687  
01:13:19,939 --> 01:13:17,190  
so that's the catch is you need some

1688  
01:13:22,130 --> 01:13:19,949

sort of anti-gravity negative energy

1689

01:13:23,510 --> 01:13:22,140

type thing I mean in fact I have a

1690

01:13:26,060 --> 01:13:23,520

YouTube video on there so hopefully

1691

01:13:28,100 --> 01:13:26,070

people here's a shameless plug well you

1692

01:13:30,260 --> 01:13:28,110

had a commercial so I get to so I have a

1693

01:13:32,479 --> 01:13:30,270

youtube video about time travel where I

1694

01:13:34,610 --> 01:13:32,489

talk about time travel well my favorites

1695

01:13:36,050 --> 01:13:34,620

hi next question yeah I was actually my

1696

01:13:37,430 --> 01:13:36,060

next question but anyway go ahead please

1697

01:13:39,560 --> 01:13:37,440

yeah yeah no go ahead

1698

01:13:41,780 --> 01:13:39,570

yeah I just wanted to ask you and I do

1699

01:13:44,720 --> 01:13:41,790

want to get into you know the the

1700

01:13:46,070 --> 01:13:44,730

possibility of propulsion that you were

1701

01:13:49,010 --> 01:13:46,080

going to bring up in the zero-point

1702

01:13:51,050 --> 01:13:49,020

energy and all that stuff yeah I was

1703

01:13:53,300 --> 01:13:51,060

going to ask you and I was unfamiliar

1704

01:13:55,130 --> 01:13:53,310

with this if you ever looked into time

1705

01:13:58,640 --> 01:13:55,140

travel and what the possibility of that

1706

01:14:00,080 --> 01:13:58,650

is yeah I got a TEDx talk on it I got

1707

01:14:01,610 --> 01:14:00,090

this oh really in a video that hope

1708

01:14:05,570 --> 01:14:01,620

since my last name is

1709

01:14:07,130 --> 01:14:05,580

so unique if all your viewers have stuck

1710

01:14:09,380 --> 01:14:07,140

my name in they don't need the link

1711

01:14:11,270 --> 01:14:09,390

because my name is so unique just put in

1712

01:14:13,730 --> 01:14:11,280

Shaddaa his time travel and there's my

1713

01:14:15,830 --> 01:14:13,740

youtube video I'm really proud of it I

1714

01:14:18,140 --> 01:14:15,840

have currently more views the neil

1715

01:14:21,110 --> 01:14:18,150

degrasse tyson's video on the same topic

1716

01:14:23,780 --> 01:14:21,120

PBS space time i have more views than

1717

01:14:24,830 --> 01:14:23,790

Kip Thorne who's got to know bowties Wow

1718

01:14:30,890 --> 01:14:24,840

with his time

1719

01:14:32,360 --> 01:14:30,900

however I've not caught up yet with some

1720

01:14:35,510 --> 01:14:32,370

science have not caught up yet I think

1721

01:14:37,520 --> 01:14:35,520

Brian Cox but I've got I've got like

1722

01:14:39,740 --> 01:14:37,530

500,000 views but I hope to get it even

1723

01:14:42,200 --> 01:14:39,750

higher well I will tell you what I will

1724

01:14:43,460 --> 01:14:42,210

do is that so Brian yep no I'm just

1725

01:14:46,790 --> 01:14:43,470

gonna say I'll link that in the show

1726

01:14:48,410 --> 01:14:46,800

notes yep okay okay cool yeah Brian Cox

1727

01:14:51,800 --> 01:14:48,420

has a million I still gotta catch up to

1728

01:14:54,740 --> 01:14:51,810

him Wow

1729

01:14:59,690 --> 01:14:54,750

yeah and so your your thoughts in

1730

01:15:03,080 --> 01:14:59,700

general on that topic is it a one is an

1731

01:15:05,090 --> 01:15:03,090

omnidirectional one single direction so

1732

01:15:07,580 --> 01:15:05,100

yeah I'll give you I'll try to in order

1733

01:15:09,590 --> 01:15:07,590

to not stray too far into this very

1734

01:15:12,110 --> 01:15:09,600

different topic I'll try to give you my

1735

01:15:14,570 --> 01:15:12,120

most concise answer which is if you look

1736

01:15:19,070 --> 01:15:14,580

at my video basically my conclusion is

1737

01:15:22,400 --> 01:15:19,080

that it's extremely unlikely that people

1738

01:15:24,830 --> 01:15:22,410

or large-scale objects will ever be able

1739

01:15:27,220 --> 01:15:24,840

to time travel to the past like in

1740

01:15:29,210 --> 01:15:27,230

science fiction but maybe one day

1741

01:15:31,160 --> 01:15:29,220

communication will be possible to the

1742

01:15:32,360 --> 01:15:31,170

Past like a tiny fraction of a second or

1743

01:15:34,520 --> 01:15:32,370

something which would be revolutionary

1744

01:15:36,320 --> 01:15:34,530

in itself my colleagues think I'm too

1745

01:15:38,660 --> 01:15:36,330

optimistic when I said that which is

1746

01:15:41,300 --> 01:15:38,670

really ironic because most people say I

1747

01:15:43,580 --> 01:15:41,310

wasn't optimistic enough right what just

1748

01:15:46,070 --> 01:15:43,590

information a tiny fraction of a second

1749

01:15:47,750 --> 01:15:46,080

not people in a machine but but it ball

1750

01:15:49,970 --> 01:15:47,760

boils down to the ability to harness

1751

01:15:52,010 --> 01:15:49,980

negative energy which we don't know how

1752

01:15:53,990 --> 01:15:52,020

to do and that's what you need for time

1753

01:15:56,570 --> 01:15:54,000

travel to the past that's what you need

1754

01:15:59,000 --> 01:15:56,580

for FTL that's your need for wormholes

1755

01:16:01,730 --> 01:15:59,010

so all those awesome things all those

1756

01:16:05,300 --> 01:16:01,740

really fun things all require this

1757

01:16:07,340 --> 01:16:05,310

secret sauce of what's it so it goes by

1758

01:16:08,840 --> 01:16:07,350

many names it's also called exotic

1759

01:16:10,730 --> 01:16:08,850

matter has nothing to do with dark

1760

01:16:12,980 --> 01:16:10,740

matter or dark energy it's yet another

1761

01:16:15,320 --> 01:16:12,990

crazy term there's exotic exotic

1762

01:16:18,740 --> 01:16:15,330

material is another term for it

1763

01:16:21,530 --> 01:16:18,750

yeah FTL is faster than light right yes

1764

01:16:23,960 --> 01:16:21,540

yeah yeah sorry I slip into acronyms all

1765

01:16:25,490 --> 01:16:23,970

the time because is so my research for

1766

01:16:28,070 --> 01:16:25,500

dark matter is funded by the Department

1767

01:16:30,770 --> 01:16:28,080

of Energy the goe all they love their

1768

01:16:32,900 --> 01:16:30,780

TAS at the DOA there's the t2 oh and the

1769

01:16:36,020 --> 01:16:32,910

dissin and the cd4 and the like oh yeah

1770

01:16:39,620 --> 01:16:36,030

they love their acronyms that's pretty

1771

01:16:42,950 --> 01:16:39,630

funny so I want to go into the

1772

01:16:45,140 --> 01:16:42,960

zero-point energy in in about 15 minutes

1773

01:16:46,730 --> 01:16:45,150

or so we're going to take calls I know

1774

01:16:50,930 --> 01:16:46,740

there's a lot of questions been popping

1775

01:16:52,730 --> 01:16:50,940

in this is the arrow point energy a lot

1776

01:16:54,800 --> 01:16:52,740

of people get that wrong and it's been

1777

01:16:57,950 --> 01:16:54,810

used in the UFO community can you

1778

01:17:01,160 --> 01:16:57,960

explain what the science scientific

1779

01:17:02,780 --> 01:17:01,170

explanation of that is please yes I will

1780

01:17:05,090 --> 01:17:02,790

do my very best because it is very

1781

01:17:08,570 --> 01:17:05,100

complicated so I want to try to explain

1782

01:17:10,640 --> 01:17:08,580

it in reasonable terms because I do want

1783

01:17:11,900 --> 01:17:10,650

your everyone in the audience of yours

1784

01:17:14,600 --> 01:17:11,910

to be able to understand so I'll do my

1785

01:17:17,390 --> 01:17:14,610

very best so the dark energy we

1786

01:17:18,890 --> 01:17:17,400

mentioned earlier is probably the same

1787

01:17:20,930 --> 01:17:18,900

thing I can't say it with certainty

1788

01:17:23,000 --> 01:17:20,940

because zero-point energy has to do with

1789

01:17:25,040 --> 01:17:23,010

particle physics dark Energy's astronomy

1790

01:17:27,830 --> 01:17:25,050

but it's our best guess that they're the

1791

01:17:30,020 --> 01:17:27,840

same thing and so what is your plan

1792

01:17:34,330 --> 01:17:30,030

energy so this so like you said this is

1793

01:17:37,580 --> 01:17:34,340

extremely poorly understood and

1794

01:17:40,310 --> 01:17:37,590

misunderstood and misused so the way it

1795

01:17:42,290 --> 01:17:40,320

works and and I should be very clear

1796

01:17:44,240 --> 01:17:42,300

that this isn't some wild-eyed

1797

01:17:46,520 --> 01:17:44,250

hypothesis this is scientific fact

1798

01:17:48,440 --> 01:17:46,530

because we can measure the effects of

1799

01:17:51,890 --> 01:17:48,450

what I'm about to describe to you there

1800

01:17:54,020 --> 01:17:51,900

are many experimental verifications of

1801

01:17:57,380 --> 01:17:54,030

this so what's your point energy is is

1802

01:17:59,540 --> 01:17:57,390

you have so imagine you have vacuum that

1803

01:18:01,790 --> 01:17:59,550

like but vacuum is not perfectly empty

1804

01:18:04,610 --> 01:18:01,800

even if you have a vacuum with no atoms

1805

01:18:08,450 --> 01:18:04,620

no protein loose protons even electrons

1806

01:18:10,280 --> 01:18:08,460

you have particle/anti-particle pairs

1807

01:18:12,740 --> 01:18:10,290

zipping in and out of existence so like

1808

01:18:15,950 --> 01:18:12,750

an electron anti electron proton and

1809

01:18:19,010 --> 01:18:15,960

proton balanced mm-hmm so you're saying

1810

01:18:21,070 --> 01:18:19,020

wow I didn't know that hairs yes so now

1811

01:18:24,410 --> 01:18:21,080

it's a it's a matter of debate though

1812

01:18:27,380 --> 01:18:24,420

whether the virtual particles I just

1813

01:18:28,600 --> 01:18:27,390

said are do they are they real in the

1814

01:18:30,910 --> 01:18:28,610

center they have an ant

1815

01:18:33,220 --> 01:18:30,920

logical you know existence or are they

1816

01:18:35,680 --> 01:18:33,230

just a handy mathematical tool for

1817

01:18:37,810 --> 01:18:35,690

calculation they do have experimentally

1818

01:18:40,090 --> 01:18:37,820

verifiable results though

1819

01:18:44,080 --> 01:18:40,100

so what zero point energy refers to is

1820

01:18:48,280 --> 01:18:44,090

that even the vacuum of space itself is

1821

01:18:49,330 --> 01:18:48,290

not completely empty it has energy it

1822

01:18:52,060 --> 01:18:49,340

has

1823

01:18:53,740 --> 01:18:52,070

you can borrow energy from the vacuum

1824

01:18:57,160 --> 01:18:53,750

you can produce particle-antiparticle

1825

01:18:59,410 --> 01:18:57,170

pairs now the thing is we don't know

1826

01:19:03,129 --> 01:18:59,420

with our current level of understanding

1827

01:19:06,430 --> 01:19:03,139

of science and technology we don't have

1828

01:19:08,859 --> 01:19:06,440

the faintest idea how to turn that into

1829

01:19:10,180 --> 01:19:08,869

something practical right how do we tap

1830

01:19:11,950 --> 01:19:10,190

into this zero point it you know it's

1831

01:19:13,479 --> 01:19:11,960

free energy it's everywhere and I

1832

01:19:15,700 --> 01:19:13,489

mentioned that it might be the same

1833

01:19:17,770 --> 01:19:15,710

thing as dark energy that's 70% of the

1834

01:19:19,450 --> 01:19:17,780

universe so isn't this everywhere can't

1835

01:19:22,300 --> 01:19:19,460

we use this to power everything and the

1836

01:19:25,180 --> 01:19:22,310

the key is we don't know because it's

1837

01:19:27,370 --> 01:19:25,190

it's such a small effect it's a very

1838

01:19:30,070 --> 01:19:27,380

large amount of hidden energy in the

1839

01:19:33,640 --> 01:19:30,080

universe on large scales but on small

1840

01:19:35,200 --> 01:19:33,650

scales it's a very very tiny effect so

1841

01:19:37,149 --> 01:19:35,210

something that always comes up

1842

01:19:38,590 --> 01:19:37,159

especially in the UFO community is the

1843

01:19:41,439 --> 01:19:38,600

Casimir effect this is one of the ways

1844

01:19:43,899 --> 01:19:41,449

we proves your point energy is not just

1845

01:19:46,780 --> 01:19:43,909

some crazy idea but actually has

1846

01:19:49,350 --> 01:19:46,790

experimental implications so in the

1847

01:19:52,899 --> 01:19:49,360

Casimir effect you have two metal plates

1848

01:19:55,479 --> 01:19:52,909

which in a vacuum a force may develop

1849

01:19:57,520 --> 01:19:55,489

between them even if they have zero zero

1850

01:19:59,890 --> 01:19:57,530

electric charge and you know nowadays we

1851  
01:20:02,379 --> 01:19:59,900  
can zero out to charge us something so

1852  
01:20:04,060 --> 01:20:02,389  
well we can count individual electrons

1853  
01:20:05,979 --> 01:20:04,070  
that's the level of technology we have

1854  
01:20:08,020 --> 01:20:05,989  
in my own dark matter experiment we

1855  
01:20:09,729 --> 01:20:08,030  
count electrons oh there's one that's

1856  
01:20:13,540 --> 01:20:09,739  
three electrons that's two that's the

1857  
01:20:16,240 --> 01:20:13,550  
level precision we have in the year 2020

1858  
01:20:18,189 --> 01:20:16,250  
and have for a while so we can we can do

1859  
01:20:20,770 --> 01:20:18,199  
this experiment with completely neutral

1860  
01:20:22,300 --> 01:20:20,780  
plates not a single extra electron which

1861  
01:20:24,220 --> 01:20:22,310  
would mess up the result and what

1862  
01:20:25,709 --> 01:20:24,230  
happens is that an electric charge and a

1863  
01:20:28,600 --> 01:20:25,719

force develops between the plates

1864

01:20:31,030 --> 01:20:28,610

because of these virtual particles you

1865

01:20:33,370 --> 01:20:31,040

have virtual electrons anti electrons

1866

01:20:37,060 --> 01:20:33,380

but as I caution earlier there are

1867

01:20:39,339 --> 01:20:37,070

multiple ways to interpret that you can

1868

01:20:40,359 --> 01:20:39,349

say well virtual particles are virtual

1869

01:20:41,830 --> 01:20:40,369

right they're not real and they're just

1870

01:20:44,310 --> 01:20:41,840

a mathematical tool

1871

01:20:47,460 --> 01:20:44,320

but the consequence is the experimental

1872

01:20:50,860 --> 01:20:47,470

consequences of zero-point energy are

1873

01:20:52,360 --> 01:20:50,870

quite undisputably real the Casimir

1874

01:20:54,310 --> 01:20:52,370

effect experiment I mentioned this has

1875

01:20:56,740 --> 01:20:54,320

been done it was in the 90s it's been

1876  
01:20:59,410 --> 01:20:56,750  
done multiple times we're talking really

1877  
01:21:01,480 --> 01:20:59,420  
really tiny amounts of energy right so

1878  
01:21:03,760 --> 01:21:01,490  
if you're free battery on the zero-point

1879  
01:21:06,130 --> 01:21:03,770  
energy would really really suck right it

1880  
01:21:09,220 --> 01:21:06,140  
would power you know your laptop for you

1881  
01:21:12,550 --> 01:21:09,230  
know a tiny fraction of a second if at

1882  
01:21:15,580 --> 01:21:12,560  
all and and so we don't know how to take

1883  
01:21:17,650 --> 01:21:15,590  
that blow it up baby scale let's make it

1884  
01:21:19,690 --> 01:21:17,660  
practical right wormholes and all these

1885  
01:21:21,670 --> 01:21:19,700  
other things that require you know that

1886  
01:21:23,230 --> 01:21:21,680  
will we don't know how to take this

1887  
01:21:25,750 --> 01:21:23,240  
teeny tiny Casimir effect with

1888  
01:21:28,390 --> 01:21:25,760

zero-point energy how do we make it you

1889

01:21:31,090 --> 01:21:28,400

know grand scale and capitalise on it

1890

01:21:34,240 --> 01:21:31,100

for something propulsion power etc but

1891

01:21:37,930 --> 01:21:34,250

it's real zero-point energy is not a

1892

01:21:40,630 --> 01:21:37,940

crackpot term it is real science it's

1893

01:21:43,600 --> 01:21:40,640

just that people will sometimes jump to

1894

01:21:46,900 --> 01:21:43,610

conclusions on how easy it is to extract

1895

01:21:50,380 --> 01:21:46,910

extract it and make it practical do you

1896

01:21:53,050 --> 01:21:50,390

think that CERN will do some work

1897

01:21:56,940 --> 01:21:53,060

that'll point more into this direction

1898

01:21:59,680 --> 01:21:56,950

or I mean how or yeah go ahead I'm sorry

1899

01:22:02,380 --> 01:21:59,690

no so I think so didn't know that's a

1900

01:22:04,900 --> 01:22:02,390

really good question I I I don't I not

1901

01:22:07,690 --> 01:22:04,910

necessarily CERN the Large Hadron

1902

01:22:09,400 --> 01:22:07,700

Collider but there are the ways we're

1903

01:22:11,200 --> 01:22:09,410

exploring zero-point energy are very

1904

01:22:13,900 --> 01:22:11,210

different so we don't have we don't use

1905

01:22:16,630 --> 01:22:13,910

giant colliders we do there's two main

1906

01:22:17,290 --> 01:22:16,640

ways of exploring this and they're very

1907

01:22:20,710 --> 01:22:17,300

different

1908

01:22:22,660 --> 01:22:20,720

one is astronomy with telescopes which

1909

01:22:24,850 --> 01:22:22,670

sounds weird right I'm talking about you

1910

01:22:26,470 --> 01:22:24,860

know particles here and the reason why

1911

01:22:28,270 --> 01:22:26,480

is because remember we think dark energy

1912

01:22:30,670 --> 01:22:28,280

is the same thing and so the way we

1913

01:22:32,860 --> 01:22:30,680

study dark energy is using telescopes

1914

01:22:35,590 --> 01:22:32,870

and looking at the expanding universe on

1915

01:22:37,690 --> 01:22:35,600

the opposite end of that the way we look

1916

01:22:40,990 --> 01:22:37,700

at dark energy or try to study it is

1917

01:22:43,180 --> 01:22:41,000

there are some theories the dark energy

1918

01:22:45,040 --> 01:22:43,190

is a particle just like dark matter and

1919

01:22:47,800 --> 01:22:45,050

maybe we could measure it on the

1920

01:22:49,870 --> 01:22:47,810

tabletop so ya know Collider like it's

1921

01:22:52,530 --> 01:22:49,880

CERN isn't really not going to is not

1922

01:22:56,070 --> 01:22:52,540

the right tool for the job

1923

01:22:58,380 --> 01:22:56,080

as far as we know so our tools are

1924

01:23:00,600 --> 01:22:58,390

telescopes studying dark energy and then

1925

01:23:02,940 --> 01:23:00,610

we have tabletop experiments where we

1926

01:23:05,940 --> 01:23:02,950

are trying to look for new forces by

1927

01:23:09,150 --> 01:23:05,950

optically by levitating like micro

1928

01:23:12,840 --> 01:23:09,160

spheres of glass of quartz and then land

1929

01:23:14,700 --> 01:23:12,850

and making sure we you know account for

1930

01:23:16,380 --> 01:23:14,710

gravity and there's no electric force

1931

01:23:19,170 --> 01:23:16,390

because it's there's no magnetic field

1932

01:23:22,650 --> 01:23:19,180

and look for evidence of additional

1933

01:23:25,020 --> 01:23:22,660

hidden forces and so that's one way that

1934

01:23:29,370 --> 01:23:25,030

we that this problem is being tackled

1935

01:23:34,080 --> 01:23:29,380

and what is a how has gravitational

1936

01:23:37,380 --> 01:23:34,090

waves played into what you study great

1937

01:23:39,870 --> 01:23:37,390

question so it has played it does it has

1938

01:23:41,520 --> 01:23:39,880

played a part but only indirectly so I

1939

01:23:43,410 --> 01:23:41,530

have to connect that I want to connect

1940

01:23:45,090 --> 01:23:43,420

the intellectual dots because it's not a

1941

01:23:46,800 --> 01:23:45,100

direct it's not a direct connection so

1942

01:23:49,260 --> 01:23:46,810

grab what gravitational waves have done

1943

01:23:51,480 --> 01:23:49,270

is they've provided further confirmation

1944

01:23:52,520 --> 01:23:51,490

of Einstein's theory of general

1945

01:23:56,220 --> 01:23:52,530

relativity

1946

01:23:58,320 --> 01:23:56,230

therefore killing off many competing

1947

01:24:00,090 --> 01:23:58,330

ideas against dark matter saying oh we

1948

01:24:01,950 --> 01:24:00,100

just don't understand gravity if you

1949

01:24:04,170 --> 01:24:01,960

look not all but if you look at some of

1950

01:24:06,390 --> 01:24:04,180

the modified gravity ideas they would

1951

01:24:08,490 --> 01:24:06,400

predict either no gravitational waves or

1952

01:24:11,160 --> 01:24:08,500

a different form but gravitational waves

1953

01:24:13,050 --> 01:24:11,170

matched the relativistic prediction and

1954

01:24:15,300 --> 01:24:13,060

still do right it was multiple detection

1955

01:24:17,670 --> 01:24:15,310

Sligo still detecting today Virgo all

1956

01:24:19,200 --> 01:24:17,680

these new experiments so indirectly what

1957

01:24:21,780 --> 01:24:19,210

what the gravitational wave discovery

1958

01:24:29,730 --> 01:24:21,790

has done is said that relativity is

1959

01:24:34,740 --> 01:24:29,740

again very very solid making it very

1960

01:24:40,440 --> 01:24:34,750

very clear that it's very unlikely that

1961

01:24:42,360 --> 01:24:40,450

dark matter is is that dark is that dark

1962

01:24:44,670 --> 01:24:42,370

matter is wrong and that we just have to

1963

01:24:45,900 --> 01:24:44,680

modify gravity so does that make sense

1964

01:24:48,120 --> 01:24:45,910

so there's kind of the indirect

1965

01:24:50,340 --> 01:24:48,130

connection yeah I'm sorry I posted that

1966

01:24:52,320 --> 01:24:50,350

question up on the chata kind of threw

1967

01:24:55,230 --> 01:24:52,330

you off a little bit sorry i sorry

1968

01:24:57,690 --> 01:24:55,240

didn't lose your concentration yes thank

1969

01:25:00,180 --> 01:24:57,700

you for that so have you ever heard of

1970

01:25:02,340 --> 01:25:00,190

what he's talking about the I have earth

1971

01:25:04,910 --> 01:25:02,350

universe Thunderbolts project yes I

1972

01:25:07,070 --> 01:25:04,920

actually have so you're at your you

1973

01:25:09,410 --> 01:25:07,080

the the asker of the question is gonna

1974

01:25:11,150 --> 01:25:09,420

be really angry it's Chloe not it's a

1975

01:25:13,310 --> 01:25:11,160

complete garbage it's nonsense because a

1976

01:25:15,650 --> 01:25:13,320

fury is only as good as it explains

1977

01:25:19,250 --> 01:25:15,660

experimental data and all these theories

1978

01:25:21,530 --> 01:25:19,260

by non physicists are or people say this

1979

01:25:23,000 --> 01:25:21,540

is just a complete garbage just nonsense

1980

01:25:23,990 --> 01:25:23,010

it can't explain gravitational waves

1981

01:25:26,060 --> 01:25:24,000

they can't explain Cosmic Microwave

1982

01:25:27,620 --> 01:25:26,070

Background I could go on and on I could

1983

01:25:29,870 --> 01:25:27,630

probably explain I could probably list

1984

01:25:33,560 --> 01:25:29,880

two or three hundred phenomena that the

1985

01:25:35,090 --> 01:25:33,570

electric universe thinks it explains I

1986

01:25:36,770 --> 01:25:35,100

once asked someone about electric

1987

01:25:38,330 --> 01:25:36,780

universe I said but what about the

1988

01:25:39,680 --> 01:25:38,340

bullet cluster and gravitational lensing

1989

01:25:41,660 --> 01:25:39,690

and they hemmed and hawed and had some

1990

01:25:43,640 --> 01:25:41,670

pseudo scientific explanation it's

1991

01:25:45,620 --> 01:25:43,650

complete garbage

1992

01:25:48,320 --> 01:25:45,630

it's it's because you have to remember

1993

01:25:51,020 --> 01:25:48,330

that theories are only as good as you

1994

01:25:54,070 --> 01:25:51,030

need real they need to be confronted by

1995

01:25:56,630 --> 01:25:54,080

experimental data and observation and

1996

01:25:58,850 --> 01:25:56,640

the electric universe fails completely

1997

01:26:02,480 --> 01:25:58,860

miserably it's it's not science it's

1998

01:26:04,910 --> 01:26:02,490

just a pretty fun idea but it's it's not

1999

01:26:05,990 --> 01:26:04,920

science I've heard that the term you

2000

01:26:08,720 --> 01:26:06,000

just mentioned there before

2001

01:26:10,750 --> 01:26:08,730

gravitational lens what is that so

2002

01:26:15,350 --> 01:26:10,760

that's where so gravity can bend light

2003

01:26:18,770 --> 01:26:15,360

so gravity can and so and and we have we

2004

01:26:21,350 --> 01:26:18,780

first observed this in 1919 Sir Arthur

2005

01:26:22,700 --> 01:26:21,360

Eddington went out and found the first

2006

01:26:25,310 --> 01:26:22,710

evidence of Einstein's theory of

2007

01:26:27,890 --> 01:26:25,320

relativity by looking at the bending of

2008

01:26:29,350 --> 01:26:27,900

light from our own Sun and nowadays we

2009

01:26:31,640 --> 01:26:29,360

use gravitational lensing on

2010

01:26:33,740 --> 01:26:31,650

astronomical scales as a tool for

2011

01:26:34,190 --> 01:26:33,750

studying how much matter there is out

2012

01:26:38,150 --> 01:26:34,200

there

2013

01:26:40,280 --> 01:26:38,160

so gravitational lensing it tells us how

2014

01:26:42,470 --> 01:26:40,290

much math is basically gravity on large

2015

01:26:44,840 --> 01:26:42,480

scales acts like a giant you know

2016

01:26:48,650 --> 01:26:44,850

eyeglass or contact lens right gravity

2017

01:26:52,010 --> 01:26:48,660

can bend a strong gravitational field

2018

01:26:55,100 --> 01:26:52,020

bends light rays well and is that is

2019

01:26:58,070 --> 01:26:55,110

that what black holes do black holes

2020

01:27:00,500 --> 01:26:58,080

absolutely black holes have very strong

2021

01:27:02,630 --> 01:27:00,510

a very aggressive lensing effect

2022

01:27:05,390 --> 01:27:02,640

especially you know near the event

2023

01:27:07,580 --> 01:27:05,400

horizon extreme distortion extreme

2024

01:27:10,570 --> 01:27:07,590

distortion of light yeah what does that

2025

01:27:13,100 --> 01:27:10,580

mean I know recently they said that

2026

01:27:16,310 --> 01:27:13,110

while I read somewhere that they've

2027

01:27:19,160 --> 01:27:16,320

discovered a black hole not nearest

2028

01:27:22,109 --> 01:27:19,170

nearest but nearer than you know

2029

01:27:23,819 --> 01:27:22,119

near us that they were unaware of do you

2030

01:27:25,830 --> 01:27:23,829

think there's black holes out there that

2031

01:27:30,060 --> 01:27:25,840

were a lot of them that we just don't

2032

01:27:32,010 --> 01:27:30,070

know that are actually around a lot we

2033

01:27:33,569 --> 01:27:32,020

have we have a call coming in but no we

2034

01:27:37,200 --> 01:27:33,579

have lensing studies we could do so we

2035

01:27:39,000 --> 01:27:37,210

look for them yeah see yeah yeah okay

2036

01:27:41,819 --> 01:27:39,010

so that's how that works um yeah he's

2037

01:27:45,450 --> 01:27:41,829

screening the call right now okay but

2038

01:27:49,530 --> 01:27:45,460

anyway it's all it's all fascinating to

2039

01:27:52,169 --> 01:27:49,540

me and you know just the fact that the

2040

01:27:53,790 --> 01:27:52,179

black holes you know what happens to

2041

01:27:58,140 --> 01:27:53,800

them and once they happen they're

2042

01:28:00,000 --> 01:27:58,150

basically forever as not all they

2043

01:28:03,689 --> 01:28:00,010

evaporate over time they disappear

2044

01:28:05,939 --> 01:28:03,699

that's called Hawking radiation now to

2045

01:28:07,620 --> 01:28:05,949

be clear though to be fair especially

2046

01:28:09,839 --> 01:28:07,630

since I dissed the electric universe

2047

01:28:13,410 --> 01:28:09,849

really to be fair we've never observed

2048

01:28:15,240 --> 01:28:13,420

Hawking radiation but our best theories

2049

01:28:18,300 --> 01:28:15,250

and models say that no black holes would

2050

01:28:20,609 --> 01:28:18,310

evaporate over time but it takes okay I

2051  
01:28:23,040 --> 01:28:20,619  
can't even use the word billion the word

2052  
01:28:27,720 --> 01:28:23,050  
billion is too small way too small it

2053  
01:28:29,760 --> 01:28:27,730  
would take so many years for even it

2054  
01:28:31,979 --> 01:28:29,770  
would take a ten to the very large power

2055  
01:28:34,589 --> 01:28:31,989  
a number of years for for us to ever

2056  
01:28:36,930 --> 01:28:34,599  
observe a black hole evaporating but but

2057  
01:28:40,700 --> 01:28:36,940  
ya know they're not necessarily eternal

2058  
01:28:43,459 --> 01:28:40,710  
yeah well I forget what the saying is in

2059  
01:28:45,979 --> 01:28:43,469  
physics but it's like order to disorder

2060  
01:28:49,470 --> 01:28:45,989  
everything you know goes to disorder

2061  
01:28:50,790 --> 01:28:49,480  
entropy entropy that's right yeah

2062  
01:28:53,189 --> 01:28:50,800  
yeah that's what I was thinking of we

2063  
01:28:57,780 --> 01:28:53,199

have a caller now Dave calling from LA

2064

01:29:00,800 --> 01:28:57,790

County Dave welcome to the show up you

2065

01:29:04,410 --> 01:29:00,810

know it's my fault yeah that's that's

2066

01:29:07,680 --> 01:29:04,420

okay now now we catch it now we get to

2067

01:29:10,709 --> 01:29:07,690

date welcome to the show great thanks I

2068

01:29:12,270 --> 01:29:10,719

was wondering as Matthew it had ever

2069

01:29:13,530 --> 01:29:12,280

considered a mentor he has he's

2070

01:29:18,620 --> 01:29:13,540

incredibly intelligent man

2071

01:29:21,750 --> 01:29:18,630

the gravity such as at a black hole the

2072

01:29:23,250 --> 01:29:21,760

the event horizon gravity can the speed

2073

01:29:25,200 --> 01:29:23,260

of gravity can be faster than light

2074

01:29:29,609 --> 01:29:25,210

which is why it doesn't allow light to

2075

01:29:30,530 --> 01:29:29,619

escape so wouldn't it be possible if you

2076

01:29:32,660 --> 01:29:30,540

could

2077

01:29:36,590 --> 01:29:32,670

it was some exotic technology in the

2078

01:29:38,450 --> 01:29:36,600

future if you could create a divot in a

2079

01:29:40,880 --> 01:29:38,460

head of your ship that you could fall

2080

01:29:43,580 --> 01:29:40,890

into and make the divot deep enough that

2081

01:29:45,890 --> 01:29:43,590

it was that you could fall faster than

2082

01:29:48,110 --> 01:29:45,900

light forward maybe make one behind you

2083

01:29:49,940 --> 01:29:48,120

have negative gravity that they could

2084

01:29:52,310 --> 01:29:49,950

push you faster than light like in in

2085

01:29:54,170 --> 01:29:52,320

concert that might be a good way to

2086

01:29:58,010 --> 01:29:54,180

travel faster the light or is am I

2087

01:30:00,320 --> 01:29:58,020

completely delusional here or what so no

2088

01:30:01,610 --> 01:30:00,330

there are there are ideas similar to

2089

01:30:03,800 --> 01:30:01,620

what you say there's the I hadn't

2090

01:30:05,870 --> 01:30:03,810

mentioned there's the Alcubierre a warp

2091

01:30:08,030 --> 01:30:05,880

drive which is good good physics good

2092

01:30:10,220 --> 01:30:08,040

science it's a good idea but it does it

2093

01:30:12,020 --> 01:30:10,230

would again require negative energy with

2094

01:30:13,940 --> 01:30:12,030

the idea you suggest with a black hole I

2095

01:30:16,330 --> 01:30:13,950

don't see how one would do that without

2096

01:30:18,560 --> 01:30:16,340

getting crushed would be the problem

2097

01:30:24,260 --> 01:30:18,570

your your point about the speed of

2098

01:30:26,690 --> 01:30:24,270

gravity and light so the speed of so

2099

01:30:30,470 --> 01:30:26,700

it's again that catches the information

2100

01:30:32,000 --> 01:30:30,480

right law is information transfer so in

2101  
01:30:33,620 --> 01:30:32,010  
your example with the black hole so the

2102  
01:30:35,030 --> 01:30:33,630  
and information is lost then you fall

2103  
01:30:36,830 --> 01:30:35,040  
through the when you when you fall

2104  
01:30:39,740 --> 01:30:36,840  
through un horizon you can't get you

2105  
01:30:40,970 --> 01:30:39,750  
can't get back out so so no you do you

2106  
01:30:43,400 --> 01:30:40,980  
have some interesting ideas there I

2107  
01:30:46,190 --> 01:30:43,410  
don't see how the two big things I see

2108  
01:30:47,330 --> 01:30:46,200  
are as I said first is how to do that

2109  
01:30:48,650 --> 01:30:47,340  
without some sort of negative energy

2110  
01:30:50,720 --> 01:30:48,660  
like you said in the back of the ship

2111  
01:30:52,820 --> 01:30:50,730  
that's always the catch professor and

2112  
01:30:59,060 --> 01:30:52,830  
light and the other thing was how do you

2113  
01:31:00,890 --> 01:30:59,070

avoid getting crushed like a carrot on a

2114

01:31:03,050 --> 01:31:00,900

stick if it was a projected out in front

2115

01:31:05,270 --> 01:31:03,060

of the chip and it was a big divot and

2116

01:31:07,790 --> 01:31:05,280

the ship was falling into the divot can

2117

01:31:09,770 --> 01:31:07,800

continually but it was only you know it

2118

01:31:11,930 --> 01:31:09,780

was just held out there so far away that

2119

01:31:13,670 --> 01:31:11,940

you simply sell forever until you turn

2120

01:31:16,090 --> 01:31:13,680

it off you turn it off you stop falling

2121

01:31:19,130 --> 01:31:16,100

you know be like a carrot on a stick and

2122

01:31:22,250 --> 01:31:19,140

kind of a projection kind of like an

2123

01:31:24,590 --> 01:31:22,260

artificial black hole yeah it's like

2124

01:31:26,750 --> 01:31:24,600

you're projected deep deep hole that you

2125

01:31:28,730 --> 01:31:26,760

could slide into but it always stays out

2126

01:31:31,490 --> 01:31:28,740

there in front of you it will probably

2127

01:31:32,960 --> 01:31:31,500

it's probably thousands of years beyond

2128

01:31:34,970 --> 01:31:32,970

what we couldn't even start to try to

2129

01:31:37,340 --> 01:31:34,980

think oh yeah yeah yeah that's probably

2130

01:31:39,170 --> 01:31:37,350

a good a good way Tim to slide forward

2131

01:31:40,760 --> 01:31:39,180

through through space it it really

2132

01:31:41,900 --> 01:31:40,770

really fast speeds yeah I'd have to

2133

01:31:43,580 --> 01:31:41,910

think more about it

2134

01:31:44,750 --> 01:31:43,590

so you're basically you

2135

01:31:47,359 --> 01:31:44,760

would you talk about it's like it's like

2136

01:31:51,620 --> 01:31:47,369

a gravitational assist but taking it

2137

01:31:53,270 --> 01:31:51,630

artists air on steroids yeah one one

2138

01:31:55,459 --> 01:31:53,280

doubt one downside - it's not

2139

01:31:57,770 --> 01:31:55,469

necessarily downside but one downside to

2140

01:31:59,750 --> 01:31:57,780

it would be you would unintentionally

2141

01:32:02,180 --> 01:31:59,760

always be time-traveling to the Future

2142

01:32:04,070 --> 01:32:02,190

one way so I'm here if you're if you're

2143

01:32:07,189 --> 01:32:04,080

that close to a black hole all the time

2144

01:32:09,979 --> 01:32:07,199

what happens is is that you know a few

2145

01:32:11,750 --> 01:32:09,989

hours passes for you but thousands of

2146

01:32:13,700 --> 01:32:11,760

years back home because remember that

2147

01:32:16,070 --> 01:32:13,710

what you just described warping of space

2148

01:32:17,750 --> 01:32:16,080

space and time are two sides of the same

2149

01:32:19,490 --> 01:32:17,760

coin if your working space your

2150

01:32:22,790 --> 01:32:19,500

generation acceleration it doesn't

2151  
01:32:24,830 --> 01:32:22,800  
matter right well no acceleration makes

2152  
01:32:27,800 --> 01:32:24,840  
it even worse so ya know you'd have so

2153  
01:32:29,450 --> 01:32:27,810  
you have pretty severe warping of not

2154  
01:32:30,919 --> 01:32:29,460  
just space but time because whenever you

2155  
01:32:32,839 --> 01:32:30,929  
have warping of space you also have

2156  
01:32:34,339 --> 01:32:32,849  
warping of time that's not necessarily a

2157  
01:32:36,740 --> 01:32:34,349  
bad thing I wouldn't mind a one-way

2158  
01:32:38,720 --> 01:32:36,750  
ticket to the future out of Cove in and

2159  
01:32:41,629 --> 01:32:38,730  
out of today's era so that's not really

2160  
01:32:44,600 --> 01:32:41,639  
a bad thing yeah great well thank you so

2161  
01:32:47,570 --> 01:32:44,610  
much thank you yeah thanks for the call

2162  
01:32:49,760 --> 01:32:47,580  
the line is open and that number is

2163  
01:32:52,520 --> 01:32:49,770

eight five five four seven two five four

2164

01:32:54,560 --> 01:32:52,530

eight three we are taking calls and you

2165

01:32:56,270 --> 01:32:54,570

are welcome to call and ask a question

2166

01:32:58,939 --> 01:32:56,280

that was actually really good question

2167

01:33:02,660 --> 01:32:58,949

another call is in just waiting for it

2168

01:33:05,839 --> 01:33:02,670

to get screened so yeah this is all very

2169

01:33:08,899 --> 01:33:05,849

fascinating I heard of there was this

2170

01:33:11,689 --> 01:33:08,909

other guy that was talking about gravity

2171

01:33:14,570 --> 01:33:11,699

like that's why there's no g-force that

2172

01:33:16,459 --> 01:33:14,580

are destructing you know the crafts or

2173

01:33:19,220 --> 01:33:16,469

the people's because they're actually in

2174

01:33:23,000 --> 01:33:19,230

a constant fall which is quite a quite a

2175

01:33:25,070 --> 01:33:23,010

very interesting theory not sure if it

2176

01:33:27,410 --> 01:33:25,080

had any really meat to it but here we

2177

01:33:30,589 --> 01:33:27,420

have Andy calling from Connecticut Andy

2178

01:33:34,550 --> 01:33:30,599

calls in quite often Andy welcome to the

2179

01:33:38,030 --> 01:33:34,560

show Andy hi guys good Joe so my

2180

01:33:41,390 --> 01:33:38,040

question is uh and I'm sure this is off

2181

01:33:44,030 --> 01:33:41,400

a little bit off subject but what does

2182

01:33:47,570 --> 01:33:44,040

our professor Matt think about the idea

2183

01:33:50,240 --> 01:33:47,580

of all points in space and time being

2184

01:33:56,120 --> 01:33:50,250

connected and and what that might mean

2185

01:33:57,410 --> 01:33:56,130

about consciousness and you know astral

2186

01:34:00,290 --> 01:33:57,420

projection out-of-body

2187

01:34:02,750 --> 01:34:00,300

experiences you know it connects to

2188

01:34:05,479 --> 01:34:02,760

spirituality I know this is a little bit

2189

01:34:09,229 --> 01:34:05,489

weird but there was that famous comment

2190

01:34:11,330 --> 01:34:09,239

made by the skunkworks director during a

2191

01:34:14,120 --> 01:34:11,340

breakfast where Jan Harvin was present

2192

01:34:16,400 --> 01:34:14,130

and and that was the comment made that

2193

01:34:20,180 --> 01:34:16,410

that we've got technology that would

2194

01:34:22,340 --> 01:34:20,190

knock your socks off and it it he

2195

01:34:27,260 --> 01:34:22,350

preferred to all points in space and

2196

01:34:30,110 --> 01:34:27,270

time being connected and then I'll take

2197

01:34:31,130 --> 01:34:30,120

my your answer up there all right thank

2198

01:34:33,890 --> 01:34:31,140

you Andy thank you

2199

01:34:35,750 --> 01:34:33,900

like that's a great great question that

2200

01:34:40,280 --> 01:34:35,760

well yeah requires mean some deep

2201  
01:34:43,669 --> 01:34:40,290  
thought so I yeah definitely I have

2202  
01:34:45,830 --> 01:34:43,679  
absolutely heard of this and and III

2203  
01:34:47,390 --> 01:34:45,840  
have I have issues with it that doesn't

2204  
01:34:51,950 --> 01:34:47,400  
mean it isn't right it would just mean

2205  
01:34:57,380 --> 01:34:51,960  
that I would have we it's very difficult

2206  
01:34:59,419 --> 01:34:57,390  
for me to it to ik Stan these phenomena

2207  
01:35:00,590 --> 01:34:59,429  
in the context of our current

2208  
01:35:01,939 --> 01:35:00,600  
understanding of science because I

2209  
01:35:04,340 --> 01:35:01,949  
mentioned the quantum entanglement

2210  
01:35:08,180 --> 01:35:04,350  
earlier where you can have in quantum

2211  
01:35:11,330 --> 01:35:08,190  
mechanics non-local effects that do seem

2212  
01:35:14,270 --> 01:35:11,340  
to imply that there is some sort of

2213  
01:35:16,100 --> 01:35:14,280

ability with a faster than than like

2214

01:35:18,140 --> 01:35:16,110

communication a connectedness and

2215

01:35:20,120 --> 01:35:18,150

distant points in space but as I said

2216

01:35:24,350 --> 01:35:20,130

the catches is then is the lack of

2217

01:35:26,720 --> 01:35:24,360

information transferring that so in my

2218

01:35:29,810 --> 01:35:26,730

in my opinion I do always this I say the

2219

01:35:35,120 --> 01:35:29,820

same thing as I do with um with UFO so I

2220

01:35:37,640 --> 01:35:35,130

think hopefully so the most honest

2221

01:35:39,770 --> 01:35:37,650

answer I can give is that I think we

2222

01:35:41,060 --> 01:35:39,780

have jinsim of the phenomena you

2223

01:35:44,660 --> 01:35:41,070

mentioned like astral projection that

2224

01:35:48,110 --> 01:35:44,670

it's similar to issues with UFOs where

2225

01:35:50,660 --> 01:35:48,120

it's not considered scientific because

2226

01:35:54,530 --> 01:35:50,670

we didn't fully try it so it's kind of a

2227

01:35:58,760 --> 01:35:54,540

tautology and so we didn't fully study

2228

01:36:00,800 --> 01:35:58,770

it and therefore it's nonsense well why

2229

01:36:03,709 --> 01:36:00,810

can't I go study it Oh cuz it's nonsense

2230

01:36:06,110 --> 01:36:03,719

but should I check no I waste your time

2231

01:36:09,100 --> 01:36:06,120

so we can see it's a tautology and so I

2232

01:36:10,849 --> 01:36:09,110

do think that even though it's extremely

2233

01:36:16,520 --> 01:36:10,859

unlikely

2234

01:36:19,069 --> 01:36:16,530

to be right or correct there it is worth

2235

01:36:21,649 --> 01:36:19,079

sometimes exploring those off-the-wall

2236

01:36:23,810 --> 01:36:21,659

ideas on the off chance I mentioned

2237

01:36:25,369 --> 01:36:23,820

earlier the zero times infinity gamble

2238

01:36:27,799 --> 01:36:25,379

as I like to call it on the off chance

2239

01:36:29,239 --> 01:36:27,809

one of the crazy ideas is right because

2240

01:36:31,250 --> 01:36:29,249

we have to realize that at one point

2241

01:36:33,439 --> 01:36:31,260

Einsteins idea is that that the speed of

2242

01:36:36,859 --> 01:36:33,449

light was the maximum speed that was

2243

01:36:39,109 --> 01:36:36,869

considered dumb and crazy and so and so

2244

01:36:41,929 --> 01:36:39,119

you know today's nonsense does so

2245

01:36:44,709 --> 01:36:41,939

sometimes become scientific fact but as

2246

01:36:47,540 --> 01:36:44,719

I said early has to be confronted with

2247

01:36:48,979 --> 01:36:47,550

experimental with experimental data and

2248

01:36:50,629 --> 01:36:48,989

I do know there's some very interesting

2249

01:36:52,669 --> 01:36:50,639

things you know going back to quantum

2250

01:36:55,459 --> 01:36:52,679

entanglement that's been happening in in

2251

01:36:58,189 --> 01:36:55,469

quantum mechanics in quantum physics so

2252

01:37:01,250 --> 01:36:58,199

I don't want to just dismiss um be

2253

01:37:03,949 --> 01:37:01,260

completely dismissive of the idea but I

2254

01:37:05,689 --> 01:37:03,959

am I am skeptical and if there was

2255

01:37:07,219 --> 01:37:05,699

actually hidden you know government

2256

01:37:10,459 --> 01:37:07,229

technology knowledge and like I said

2257

01:37:13,669 --> 01:37:10,469

earlier as a scientist not just Susan I

2258

01:37:15,829 --> 01:37:13,679

would be extremely angry and deeply

2259

01:37:18,500 --> 01:37:15,839

offended because of these things that

2260

01:37:20,779 --> 01:37:18,510

you mentioned are real scientists should

2261

01:37:22,520 --> 01:37:20,789

be studying them and trying to

2262

01:37:25,520 --> 01:37:22,530

understand how they work and what causes

2263

01:37:27,799 --> 01:37:25,530

them they should not be kept secret but

2264

01:37:29,179 --> 01:37:27,809

the and and then and then laughed at is

2265

01:37:31,069 --> 01:37:29,189

like oh we already know that doesn't

2266

01:37:34,790 --> 01:37:31,079

work they should we should crack that

2267

01:37:36,859 --> 01:37:34,800

open and then study that so it if if the

2268

01:37:38,899 --> 01:37:36,869

caller is right that you know that there

2269

01:37:40,669 --> 01:37:38,909

is and I have heard this obviously I've

2270

01:37:42,469 --> 01:37:40,679

heard this myself and from Kevin that

2271

01:37:44,479 --> 01:37:42,479

these are real technologies you know

2272

01:37:45,679 --> 01:37:44,489

there's the CIA program for psychic

2273

01:37:47,989 --> 01:37:45,689

spies and stuff like that

2274

01:37:49,099 --> 01:37:47,999

not necessarily technology I used that

2275

01:37:51,500 --> 01:37:49,109

word wrong could just be you know

2276

01:37:54,109 --> 01:37:51,510

natural some something of the human mind

2277

01:37:55,909 --> 01:37:54,119

on its own I would be furious to learn

2278

01:37:57,500 --> 01:37:55,919

that it was real and the scientific

2279

01:37:59,089 --> 01:37:57,510

community's been laughing out for years

2280

01:38:01,429 --> 01:37:59,099

and the US government's had this the

2281

01:38:04,429 --> 01:38:01,439

whole time because we should be studying

2282

01:38:07,459 --> 01:38:04,439

we should be trying to understand what

2283

01:38:09,679 --> 01:38:07,469

the causes is it what type of wave is

2284

01:38:12,020 --> 01:38:09,689

being communicated what force if these

2285

01:38:15,619 --> 01:38:12,030

are real phenomena we should apply the

2286

01:38:17,869 --> 01:38:15,629

scientific method and determine what the

2287

01:38:20,000 --> 01:38:17,879

causes are and not just not just laugh

2288

01:38:22,849 --> 01:38:20,010

it off so that was a long-winded answer

2289

01:38:24,950 --> 01:38:22,859

sorry no no I love ya

2290

01:38:28,370 --> 01:38:24,960

we now have Greg

2291

01:38:30,500 --> 01:38:28,380

in Samara yeah Samaria I think that's my

2292

01:38:34,310 --> 01:38:30,510

first Sumerian call Greg welcome to the

2293

01:38:39,169 --> 01:38:34,320

show hey thank you I you have to promise

2294

01:38:40,640 --> 01:38:39,179

not to hit me before I ask this yes wait

2295

01:38:44,080 --> 01:38:40,650

a minute first of all this may be an

2296

01:38:48,169 --> 01:38:44,090

excuse what time is it there right now

2297

01:38:59,479 --> 01:38:48,179

well it's several years it's like 1,000

2298

01:39:03,589 --> 01:38:59,489

BC actually anyway yeah go ahead go

2299

01:39:05,720 --> 01:39:03,599

ahead ask the question all right some

2300

01:39:08,240 --> 01:39:05,730

great minds like Steve Hudgens from

2301  
01:39:10,640 --> 01:39:08,250  
MUFON and all that believe in this guy

2302  
01:39:14,419 --> 01:39:10,650  
cuz you and one-millisecond tell me

2303  
01:39:21,649 --> 01:39:14,429  
everything he got right with the worlds

2304  
01:39:23,660 --> 01:39:21,659  
of collision Velikovsky you know worlds

2305  
01:39:24,950 --> 01:39:23,670  
of cos sorry the the internet broke up

2306  
01:39:26,540 --> 01:39:24,960  
and I couldn't I couldn't hear my

2307  
01:39:29,209 --> 01:39:26,550  
connection broke up worlds in collision

2308  
01:39:31,879 --> 01:39:29,219  
and what was the other thing

2309  
01:39:34,520 --> 01:39:31,889  
Oh scoffs key he's the one who has the

2310  
01:39:37,899 --> 01:39:34,530  
thing tonging up I think his Venus was

2311  
01:39:41,000 --> 01:39:37,909  
ping-ponging around the solar system and

2312  
01:39:43,220 --> 01:39:41,010  
cause I think he called Noah's Flood I

2313  
01:39:46,359 --> 01:39:43,230

can't remember for sure there was a lot

2314

01:39:50,089 --> 01:39:46,369

of ping pong and really strange physics

2315

01:39:52,910 --> 01:39:50,099

well we actually so we know the history

2316

01:39:54,709 --> 01:39:52,920

of the solar system incredibly well so

2317

01:39:57,700 --> 01:39:54,719

the planets were in different positions

2318

01:40:01,189 --> 01:39:57,710

over time and we actually we have solid

2319

01:40:03,080 --> 01:40:01,199

we actually have pretty good models for

2320

01:40:05,000 --> 01:40:03,090

how the planets moved over time and what

2321

01:40:07,819 --> 01:40:05,010

their climates were they're not perfect

2322

01:40:11,209 --> 01:40:07,829

but what their climates were a billions

2323

01:40:13,669 --> 01:40:11,219

of years ago and I don't think there's

2324

01:40:17,720 --> 01:40:13,679

any any good scientific evidence for any

2325

01:40:21,080 --> 01:40:17,730

of those any of those ideas so there's

2326

01:40:23,240 --> 01:40:21,090

like no chance on it no chance at all

2327

01:40:25,339 --> 01:40:23,250

that Venus could be pink hanging around

2328

01:40:27,979 --> 01:40:25,349

or that plan that X could be looming

2329

01:40:31,160 --> 01:40:27,989

right over the horizon ready to kill us

2330

01:40:33,770 --> 01:40:31,170

and you're right no no there could be in

2331

01:40:36,950 --> 01:40:33,780

the Kuiper belt there could be a very

2332

01:40:38,030 --> 01:40:36,960

large additional planet there is

2333

01:40:40,850 --> 01:40:38,040

actually some

2334

01:40:43,610 --> 01:40:40,860

in some way out there way yeah out there

2335

01:40:46,490 --> 01:40:43,620

yeah no and and yeah there is Evelyn a

2336

01:40:48,890 --> 01:40:46,500

few years are you referring to the

2337

01:40:51,650 --> 01:40:48,900

nemesis the potentially the nemesis

2338

01:40:54,500 --> 01:40:51,660

hypothesis it's not one of my favorite

2339

01:40:56,060 --> 01:40:54,510

series I'm a little fuzzy on it because

2340

01:40:59,270 --> 01:40:56,070

I kind of like started throwing things

2341

01:41:01,070 --> 01:40:59,280

when I was reading it but yeah this come

2342

01:41:03,200 --> 01:41:01,080

around every few thousand years I think

2343

01:41:05,870 --> 01:41:03,210

which I don't see how that would be

2344

01:41:08,090 --> 01:41:05,880

remotely possible well we do have

2345

01:41:11,150 --> 01:41:08,100

meteors and comets that do come around

2346

01:41:12,920 --> 01:41:11,160

and in some cases in what seems to be on

2347

01:41:15,590 --> 01:41:12,930

regular cycles like if you look at the

2348

01:41:19,070 --> 01:41:15,600

extinction history of Earth so there is

2349

01:41:22,100 --> 01:41:19,080

space is dynamic so one thing that is

2350

01:41:24,020 --> 01:41:22,110

correct there is space is dynamic so

2351

01:41:26,660 --> 01:41:24,030

this cartoon that we have picture of the

2352

01:41:28,280 --> 01:41:26,670

solar system from childhood is not fully

2353

01:41:30,530 --> 01:41:28,290

correct because the solar system has

2354

01:41:32,300 --> 01:41:30,540

shifted over billions of years so you

2355

01:41:34,940 --> 01:41:32,310

don't just have you know there's the Sun

2356

01:41:37,210 --> 01:41:34,950

and Mercury Venus that's how it is now

2357

01:41:40,010 --> 01:41:37,220

but over billions of years things do

2358

01:41:44,420 --> 01:41:40,020

things can switch up I do I know I've

2359

01:41:46,520 --> 01:41:44,430

seen one astronomical model where where

2360

01:41:48,350 --> 01:41:46,530

Jupiter was once much close to the Sun

2361

01:41:51,920 --> 01:41:48,360

billions of years ago and that shifted

2362

01:41:54,170 --> 01:41:51,930

and kicked things around so there is but

2363

01:41:56,960 --> 01:41:54,180

a ping-pong in effect would be very

2364

01:41:59,210 --> 01:41:56,970

difficult to explain gravitationally

2365

01:42:00,890 --> 01:41:59,220

because why would it go and come back

2366

01:42:03,350 --> 01:42:00,900

because remember that gravity is only

2367

01:42:06,050 --> 01:42:03,360

attractive and it can also mean anybody

2368

01:42:08,750 --> 01:42:06,060

else's orbit which is kind of crazy

2369

01:42:11,750 --> 01:42:08,760

ya know ya know everything is this is is

2370

01:42:14,660 --> 01:42:11,760

interconnected because even though the

2371

01:42:16,730 --> 01:42:14,670

planets are very far apart gravity does

2372

01:42:19,670 --> 01:42:16,740

have an infinite range has an infinite

2373

01:42:23,270 --> 01:42:19,680

extent so like Jupiter's gravity is a

2374

01:42:25,160 --> 01:42:23,280

non negligible quantity in our solar

2375

01:42:27,440 --> 01:42:25,170

system right it's not just that this the

2376

01:42:30,080 --> 01:42:27,450

Sun's gravity is the most important but

2377

01:42:34,250 --> 01:42:30,090

Jupiter's gravity is very non negligible

2378

01:42:36,080 --> 01:42:34,260

yeah yeah first size thank you Greg so

2379

01:42:38,600 --> 01:42:36,090

yeah I mean there's there's been often

2380

01:42:41,360 --> 01:42:38,610

there's been talk about you know an an

2381

01:42:42,590 --> 01:42:41,370

elliptical orbit that we don't know

2382

01:42:44,690 --> 01:42:42,600

about the come you know something that

2383

01:42:46,130 --> 01:42:44,700

may come around every you know eight

2384

01:42:47,990 --> 01:42:46,140

hundred years or something like that

2385

01:42:51,799 --> 01:42:48,000

that we have absolutely no idea until it

2386

01:42:52,909 --> 01:42:51,809

shows up how do you think we are set as

2387

01:42:55,879 --> 01:42:52,919

you know one of the things of course

2388

01:42:58,849 --> 01:42:55,889

that always makes me a little nervous is

2389

01:43:00,169 --> 01:42:58,859

um you know asteroids you know getting

2390

01:43:02,839 --> 01:43:00,179

hit by an asteroid or something like

2391

01:43:04,279 --> 01:43:02,849

that do you think we have a long way to

2392

01:43:06,949 --> 01:43:04,289

go on that or do you think we're fairly

2393

01:43:08,750 --> 01:43:06,959

safe as far as detection and what do we

2394

01:43:11,599 --> 01:43:08,760

do if we see when coming right at us I

2395

01:43:13,669 --> 01:43:11,609

mean I've screwed we're screwed I listen

2396

01:43:14,629 --> 01:43:13,679

to astronomy Cass I don't know if you've

2397

01:43:18,709 --> 01:43:14,639

ever listened to that

2398

01:43:20,299 --> 01:43:18,719

yeah with a Fraser Cain uh yeah yeah one

2399

01:43:23,809 --> 01:43:20,309

of his sayings is you know the universe

2400

01:43:26,509 --> 01:43:23,819

is out to kill us I thank you for the

2401

01:43:28,549 --> 01:43:26,519

for that question yeah I uh tied zip

2402

01:43:30,109 --> 01:43:28,559

ties in nicely with our last caller no

2403

01:43:33,349 --> 01:43:30,119

it's not a question of if it's a

2404

01:43:34,929 --> 01:43:33,359

question of when um and and and what

2405

01:43:36,859 --> 01:43:34,939

you're saying is it likely

2406

01:43:38,239 --> 01:43:36,869

unfortunately statistics doesn't work

2407

01:43:40,189 --> 01:43:38,249

that way but I'm really glad you asked

2408

01:43:41,419 --> 01:43:40,199

that that will be like asking that would

2409

01:43:45,319 --> 01:43:41,429

be like asking the following question

2410

01:43:47,569 --> 01:43:45,329

I'm playing cards right blackjack poker

2411

01:43:50,119 --> 01:43:47,579

or whatever I'm losing oh you know what

2412

01:43:52,129 --> 01:43:50,129

I'm due for a win the law of averages

2413

01:43:55,579 --> 01:43:52,139

this is not how it works an asteroid

2414

01:43:58,040 --> 01:43:55,589

could come tomorrow or not for another

2415

01:44:00,049 --> 01:43:58,050

10 million years and I can't say one or

2416

01:44:01,759 --> 01:44:00,059

the other is quote-unquote more likely

2417

01:44:04,579 --> 01:44:01,769

that's now statistics works its

2418

01:44:08,270 --> 01:44:04,589

statistics is better apply when you

2419

01:44:09,139 --> 01:44:08,280

average over time so it's but also you

2420

01:44:10,579 --> 01:44:09,149

know there's different schools of

2421

01:44:12,169 --> 01:44:10,589

thought on it there's Bayesian and

2422

01:44:14,329 --> 01:44:12,179

frequentist statistics stuff like that

2423

01:44:17,959 --> 01:44:14,339

but basically yeah it could be tomorrow

2424

01:44:20,540 --> 01:44:17,969

right as far as detection people work

2425

01:44:22,520 --> 01:44:20,550

hard on it both astronomers and amateur

2426  
01:44:24,319 --> 01:44:22,530  
astronomers detecting near-earth objects

2427  
01:44:27,829 --> 01:44:24,329  
that's what they're called you know any

2428  
01:44:30,189 --> 01:44:27,839  
OHS no but you're absolutely contrite

2429  
01:44:34,339 --> 01:44:30,199  
that we could just get completely

2430  
01:44:38,329 --> 01:44:34,349  
unlucky and but and I worry about it too

2431  
01:44:41,149 --> 01:44:38,339  
because we don't have our you know shi t

2432  
01:44:42,529 --> 01:44:41,159  
together as humanity basically and and

2433  
01:44:45,529 --> 01:44:42,539  
we would have to be we would have to

2434  
01:44:48,020 --> 01:44:45,539  
stop treating science and technology as

2435  
01:44:49,969 --> 01:44:48,030  
a joke funding it more not just in the

2436  
01:44:52,369 --> 01:44:49,979  
US but in the around the world treat

2437  
01:44:54,040 --> 01:44:52,379  
science seriously because we're not

2438  
01:44:56,540 --> 01:44:54,050

ready we're not a science or technology

2439

01:44:59,029 --> 01:44:56,550

it's not like the movie Armageddon or

2440

01:45:01,429 --> 01:44:59,039

deep impact there's there's nothing we

2441

01:45:03,889 --> 01:45:01,439

could do nuclear weapons nothing so I

2442

01:45:05,050 --> 01:45:03,899

used to I used to think our fine you

2443

01:45:07,390 --> 01:45:05,060

lots of nukes

2444

01:45:10,390 --> 01:45:07,400

and then I sat down I realized it's not

2445

01:45:12,070 --> 01:45:10,400

gonna do it big enough rock it would

2446

01:45:14,200 --> 01:45:12,080

just make a dent you know the entire

2447

01:45:16,260 --> 01:45:14,210

world nuclear arsenal would be like

2448

01:45:18,430 --> 01:45:16,270

think you know cuz these are you know

2449

01:45:20,830 --> 01:45:18,440

potentially big rocks we're talking

2450

01:45:22,330 --> 01:45:20,840

about and so I completely agree with you

2451

01:45:24,550 --> 01:45:22,340

and I think that this is one of the

2452

01:45:27,010 --> 01:45:24,560

reasons why my colleagues think I'm

2453

01:45:28,810 --> 01:45:27,020

crazy when I say this we need to become

2454

01:45:30,820 --> 01:45:28,820

an interplanetary Society

2455

01:45:33,460 --> 01:45:30,830

I'm disappointed when I was a kid

2456

01:45:36,370 --> 01:45:33,470

where's the moon base where's the Mars

2457

01:45:38,740 --> 01:45:36,380

colony it's 2020 we still don't have a

2458

01:45:42,040 --> 01:45:38,750

moon base we're pathetic we're pathetic

2459

01:45:44,590 --> 01:45:42,050

we have all our eggs in one basket one

2460

01:45:47,890 --> 01:45:44,600

bullet takes us out you know kovat 19

2461

01:45:51,220 --> 01:45:47,900

imagine if Cova 19 instead of 3 or 4

2462

01:45:54,040 --> 01:45:51,230

percent fatal was 30 percent fatal like

2463

01:45:55,960 --> 01:45:54,050

MERS or SARS but it was was was more

2464

01:45:58,540 --> 01:45:55,970

continued we'd be on would we be all

2465

01:46:00,820 --> 01:45:58,550

dead right now right and like that's why

2466

01:46:03,250 --> 01:46:00,830

I think it's so important we become

2467

01:46:06,010 --> 01:46:03,260

interplanetary because it was not a

2468

01:46:08,380 --> 01:46:06,020

virus then it's a comet or asteroid

2469

01:46:10,930 --> 01:46:08,390

something's gonna get us you know you

2470

01:46:12,970 --> 01:46:10,940

can spread out volcano Yellowstone right

2471

01:46:15,580 --> 01:46:12,980

Super Bowl camp we need to spread out

2472

01:46:17,440 --> 01:46:15,590

and unfortunately that's gonna take

2473

01:46:20,440 --> 01:46:17,450

billions and trillions of dollars and

2474

01:46:22,210 --> 01:46:20,450

euros and yen and all that I don't think

2475

01:46:25,360 --> 01:46:22,220

we have the willpower for it I wish we

2476

01:46:27,400 --> 01:46:25,370

did I wish we did did you follow I don't

2477

01:46:28,930 --> 01:46:27,410

know was it maybe four years ago people

2478

01:46:30,790 --> 01:46:28,940

were signing up to go to Mars do you

2479

01:46:34,300 --> 01:46:30,800

remember that yeah it what it was called

2480

01:46:36,250 --> 01:46:34,310

yeah I know a lot of people yeah yeah no

2481

01:46:37,360 --> 01:46:36,260

but I think it was premature even though

2482

01:46:40,240 --> 01:46:37,370

I just said we have to become

2483

01:46:42,160 --> 01:46:40,250

interplanetary we have not solved all

2484

01:46:43,930 --> 01:46:42,170

the problems right what if there's you

2485

01:46:46,270 --> 01:46:43,940

know this cosmic radiation marie's

2486

01:46:49,330 --> 01:46:46,280

radius where there's a solar flare you

2487

01:46:52,630 --> 01:46:49,340

know boom you know so we have not solved

2488

01:46:55,000 --> 01:46:52,640

all the problems I I want to but we also

2489

01:46:57,430 --> 01:46:55,010

we shouldn't rush and just kill

2490

01:46:59,770 --> 01:46:57,440

everybody doing interstellar travel so

2491

01:47:01,330 --> 01:46:59,780

we have to be cautious but I worry that

2492

01:47:03,640 --> 01:47:01,340

we're being too cautious and we're not

2493

01:47:05,980 --> 01:47:03,650

trying hard enough all these problems

2494

01:47:08,380 --> 01:47:05,990

like radiation there's no law of physics

2495

01:47:11,020 --> 01:47:08,390

stopping us this is an engineering

2496

01:47:13,090 --> 01:47:11,030

problem we're smart we have engineers

2497

01:47:14,680 --> 01:47:13,100

this is an engineering problem there's

2498

01:47:16,780 --> 01:47:14,690

nothing in the laws of physics is

2499

01:47:18,339 --> 01:47:16,790

stopping us from first becoming

2500

01:47:20,560 --> 01:47:18,349

interplanetary

2501

01:47:22,899 --> 01:47:20,570

and then eventually interstellar yeah

2502

01:47:25,239 --> 01:47:22,909

this question up here we knew another

2503

01:47:27,159 --> 01:47:25,249

planet young if we knew of another

2504

01:47:28,779 --> 01:47:27,169

planet beyond Pluto we would have known

2505

01:47:31,569 --> 01:47:28,789

it by now

2506

01:47:34,149 --> 01:47:31,579

from an astronomer but they actually do

2507

01:47:36,969 --> 01:47:34,159

know of bodies that can be fairly large

2508

01:47:39,849 --> 01:47:36,979

and almost considered a planet don't

2509

01:47:41,919 --> 01:47:39,859

they or similar size to Pluto maybe even

2510

01:47:43,869 --> 01:47:41,929

bigger yeah there was this plenty beyond

2511

01:47:46,889 --> 01:47:43,879

Pluto there's the Kuiper belt in the

2512

01:47:49,359 --> 01:47:46,899

Oort cloud and actually it's not it's

2513

01:47:52,330 --> 01:47:49,369

not true that we would have known about

2514

01:47:54,520 --> 01:47:52,340

it and here's the reason why so it's a

2515

01:47:56,529 --> 01:47:54,530

very strange kind of counterintuitive

2516

01:47:58,899 --> 01:47:56,539

effect but sometimes in astronomy it's

2517

01:48:02,080 --> 01:47:58,909

easier to see far away than close by so

2518

01:48:04,689 --> 01:48:02,090

for example so it's just the mr.

2519

01:48:07,089 --> 01:48:04,699

Stanford ex works I think you know we

2520

01:48:08,589 --> 01:48:07,099

can use the Hubble Space Telescope which

2521

01:48:11,139 --> 01:48:08,599

is here now you know there's James Webb

2522

01:48:14,049 --> 01:48:11,149

coming but we had huh HST we can see

2523

01:48:15,310 --> 01:48:14,059

hundred billion you know 100 bill you

2524

01:48:17,109 --> 01:48:15,320

know not 100 billion but you know

2525

01:48:17,679 --> 01:48:17,119

billions of light years away there's a

2526

01:48:19,540 --> 01:48:17,689

galaxy

2527

01:48:21,849 --> 01:48:19,550

you can't them you can't point the

2528

01:48:23,560 --> 01:48:21,859

telescope and then show the American

2529

01:48:25,209 --> 01:48:23,570

flag on the moon for example and prove

2530

01:48:27,069 --> 01:48:25,219

to them you know moon hoaxers how we

2531

01:48:28,569 --> 01:48:27,079

landed on the moon doesn't work that way

2532

01:48:30,819 --> 01:48:28,579

it's not how objects were so sometimes

2533

01:48:32,560 --> 01:48:30,829

it's easier to see what's farther away

2534

01:48:34,929 --> 01:48:32,570

than what's right under your own nose

2535

01:48:36,909 --> 01:48:34,939

and so it's not true that if there was

2536

01:48:39,399 --> 01:48:36,919

another planet there we would have seen

2537

01:48:41,349 --> 01:48:39,409

it probably not but I have seen articles

2538

01:48:43,509 --> 01:48:41,359

real scientific articles not just

2539

01:48:46,659 --> 01:48:43,519

popular press that there may be another

2540

01:48:48,969 --> 01:48:46,669

planet that could be very large maybe

2541

01:48:51,849 --> 01:48:48,979

earth sized or even bigger lurking in

2542

01:48:55,000 --> 01:48:51,859

the Kuiper belt and it's possible it's

2543

01:48:57,939 --> 01:48:55,010

not probable so the comment was write

2544

01:49:02,349 --> 01:48:57,949

this it's not probable but it's not

2545

01:49:03,639 --> 01:49:02,359

impossible well interesting while I have

2546

01:49:05,799 --> 01:49:03,649

everyone's attention I just wanted to

2547

01:49:07,000 --> 01:49:05,809

say well we're running out of time to

2548

01:49:11,619 --> 01:49:07,010

take calls we've got about five minutes

2549

01:49:12,879 --> 01:49:11,629

left but next week we have four guests I

2550

01:49:14,709 --> 01:49:12,889

usually announce this at the very end

2551

01:49:17,020 --> 01:49:14,719

but I just wanted to do it now case

2552

01:49:19,029 --> 01:49:17,030

someone drops off we have Tom Kerry and

2553

01:49:21,099 --> 01:49:19,039

Don Schmidt they're gonna be talking

2554

01:49:24,040 --> 01:49:21,109

about their new book and at the very end

2555

01:49:25,509 --> 01:49:24,050

for fun only a half hour left on the

2556

01:49:28,929 --> 01:49:25,519

show I'm gonna be actually interviewing

2557

01:49:32,810 --> 01:49:28,939

two people from this is for fun now it's

2558

01:49:35,450 --> 01:49:32,820

just for fun and it's uh it's called

2559

01:49:38,660 --> 01:49:35,460

it's a movie coming out Elvis from outer

2560

01:49:41,569 --> 01:49:38,670

space conspiracy and there's an Elvis

2561

01:49:44,870 --> 01:49:41,579

impersonator like I said and this is for

2562

01:49:45,740 --> 01:49:44,880

fun and also Tracy will chard who's the

2563

01:49:48,229 --> 01:49:45,750

writer director

2564

01:49:51,439 --> 01:49:48,239

so that is for fun it's my birthday next

2565

01:49:53,780 --> 01:49:51,449

Tuesday so I'm doing a little fun yeah

2566

01:49:58,040 --> 01:49:53,790

in advance yeah a little fun at the end

2567

01:49:59,810 --> 01:49:58,050

of the show and anyway so moving on I

2568

01:50:01,819 --> 01:49:59,820

think we're about out of time for cause

2569

01:50:03,950 --> 01:50:01,829

unless if someone wants to get a quick

2570

01:50:07,280 --> 01:50:03,960

call in we can take one more call that

2571

01:50:11,089 --> 01:50:07,290

numbers up on your screen it's 855 472

2572

01:50:12,919 --> 01:50:11,099

543 otherwise don't forget you actually

2573

01:50:14,870 --> 01:50:12,929

go ahead and forget it men in black

2574

01:50:20,089 --> 01:50:14,880

Tommy Lee Jones told Will Smith Elvis

2575

01:50:20,930 --> 01:50:20,099

didn't die he just went home yeah that's

2576

01:50:25,459 --> 01:50:20,940

right

2577

01:50:30,229 --> 01:50:25,469

so did we actually discuss the total

2578

01:50:33,169 --> 01:50:30,239

idea of how like any craft can use dark

2579

01:50:35,450 --> 01:50:33,179

matter to create the zero-point energy

2580

01:50:37,609 --> 01:50:35,460

did you go through that whole thing we

2581

01:50:39,109 --> 01:50:37,619

got a couple minutes left but yeah you

2582

01:50:41,569 --> 01:50:39,119

know we never got there so we should get

2583

01:50:43,280 --> 01:50:41,579

to here so so no but remember zero point

2584

01:50:45,589 --> 01:50:43,290

energies dark energy not dark matter

2585

01:50:48,140 --> 01:50:45,599

there they're probably not related but

2586

01:50:49,550 --> 01:50:48,150

but yeah your question is yeah very good

2587

01:50:52,160 --> 01:50:49,560

question because I said this a few weeks

2588

01:50:54,169 --> 01:50:52,170

ago with se you so even though dark

2589

01:50:56,089 --> 01:50:54,179

matter interacts very rarely and dark

2590

01:50:57,620 --> 01:50:56,099

energy we're not sure what it is it's

2591

01:51:00,410 --> 01:50:57,630

probably related to zero-point energy

2592

01:51:04,760 --> 01:51:00,420

the point I was making about propulsion

2593

01:51:07,040 --> 01:51:04,770

was that if we could find a way to tap

2594

01:51:10,640 --> 01:51:07,050

if there was something we can't pretend

2595

01:51:13,370 --> 01:51:10,650

imagine right now today to tap into dark

2596

01:51:15,350 --> 01:51:13,380

matter and or dark energy we have this

2597

01:51:17,600 --> 01:51:15,360

giant fuel source then right

2598

01:51:20,270 --> 01:51:17,610

you don't need fuel anymore if 70% of

2599

01:51:23,060 --> 01:51:20,280

the universe is dark energy and 25% is

2600

01:51:26,810 --> 01:51:23,070

dark matter then if there was some way

2601  
01:51:31,580 --> 01:51:26,820  
to tap into that maybe that could allow

2602  
01:51:33,770 --> 01:51:31,590  
for propulsion for craft without needing

2603  
01:51:36,620 --> 01:51:33,780  
to carry fuel and this would not break

2604  
01:51:38,149 --> 01:51:36,630  
laws of physics it's not few propellant

2605  
01:51:40,729 --> 01:51:38,159  
less propulsion which is a term that's

2606  
01:51:43,339 --> 01:51:40,739  
how there wouldn't be you're just using

2607  
01:51:45,290 --> 01:51:43,349  
the natural fuel the natural propellant

2608  
01:51:46,080 --> 01:51:45,300  
of the cosmos I don't know how that

2609  
01:51:47,939 --> 01:51:46,090  
would work

2610  
01:51:50,280 --> 01:51:47,949  
because we don't know what dark matter

2611  
01:51:53,580 --> 01:51:50,290  
is yet we don't know what dark energy is

2612  
01:51:57,209 --> 01:51:53,590  
yet but what I find compelling is

2613  
01:52:01,109 --> 01:51:57,219

there's 95% of the universe out there we

2614

01:52:04,109 --> 01:52:01,119

don't understand 95% if there was some

2615

01:52:05,729 --> 01:52:04,119

way to tap into that natural background

2616

01:52:08,580 --> 01:52:05,739

of the universe that's all around out of

2617

01:52:11,580 --> 01:52:08,590

the dark matter and /or the dark energy

2618

01:52:14,790 --> 01:52:11,590

I feel like that's untapped potential

2619

01:52:17,850 --> 01:52:14,800

for propulsion that doesn't require you

2620

01:52:20,820 --> 01:52:17,860

to take all this fuel from your home

2621

01:52:24,359 --> 01:52:20,830

from your home base right and people

2622

01:52:28,439 --> 01:52:24,369

have talked for years about let's see I

2623

01:52:30,810 --> 01:52:28,449

want to say helium-3 on the moon could

2624

01:52:32,490 --> 01:52:30,820

be used for energy and like to create

2625

01:52:34,919 --> 01:52:32,500

some type of base there and actually

2626

01:52:38,339 --> 01:52:34,929

launch from there but can that actually

2627

01:52:40,200 --> 01:52:38,349

be used for fuel helium-3 yes and

2628

01:52:42,540 --> 01:52:40,210

actually moon is a great place because

2629

01:52:44,280 --> 01:52:42,550

there's less gravity so the idea behind

2630

01:52:46,740 --> 01:52:44,290

moon base is similar to you know like a

2631

01:52:49,680 --> 01:52:46,750

like it's like having a sky elevator

2632

01:52:52,320 --> 01:52:49,690

that once you invest in getting

2633

01:52:54,660 --> 01:52:52,330

somewhere then the next step is easier

2634

01:52:57,510 --> 01:52:54,670

so if we were to go to the moon and we

2635

01:52:59,609 --> 01:52:57,520

mined helium-3 we have a bonus of those

2636

01:53:02,459 --> 01:52:59,619

of the moon's lower gravitational field

2637

01:53:06,689 --> 01:53:02,469

so now it's easier to go places right so

2638

01:53:08,070 --> 01:53:06,699

so I I wish that you know all a lot of

2639

01:53:10,260 --> 01:53:08,080

these ideas like you just mentioned

2640

01:53:12,689 --> 01:53:10,270

helium-3 in the moon we were supposed to

2641

01:53:15,359 --> 01:53:12,699

have done that already in like 1995

2642

01:53:16,950 --> 01:53:15,369

right if you watch The Twilight Zone we

2643

01:53:18,689 --> 01:53:16,960

should already have been on the moon we

2644

01:53:20,939 --> 01:53:18,699

should already have a base and flying

2645

01:53:23,189 --> 01:53:20,949

cars don't reapplying cars yeah oh god I

2646

01:53:26,189 --> 01:53:23,199

want my flying car we're five years late

2647

01:53:29,390 --> 01:53:26,199

right at least back to actually 15 yeah

2648

01:53:32,339 --> 01:53:29,400

actually trying to think who it is his

2649

01:53:34,229 --> 01:53:32,349

his father was involved in his

2650

01:53:37,020 --> 01:53:34,239

grandfather was involved in Roswell and

2651  
01:53:38,490 --> 01:53:37,030  
why can't I think of his name his father

2652  
01:53:39,750 --> 01:53:38,500  
was wonderful passed away a few years

2653  
01:53:42,060 --> 01:53:39,760  
ago

2654  
01:53:43,620 --> 01:53:42,070  
someone's gonna crown me for forgetting

2655  
01:53:45,479 --> 01:53:43,630  
his name but he's working on the flying

2656  
01:53:47,700 --> 01:53:45,489  
cars he's actually got like a scooter

2657  
01:53:49,979 --> 01:53:47,710  
and everything else out there he's

2658  
01:53:52,260 --> 01:53:49,989  
getting funding for I'll think of his

2659  
01:53:53,790 --> 01:53:52,270  
name afterwards is terrible problems not

2660  
01:53:55,560 --> 01:53:53,800  
the technology we have the technology

2661  
01:53:57,300 --> 01:53:55,570  
for years is people it's three

2662  
01:53:59,870 --> 01:53:57,310  
dimensional travel we would crash into

2663  
01:54:01,910 --> 01:53:59,880

each other I don't care I want my

2664

01:54:04,100 --> 01:54:01,920

car I'll be honest with you as great as

2665

01:54:06,590 --> 01:54:04,110

the internet is allowing us like having

2666

01:54:09,320 --> 01:54:06,600

this interview I would rather live in a

2667

01:54:10,850 --> 01:54:09,330

world with a moon base and I know a lot

2668

01:54:13,250 --> 01:54:10,860

of viewers will get angry at me I

2669

01:54:16,400 --> 01:54:13,260

apologize I would rather have a moon

2670

01:54:17,690 --> 01:54:16,410

base and flying cars than the internet

2671

01:54:19,670 --> 01:54:17,700

and YouTube I'm sorry

2672

01:54:22,040 --> 01:54:19,680

yes great as they are I think that's one

2673

01:54:24,170 --> 01:54:22,050

it's a moon base yeah we're right at the

2674

01:54:25,670 --> 01:54:24,180

end Matthew thank you so much all right

2675

01:54:27,650 --> 01:54:25,680

all right everyone hang in there and

2676

01:54:29,090 --> 01:54:27,660

well I should say hang in there we'll

2677

01:54:30,830 --> 01:54:29,100

see you next week we'll see you next

2678

01:54:37,100 --> 01:54:30,840

week and remember to keep your eyes to