

FADE TO BLACK

with JIMMY CHURCH

PRESENTS

ISAAC ARTHUR

WORMHOLES AND ET

WED JAN 04 **LIVE**

7:00 PM PT/10:00PM ET



1
00:00:33,130 --> 00:00:28,150

[Music]

2
00:00:36,470 --> 00:00:33,140

the smoke radio for the masses of July 8

3
00:00:38,810 --> 00:00:36,480

1947 the Army Air Forces has announced

4
00:00:41,389 --> 00:00:38,820

that a flying disc has been found and is

5
00:00:45,950 --> 00:00:41,399

now in the possession of the army

6
00:00:48,709 --> 00:00:45,960

rigs change the game game changer I

7
00:00:52,310 --> 00:00:48,719

occasionally think how quickly hard

8
00:00:54,770 --> 00:00:52,320

difference is worldwide would vanish if

9
00:00:56,140 --> 00:00:54,780

we were facing an alien threat from

10
00:00:57,920 --> 00:00:56,150

outside this work

11
00:00:58,130 --> 00:00:57,930

[Music]

12
00:01:00,430 --> 00:00:58,140

[Applause]

13
00:01:03,349 --> 00:01:00,440

[Music]

14

00:01:06,230 --> 00:01:03,359

this is Fade to Black with your host

15

00:01:06,900 --> 00:01:06,240

Jimmy Church on the game changer Radio

16

00:01:10,969 --> 00:01:06,910

Network

17

00:01:14,149 --> 00:01:10,979

[Music]

18

00:01:15,609 --> 00:01:14,159

good evening Fade to Black I'm your host

19

00:01:22,310 --> 00:01:15,619

Jimmy Church

20

00:01:26,630 --> 00:01:22,320

today is January 4th 2023 and my guest

21

00:01:29,330 --> 00:01:26,640

tonight is Isaac Arthur and we are going

22

00:01:33,770 --> 00:01:29,340

to be discussing wormholes

23

00:01:36,289 --> 00:01:33,780

E.T and a host of uh of other subjects

24

00:01:39,789 --> 00:01:36,299

that's what happens when Isaac is on the

25

00:01:42,350 --> 00:01:39,799

show with us but uh just really quick

26

00:01:47,210 --> 00:01:42,360

Isaac is of course the host of Science

27

00:01:50,149 --> 00:01:47,220

and futurism with Isaac Arthur and he

28

00:01:53,389 --> 00:01:50,159

broadcast on YouTube he's got over 700

29

00:01:55,429 --> 00:01:53,399

000 subscribers and he discusses you

30

00:01:58,810 --> 00:01:55,439

know things like colonizing the solar

31

00:02:01,670 --> 00:01:58,820

system the universe Interstellar travel

32

00:02:05,090 --> 00:02:01,680

faster than light travel speed of light

33

00:02:09,050 --> 00:02:05,100

artificial intelligence uh what else

34

00:02:10,729 --> 00:02:09,060

Isaac the Fermi Paradox of course one of

35

00:02:12,890 --> 00:02:10,739

uh my favorite things that Isaac

36

00:02:16,130 --> 00:02:12,900

discusses over there and if you haven't

37

00:02:19,010 --> 00:02:16,140

visited you should it is one of the

38

00:02:20,330 --> 00:02:19,020

reasons to have the internet he

39

00:02:22,790 --> 00:02:20,340

graduated from Kent State University

40

00:02:25,790 --> 00:02:22,800

graduating top in his class at the age

41

00:02:28,130 --> 00:02:25,800

of 20 studying physics of course then

42

00:02:31,910 --> 00:02:28,140

joined the US Army got out of the army

43

00:02:34,729 --> 00:02:31,920

then worked as a civilian researcher at

44

00:02:38,270 --> 00:02:34,739

the Air Force Institute of Technology in

45

00:02:43,070 --> 00:02:38,280

Dayton Ohio and I say it every time that

46

00:02:45,229 --> 00:02:43,080

means Isaac is one of them he is a Men

47

00:02:47,869 --> 00:02:45,239

In Black he is the man in Black let me

48

00:02:51,770 --> 00:02:47,879

see what he's wearing tonight Isaac

49

00:02:58,250 --> 00:02:51,780

Arthur there he is my man

50

00:03:01,610 --> 00:03:00,589

uh Isaac uh it's good to see you my

51
00:03:03,830 --> 00:03:01,620
friend

52
00:03:06,110 --> 00:03:03,840
um happy Holidays happy New Year

53
00:03:09,589 --> 00:03:06,120
still glad to be back out again how was

54
00:03:11,930 --> 00:03:09,599
the trip to Egypt oh man you know as

55
00:03:16,009 --> 00:03:11,940
soon as you said that a hundred thousand

56
00:03:19,970 --> 00:03:16,019
people went oh no more Egypt with Jimmy

57
00:03:24,290 --> 00:03:19,980
um yeah it was it it was incredible and

58
00:03:27,350 --> 00:03:24,300
if you haven't been uh it is an absolute

59
00:03:30,170 --> 00:03:27,360
uh bucket list thing and I know that you

60
00:03:32,809 --> 00:03:30,180
know that's a basic suggestion to

61
00:03:35,449 --> 00:03:32,819
anybody Egypt is always you know on the

62
00:03:37,070 --> 00:03:35,459
bucket list and I get that but uh it's

63
00:03:38,570 --> 00:03:37,080

the one thing on the bucket list you

64

00:03:40,369 --> 00:03:38,580

don't want to play around about you

65

00:03:41,570 --> 00:03:40,379

actually that that is something that you

66

00:03:42,890 --> 00:03:41,580

want to do it's extraordinary

67

00:03:44,930 --> 00:03:42,900

extraordinary

68

00:03:46,850 --> 00:03:44,940

I know my wife's maternal grandfather

69

00:03:48,410 --> 00:03:46,860

went there for some time way way back in

70

00:03:49,729 --> 00:03:48,420

the day and it's one of his favorite

71

00:03:52,610 --> 00:03:49,739

trips to talk about to go see the

72

00:03:56,270 --> 00:03:52,620

pyramid so you know

73

00:04:00,289 --> 00:03:56,280

um here's you're a scientist right you

74

00:04:03,589 --> 00:04:00,299

deal with wondering and pondering and

75

00:04:05,930 --> 00:04:03,599

thinking right and and trying to figure

76
00:04:08,149 --> 00:04:05,940
out Solutions and measurement right

77
00:04:10,369 --> 00:04:08,159
that's what you do that's the world of

78
00:04:14,289 --> 00:04:10,379
Isaac Arthur right you're going to go to

79
00:04:18,949 --> 00:04:14,299
Egypt and go WTF right

80
00:04:22,370 --> 00:04:18,959
how did they faster than light travel is

81
00:04:23,990 --> 00:04:22,380
easier than what they did in Egypt it's

82
00:04:26,090 --> 00:04:24,000
an amazing piece of engineering that did

83
00:04:28,370 --> 00:04:26,100
over there it's it's and it's because it

84
00:04:29,810 --> 00:04:28,380
kept it up for so long it's a lot like

85
00:04:33,170 --> 00:04:29,820
with Romans the other places like they

86
00:04:35,590 --> 00:04:33,180
did so much with so little and you know

87
00:04:38,330 --> 00:04:35,600
it's just it's just impressive you know

88
00:04:40,310 --> 00:04:38,340

it speaks Lots the Kyoto of mankind that

89

00:04:42,770 --> 00:04:40,320

we got that much work done right right

90

00:04:45,129 --> 00:04:42,780

now you're a smart guy right much

91

00:04:49,670 --> 00:04:45,139

smarter than I am

92

00:04:53,170 --> 00:04:49,680

wrap your head around this thought

93

00:04:56,030 --> 00:04:53,180

Giza right the Great Pyramid right the

94

00:04:57,950 --> 00:04:56,040

most coolest thing on planet Earth the

95

00:05:00,350 --> 00:04:57,960

Great Pyramid you know I have coffrey

96

00:05:02,150 --> 00:05:00,360

Khufu mankari three pyramids there the

97

00:05:04,249 --> 00:05:02,160

the Great Sphinx the whole Plateau

98

00:05:06,110 --> 00:05:04,259

everything that's going on

99

00:05:08,170 --> 00:05:06,120

that was

100

00:05:14,689 --> 00:05:08,180

two thousand

101
00:05:23,409 --> 00:05:16,909
Mike what

102
00:05:26,770 --> 00:05:23,419
you know it's it's 2000 yes 2 600 what

103
00:05:31,510 --> 00:05:26,780
two thousand and six hundred years later

104
00:05:35,749 --> 00:05:31,520
Rome Rome was mud huts

105
00:05:40,850 --> 00:05:35,759
that's how old Egypt is and and and and

106
00:05:43,029 --> 00:05:40,860
and the the progression you know uh uh

107
00:05:45,710 --> 00:05:43,039
where they were thousands of years

108
00:05:48,170 --> 00:05:45,720
before the rights even thought thought

109
00:05:49,969 --> 00:05:48,180
about democracy and philosophy I don't

110
00:05:51,469 --> 00:05:49,979
think anyone of that Eva came close to

111
00:05:53,330 --> 00:05:51,479
what they had in Egypt but some other

112
00:05:54,830 --> 00:05:53,340
was paralled it and it was like we'll

113
00:05:56,990 --> 00:05:54,840

find the most fascinating structures

114

00:05:59,090 --> 00:05:57,000

underneath the English Channel for like

115

00:06:01,550 --> 00:05:59,100

5 000 years ago when I guess it wasn't

116

00:06:03,110 --> 00:06:01,560

flooded in yet or over in India of

117

00:06:05,270 --> 00:06:03,120

course uh you know in China there are so

118

00:06:06,950 --> 00:06:05,280

many of these ancient ones inside an

119

00:06:08,990 --> 00:06:06,960

uncle who was an archaeologist for

120

00:06:11,570 --> 00:06:09,000

mesoamerica and of course that's more

121

00:06:13,189 --> 00:06:11,580

recent but uh it's still it's it's a

122

00:06:15,529 --> 00:06:13,199

very similar technology a couple

123

00:06:18,710 --> 00:06:15,539

thousand years later is amazing what

124

00:06:20,990 --> 00:06:18,720

those people did with so

125

00:06:23,689 --> 00:06:21,000

I would say so little you know so no

126
00:06:25,909 --> 00:06:23,699
matter how smart they were well see but

127
00:06:27,710 --> 00:06:25,919
this is where you're wrong Isaac this is

128
00:06:29,770 --> 00:06:27,720
where I get to teach you can I teach you

129
00:06:32,390 --> 00:06:29,780
yeah you better hit that coffee

130
00:06:35,510 --> 00:06:32,400
you're in that coffee because Jimmy's

131
00:06:39,529 --> 00:06:35,520
coming at you here's the deal

132
00:06:41,930 --> 00:06:39,539
um to suggest that they had so very

133
00:06:45,469 --> 00:06:41,940
little because everybody does right and

134
00:06:47,390 --> 00:06:45,479
I get the reasons to think that way but

135
00:06:55,189 --> 00:06:47,400
you do not

136
00:06:57,129 --> 00:06:55,199
level a limestone Hilltop perfectly

137
00:07:01,990 --> 00:06:57,139
level to the Earth

138
00:07:06,950 --> 00:07:02,000

18 Acres you know 18

139

00:07:12,710 --> 00:07:06,960

pitch of soccer pitches level it and

140

00:07:14,330 --> 00:07:12,720

then Orient that to True North by a 60th

141

00:07:17,029 --> 00:07:14,340

of a degree

142

00:07:20,029 --> 00:07:17,039

and then put two and a half million five

143

00:07:21,890 --> 00:07:20,039

ton stones on top of that and everything

144

00:07:26,809 --> 00:07:21,900

else that's inside of it without having

145

00:07:30,230 --> 00:07:26,819

a huge Advanced theoretical knowledge of

146

00:07:33,529 --> 00:07:30,240

of engineering of math and of astronomy

147

00:07:36,050 --> 00:07:33,539

and and what the Earth is and so how

148

00:07:39,370 --> 00:07:36,060

does Stone Age man do that well it's

149

00:07:42,290 --> 00:07:39,380

because it it wasn't Stone Age man

150

00:07:44,930 --> 00:07:42,300

there's just no way uh they they had

151
00:07:47,210 --> 00:07:44,940
Advanced uh mathematics and Engineering

152
00:07:49,370 --> 00:07:47,220
they had Mad Skills when you go there

153
00:07:52,249 --> 00:07:49,380
and you see it for yourself right you

154
00:07:54,170 --> 00:07:52,259
put your hands out and you see it no

155
00:07:55,070 --> 00:07:54,180
there's something else going on I don't

156
00:07:59,409 --> 00:07:55,080
know

157
00:08:01,730 --> 00:07:59,419
answers but it's it's it's it's it's

158
00:08:03,050 --> 00:08:01,740
perplexing man it is always a

159
00:08:04,430 --> 00:08:03,060
possibility and again I don't want to

160
00:08:06,290 --> 00:08:04,440
they could have had hope you know that's

161
00:08:07,670 --> 00:08:06,300
one of those things I I'm a scientist

162
00:08:08,570 --> 00:08:07,680
and I go by what the evidence tells me

163
00:08:10,249 --> 00:08:08,580

and here's the thing is we don't

164

00:08:12,050 --> 00:08:10,259

actually have very much evidence at all

165

00:08:13,249 --> 00:08:12,060

right that's the problem though almost

166

00:08:15,170 --> 00:08:13,259

everything we know about Egypt from

167

00:08:18,110 --> 00:08:15,180

video could fit onto a couple shelves

168

00:08:19,550 --> 00:08:18,120

you know it's a lot of speculative I

169

00:08:21,529 --> 00:08:19,560

tend to go with the mainstream Theory

170

00:08:23,570 --> 00:08:21,539

out which is that they were very clever

171

00:08:25,010 --> 00:08:23,580

and very very determined and they were

172

00:08:28,249 --> 00:08:25,020

very willing to use unlimited supplies

173

00:08:29,210 --> 00:08:28,259

of manpower on the flip side of that nah

174

00:08:30,589 --> 00:08:29,220

somebody could have come by and give

175

00:08:32,510 --> 00:08:30,599

them some you know help your hand how

176

00:08:34,610 --> 00:08:32,520

would you even know if they had you know

177

00:08:37,130 --> 00:08:34,620

other than by just being you know as you

178

00:08:38,810 --> 00:08:37,140

say just sit again saying nah this is

179

00:08:40,430 --> 00:08:38,820

too much and how would we know if

180

00:08:42,110 --> 00:08:40,440

somebody had come back we did an episode

181

00:08:44,149 --> 00:08:42,120

on that not that long ago just kind of

182

00:08:46,070 --> 00:08:44,159

examine that kind of theory about taking

183

00:08:48,889 --> 00:08:46,080

some fun at the the Battlestar Galactica

184

00:08:52,930 --> 00:08:48,899

series but um it is always possible that

185

00:08:58,690 --> 00:08:55,610

when the

186

00:09:02,690 --> 00:08:58,700

the ability to question

187

00:09:06,110 --> 00:09:02,700

left science I think that that's when

188

00:09:08,090 --> 00:09:06,120

because what you're saying here is the

189

00:09:10,250 --> 00:09:08,100

correct way to to attempt to look at it

190

00:09:11,630 --> 00:09:10,260

we don't know we don't have much

191

00:09:16,509 --> 00:09:11,640

information let's try to figure it out

192

00:09:20,930 --> 00:09:16,519

instead uh today's science so much

193

00:09:23,570 --> 00:09:20,940

uh uh it just it doesn't allow

194

00:09:26,690 --> 00:09:23,580

for thinking outside of your confines

195

00:09:29,750 --> 00:09:26,700

right you can't you have to stay right

196

00:09:31,790 --> 00:09:29,760

in bounds all of the time and you can't

197

00:09:33,470 --> 00:09:31,800

say you know like like what if and

198

00:09:36,410 --> 00:09:33,480

tonight tonight we're going to talk

199

00:09:37,790 --> 00:09:36,420

about wormholes and and other things and

200

00:09:41,030 --> 00:09:37,800

believe it or not they're they're kind

201
00:09:44,329 --> 00:09:41,040
of tied together because the concept of

202
00:09:46,250 --> 00:09:44,339
a wormhole if we go back it you know

203
00:09:49,070 --> 00:09:46,260
this this is the turn of the century

204
00:09:52,550 --> 00:09:49,080
when these ideas started to surface

205
00:09:55,790 --> 00:09:52,560
covered wagons horses right the car

206
00:09:57,949 --> 00:09:55,800
wasn't even invented yet but yet

207
00:10:00,170 --> 00:09:57,959
um a physicists and scientists around

208
00:10:03,110 --> 00:10:00,180
the world were thinking about these

209
00:10:05,030 --> 00:10:03,120
things relativity and and the and the

210
00:10:06,769 --> 00:10:05,040
papers and the stuff that that was all

211
00:10:09,170 --> 00:10:06,779
based on the foundations of other things

212
00:10:10,930 --> 00:10:09,180
too as well that Einstein was studying

213
00:10:13,430 --> 00:10:10,940

at the time and there were other

214

00:10:15,430 --> 00:10:13,440

physicists and scientists that were

215

00:10:18,590 --> 00:10:15,440

looking at things all around the world

216

00:10:20,949 --> 00:10:18,600

and the idea the Einstein Rose and

217

00:10:23,810 --> 00:10:20,959

Bridge and you know that came out of

218

00:10:25,430 --> 00:10:23,820

Einstein's field work that was at the

219

00:10:28,329 --> 00:10:25,440

turn of the century and that's because

220

00:10:30,949 --> 00:10:28,339

right they were thinking differently

221

00:10:33,829 --> 00:10:30,959

they don't do that anymore dude why why

222

00:10:35,750 --> 00:10:33,839

is that why is science so clamped down I

223

00:10:37,970 --> 00:10:35,760

I mean it's not that it hasn't had some

224

00:10:39,230 --> 00:10:37,980

of those phases in the past too and it's

225

00:10:41,449 --> 00:10:39,240

not new in some ways it's actually a

226

00:10:43,490 --> 00:10:41,459

little bit better like 10 20 years ago

227

00:10:44,750 --> 00:10:43,500

uh even even where I'm at because I need

228

00:10:46,490 --> 00:10:44,760

a way of saying more about these things

229

00:10:48,350 --> 00:10:46,500

than most people who are in Academia can

230

00:10:49,610 --> 00:10:48,360

but even as I you couldn't have talked

231

00:10:51,949 --> 00:10:49,620

about you know the possibility of the

232

00:10:54,110 --> 00:10:51,959

New York Navy UFOs were real I mean you

233

00:10:55,790 --> 00:10:54,120

know I'm a hyper skeptic but I was I

234

00:10:57,650 --> 00:10:55,800

always hated that you can't talk about

235

00:10:59,030 --> 00:10:57,660

this because you know it's not that it

236

00:11:00,650 --> 00:10:59,040

was any particularly strange bit of

237

00:11:02,030 --> 00:11:00,660

skepticism we just get laughed off the

238

00:11:04,550 --> 00:11:02,040

stage

239

00:11:06,170 --> 00:11:04,560

um and not it was kind of tense lateral

240

00:11:07,970 --> 00:11:06,180

people who didn't want to do to impale

241

00:11:09,949 --> 00:11:07,980

their tenure

242

00:11:11,389 --> 00:11:09,959

um there was a lot of that though and

243

00:11:13,130 --> 00:11:11,399

it's sad and I know a lot of folks in

244

00:11:15,290 --> 00:11:13,140

the field who feel the same way it comes

245

00:11:16,610 --> 00:11:15,300

up a lot they they're allowed to publish

246

00:11:18,170 --> 00:11:16,620

a little bit more fun stuff than they

247

00:11:19,970 --> 00:11:18,180

used to but it used to have to be at the

248

00:11:22,190 --> 00:11:19,980

publish things like that as speculative

249

00:11:24,410 --> 00:11:22,200

humor almost if you want to do a serious

250

00:11:26,449 --> 00:11:24,420

paper on it and that was unfortunate

251

00:11:27,949 --> 00:11:26,459

because while you do need to have

252

00:11:29,990 --> 00:11:27,959

standards you need to have some way of

253

00:11:31,370 --> 00:11:30,000

separating the you know the hard line

254

00:11:32,329 --> 00:11:31,380

stuff that's very experimented from the

255

00:11:33,889 --> 00:11:32,339

stuff that's a little bit more off on

256

00:11:36,350 --> 00:11:33,899

the side you know

257

00:11:39,530 --> 00:11:36,360

um you need to do it with a pop or clear

258

00:11:41,569 --> 00:11:39,540

head that says all go here is not to put

259

00:11:43,130 --> 00:11:41,579

our nose up in the air or to deny

260

00:11:45,949 --> 00:11:43,140

anything that could be possibly true you

261

00:11:48,889 --> 00:11:45,959

know it's unlikely our goal is to find

262

00:11:51,829 --> 00:11:48,899

the truth and you rarely get that by

263

00:11:53,810 --> 00:11:51,839

refusing to look at something seriously

264

00:11:55,670 --> 00:11:53,820

and I think you can actually point the

265

00:11:58,190 --> 00:11:55,680

phase of that in in between the last

266

00:11:59,810 --> 00:11:58,200

century with Einstein he was not the

267

00:12:01,430 --> 00:11:59,820

radical thinker that was out of the box

268

00:12:04,009 --> 00:12:01,440

that people think I mean man's a genius

269

00:12:05,030 --> 00:12:04,019

but people say oh Einstein he he was

270

00:12:07,190 --> 00:12:05,040

came out of left field and everyone

271

00:12:08,990 --> 00:12:07,200

mocked his theories no no they didn't he

272

00:12:11,030 --> 00:12:09,000

was the people of one like those famous

273

00:12:12,470 --> 00:12:11,040

scientists that era everybody figure is

274

00:12:14,030 --> 00:12:12,480

going to be a big scientist one point

275

00:12:16,009 --> 00:12:14,040

and he was walking in the patent office

276

00:12:17,090 --> 00:12:16,019

because that was a respectable job for a

277

00:12:19,550 --> 00:12:17,100

young scientist waiting for a

278

00:12:20,750 --> 00:12:19,560

professorship uh but they had a lot of

279

00:12:22,730 --> 00:12:20,760

people who were going for some of the

280

00:12:24,350 --> 00:12:22,740

most bizarre hockey theories on the one

281

00:12:26,210 --> 00:12:24,360

hand you know like your phenology type

282

00:12:28,310 --> 00:12:26,220

style stuff of the era well on the other

283

00:12:30,110 --> 00:12:28,320

hand would never even look at some of

284

00:12:31,730 --> 00:12:30,120

the new Concepts that were coming up and

285

00:12:33,710 --> 00:12:31,740

we can laugh at that on the one hand say

286

00:12:35,269 --> 00:12:33,720

ah this stuff was science until we

287

00:12:37,910 --> 00:12:35,279

disproved it or vice versa I was crazy

288

00:12:39,650 --> 00:12:37,920

until someone sowed otherwise uh but you

289

00:12:41,630 --> 00:12:39,660

do have phases where science gets kind

290

00:12:43,370 --> 00:12:41,640

of clamped up with other ones where it's

291

00:12:45,530 --> 00:12:43,380

maybe a blue or too loose on it it does

292

00:12:47,750 --> 00:12:45,540

go on epicycles and it probably depends

293

00:12:49,250 --> 00:12:47,760

on a few or two I would love to say that

294

00:12:50,930 --> 00:12:49,260

physics is not as infected with those

295

00:12:53,629 --> 00:12:50,940

other fields and I do think that's true

296

00:12:55,250 --> 00:12:53,639

but it's still you know especially with

297

00:12:56,629 --> 00:12:55,260

folks who will come you got something

298

00:12:58,730 --> 00:12:56,639

who's established didn't really need to

299

00:13:00,949 --> 00:12:58,740

go out of the box too much yes I was new

300

00:13:02,150 --> 00:13:00,959

and looking to continue they're afraid

301
00:13:03,829 --> 00:13:02,160
they got the new thoughts but they're

302
00:13:04,970 --> 00:13:03,839
afraid to go out of the box because they

303
00:13:06,590 --> 00:13:04,980
don't want to get to the next job and

304
00:13:08,629 --> 00:13:06,600
say well I'd love to be a professor here

305
00:13:10,430 --> 00:13:08,639
looking at Aerospace and technology for

306
00:13:12,530 --> 00:13:10,440
you and you know have you looked at my

307
00:13:14,150 --> 00:13:12,540
resume yeah we did what was that about

308
00:13:17,090 --> 00:13:14,160
aliens landing and how much it would

309
00:13:18,790 --> 00:13:17,100
take to land a saso oh yeah we saw your

310
00:13:21,949 --> 00:13:18,800
Facebook

311
00:13:23,690 --> 00:13:21,959
and and and you write though about about

312
00:13:27,129 --> 00:13:23,700
Einstein

313
00:13:31,730 --> 00:13:27,139

um there is the way that it's it's it's

314

00:13:33,829 --> 00:13:31,740

almost it's almost like you have a few

315

00:13:37,069 --> 00:13:33,839

different terms here you have Legend and

316

00:13:40,370 --> 00:13:37,079

legendary Right and you've apologize in

317

00:13:41,930 --> 00:13:40,380

a bit right right and with Einstein his

318

00:13:43,730 --> 00:13:41,940

free Thinking Out of the Box think

319

00:13:47,210 --> 00:13:43,740

that's legendary right that's

320

00:13:48,230 --> 00:13:47,220

mythological he there were groups he

321

00:13:50,329 --> 00:13:48,240

would go to these you know those

322

00:13:52,550 --> 00:13:50,339

physicists especially back then

323

00:13:55,129 --> 00:13:52,560

supported each other they'd hang out and

324

00:13:57,110 --> 00:13:55,139

smoke cigarettes and and drink Scotch

325

00:13:58,970 --> 00:13:57,120

all night and and contemplate things and

326

00:14:01,250 --> 00:13:58,980

that's what they I wish they would do

327

00:14:05,290 --> 00:14:01,260

more of that today but Einstein would

328

00:14:10,690 --> 00:14:07,850

not so bad that's a little bit too far

329

00:14:13,490 --> 00:14:10,700

you know and so yeah the the the

330

00:14:16,430 --> 00:14:13,500

Einstein free thinker that that's a

331

00:14:19,430 --> 00:14:16,440

legendary uh that's mythological you

332

00:14:21,590 --> 00:14:19,440

know that's and he was brilliant he did

333

00:14:23,449 --> 00:14:21,600

so I mean if I had to you know we were

334

00:14:25,850 --> 00:14:23,459

looking for the top scientists ever and

335

00:14:27,530 --> 00:14:25,860

we say Newton and Einstein they deserve

336

00:14:28,970 --> 00:14:27,540

that status there's a handful of people

337

00:14:30,829 --> 00:14:28,980

I could name who probably deserve to be

338

00:14:32,329 --> 00:14:30,839

on there and probably dozens of others

339

00:14:34,550 --> 00:14:32,339

who were amazing but never really caught

340

00:14:36,170 --> 00:14:34,560

that public eye historically but at the

341

00:14:38,210 --> 00:14:36,180

same time you know they they want

342

00:14:40,129 --> 00:14:38,220

singular but they are about as close you

343

00:14:42,170 --> 00:14:40,139

could get to it they were that extra Cut

344

00:14:43,790 --> 00:14:42,180

Above at the same time they weren't that

345

00:14:46,730 --> 00:14:43,800

huge of A Cut Above you know folks like

346

00:14:48,710 --> 00:14:46,740

hockey brilliant man but no smaller than

347

00:14:50,930 --> 00:14:48,720

Penrose you know his colleague from the

348

00:14:53,090 --> 00:14:50,940

time uh which is more memorable you know

349

00:14:54,530 --> 00:14:53,100

in some ways the best of the few of the

350

00:14:56,389 --> 00:14:54,540

year but there'll probably be another

351
00:14:58,189 --> 00:14:56,399
100 who releases equal I could probably

352
00:15:00,530 --> 00:14:58,199
name off we really want to get to it oh

353
00:15:03,110 --> 00:15:00,540
you know what can I can can I run okay

354
00:15:05,750 --> 00:15:03,120
I'm gonna run some names by you

355
00:15:07,430 --> 00:15:05,760
um my my a list of of free thinking

356
00:15:08,329 --> 00:15:07,440
physicists and I think at the top of

357
00:15:11,470 --> 00:15:08,339
that list

358
00:15:14,509 --> 00:15:11,480
John Wheeler yep yeah

359
00:15:18,710 --> 00:15:14,519
and black holes and what was all part of

360
00:15:21,069 --> 00:15:18,720
his area yeah and he I think that other

361
00:15:23,389 --> 00:15:21,079
physicists especially today right

362
00:15:26,750 --> 00:15:23,399
they'll they'll look back and go and

363
00:15:29,930 --> 00:15:26,760

John Wheeler was crazy that guy thought

364

00:15:33,110 --> 00:15:29,940

outside of the box John Wheeler taught

365

00:15:36,650 --> 00:15:33,120

me how to think differently and he's got

366

00:15:39,410 --> 00:15:36,660

that respect but he's not a name that we

367

00:15:43,610 --> 00:15:39,420

would put up there with with so many

368

00:15:46,129 --> 00:15:43,620

others very quickly John Wheeler is the

369

00:15:48,769 --> 00:15:46,139

physicist physicist but he was he wasn't

370

00:15:50,509 --> 00:15:48,779

a rock star was he no no I mean probably

371

00:15:52,670 --> 00:15:50,519

more than most is the fact that he is a

372

00:15:54,350 --> 00:15:52,680

he's a household name amongst physicists

373

00:15:56,810 --> 00:15:54,360

at least you know most of us would know

374

00:15:59,870 --> 00:15:56,820

him uh but even then you know that so

375

00:16:01,310 --> 00:15:59,880

he's he's popular but he's you know not

376

00:16:03,410 --> 00:16:01,320

not one of those ones everybody got

377

00:16:04,670 --> 00:16:03,420

legendary uh Freeman Dyson is probably

378

00:16:06,590 --> 00:16:04,680

most the only know because of the Dyson

379

00:16:08,269 --> 00:16:06,600

Sphere and you know that he was a

380

00:16:10,069 --> 00:16:08,279

popular tournament until fairly recent

381

00:16:11,990 --> 00:16:10,079

videos either uh here's another

382

00:16:13,490 --> 00:16:12,000

brilliant one Richard Feynman you know

383

00:16:16,490 --> 00:16:13,500

was he was one of those household names

384

00:16:18,050 --> 00:16:16,500

but I can name it like tiplo Hoyle they

385

00:16:20,150 --> 00:16:18,060

probably would have been more famous if

386

00:16:21,650 --> 00:16:20,160

they hadn't been uh on the more

387

00:16:23,750 --> 00:16:21,660

controversial side of some things like

388

00:16:25,490 --> 00:16:23,760

Evie Loeb famous guy but mostly for

389

00:16:27,470 --> 00:16:25,500

controversial stuff he says but he's

390

00:16:28,730 --> 00:16:27,480

brilliant as like to my folks just

391

00:16:30,170 --> 00:16:28,740

because you have a crazy idea in physics

392

00:16:31,670 --> 00:16:30,180

it might be a little bit nuts doesn't

393

00:16:33,110 --> 00:16:31,680

mean you're a bad physicist that just

394

00:16:34,850 --> 00:16:33,120

means you're normal for physicist okay

395

00:16:37,850 --> 00:16:34,860

we're in the field it's nuts every

396

00:16:40,189 --> 00:16:37,860

single one yeah tipler tipler is

397

00:16:42,829 --> 00:16:40,199

another one like wheeler

398

00:16:46,490 --> 00:16:42,839

um I think you know he's tipler's at

399

00:16:51,470 --> 00:16:46,500

the tippy top in in my world

400

00:16:52,550 --> 00:16:51,480

um uh uh Kip Thorne to me uh and we're

401
00:16:54,350 --> 00:16:52,560
going to spend a lot of time talking

402
00:16:56,210 --> 00:16:54,360
about Kip tonight of course too as well

403
00:16:57,650 --> 00:16:56,220
well and you can't talk about Kip and

404
00:17:00,290 --> 00:16:57,660
and wormholes without talking about

405
00:17:02,150 --> 00:17:00,300
tippler as well

406
00:17:04,669 --> 00:17:02,160
um and it sounds like I I really know

407
00:17:07,669 --> 00:17:04,679
what's going on but I'm just fascinated

408
00:17:10,850 --> 00:17:07,679
with these guys and and I try to read

409
00:17:14,329 --> 00:17:10,860
all of their material I've gone back and

410
00:17:17,510 --> 00:17:14,339
listened to feynman's lectures over the

411
00:17:19,429 --> 00:17:17,520
years and there and and and and watch

412
00:17:22,069 --> 00:17:19,439
there you can see some of them are on

413
00:17:23,990 --> 00:17:22,079

film that were that were shot and and a

414

00:17:26,150 --> 00:17:24,000

guy like Feynman who again outside of

415

00:17:28,390 --> 00:17:26,160

the box man very controversial

416

00:17:34,549 --> 00:17:28,400

um at the time and and still to this day

417

00:17:36,770 --> 00:17:34,559

but Feynman had a way of making uh every

418

00:17:39,169 --> 00:17:36,780

man or every woman you know and every

419

00:17:41,930 --> 00:17:39,179

person somebody like myself kind of get

420

00:17:44,570 --> 00:17:41,940

a grip on physics where I could sit back

421

00:17:47,350 --> 00:17:44,580

and go you know what dang I think I got

422

00:17:49,310 --> 00:17:47,360

it right I don't know

423

00:17:51,049 --> 00:17:49,320

I'm gonna get unpopular just because

424

00:17:52,430 --> 00:17:51,059

they get popular though at least it's

425

00:17:54,230 --> 00:17:52,440

called the Sagan effect I think that's

426

00:17:56,270 --> 00:17:54,240

actually a name for it is when a person

427

00:17:58,190 --> 00:17:56,280

gets so popular amongst the laymen for

428

00:18:00,230 --> 00:17:58,200

the field that his own fellow is still

429

00:18:01,789 --> 00:18:00,240

kind of poking at him because uh well

430

00:18:03,490 --> 00:18:01,799

you know he's not really as brilliant as

431

00:18:05,870 --> 00:18:03,500

all that and of course Sagan and fine

432

00:18:09,169 --> 00:18:05,880

especially was brilliant but Sagan was

433

00:18:10,730 --> 00:18:09,179

very very good at the very least

434

00:18:11,570 --> 00:18:10,740

um and the same for some means guys you

435

00:18:14,090 --> 00:18:11,580

know like

436

00:18:15,350 --> 00:18:14,100

you you have folks who are very good

437

00:18:17,090 --> 00:18:15,360

explain things of course that's kind of

438

00:18:18,770 --> 00:18:17,100

my [h__h] too so it's more important to me

439

00:18:20,510 --> 00:18:18,780

but if you can explain something to

440

00:18:21,950 --> 00:18:20,520

people it has a value because the very

441

00:18:24,110 --> 00:18:21,960

least you're creating new scientists and

442

00:18:26,029 --> 00:18:24,120

Feynman actually did some of the most

443

00:18:28,789 --> 00:18:26,039

fundamental War for quantum mechanics

444

00:18:30,890 --> 00:18:28,799

out there uh the band was brilliant in a

445

00:18:33,289 --> 00:18:30,900

resource sense too but he

446

00:18:35,450 --> 00:18:33,299

he could just get you to love the field

447

00:18:38,090 --> 00:18:35,460

he can get you above the field you know

448

00:18:40,970 --> 00:18:38,100

you know what I did with Feynman one day

449

00:18:42,590 --> 00:18:40,980

I'm not making this up man you'll get

450

00:18:45,169 --> 00:18:42,600

this

451
00:18:48,710 --> 00:18:45,179
um is I'm watching one of his lectures

452
00:18:51,350 --> 00:18:48,720
and he's drawing he's literally I'm not

453
00:18:53,450 --> 00:18:51,360
I'm not making this up it's like uh a

454
00:18:55,430 --> 00:18:53,460
circle a square and a triangle you know

455
00:18:57,890 --> 00:18:55,440
that's what he's like drawn right okay

456
00:18:59,570 --> 00:18:57,900
so now let's talk about the speed of

457
00:19:02,029 --> 00:18:59,580
light and I'm looking at this and he's

458
00:19:04,130 --> 00:19:02,039
explaining and he's got this real simple

459
00:19:06,230 --> 00:19:04,140
illustration it's like a stick figure

460
00:19:09,590 --> 00:19:06,240
it's like he's playing hangman you know

461
00:19:11,330 --> 00:19:09,600
this real fundamental drawing up up

462
00:19:12,650 --> 00:19:11,340
there and and I'm looking at that and

463
00:19:13,909 --> 00:19:12,660

he's explaining through and I'm and I

464

00:19:15,970 --> 00:19:13,919

said to myself

465

00:19:23,270 --> 00:19:15,980

he's faking it

466

00:19:26,690 --> 00:19:23,280

that that's he's getting me I'm

467

00:19:29,210 --> 00:19:26,700

believing what he is but that's that's

468

00:19:32,029 --> 00:19:29,220

how he would connect with his students

469

00:19:36,289 --> 00:19:32,039

you know he would break it down to these

470

00:19:39,950 --> 00:19:36,299

very simple ideas instead of you know a

471

00:19:42,830 --> 00:19:39,960

wall of equations right he had a way of

472

00:19:43,850 --> 00:19:42,840

of explaining this and I'm serious I

473

00:19:47,270 --> 00:19:43,860

thought that

474

00:19:49,010 --> 00:19:47,280

it's an act it's a smoke screen I think

475

00:19:51,230 --> 00:19:49,020

with the wall equation and you see

476

00:19:52,430 --> 00:19:51,240

enough in class going underground two in

477

00:19:53,870 --> 00:19:52,440

the field too you could be just going

478

00:19:55,789 --> 00:19:53,880

through it but usually it's one problem

479

00:19:57,650 --> 00:19:55,799

you're walking through for practice but

480

00:19:58,610 --> 00:19:57,660

you know the concepts themselves are you

481

00:20:00,230 --> 00:19:58,620

trying to explain the wall of equations

482

00:20:02,390 --> 00:20:00,240

anyone who's not a mathematician or

483

00:20:04,669 --> 00:20:02,400

physicists what's the point well you

484

00:20:05,870 --> 00:20:04,679

know you are you trying to prove them

485

00:20:07,669 --> 00:20:05,880

you really small because you say all

486

00:20:09,169 --> 00:20:07,679

sorts of all Queen equations or you can

487

00:20:10,549 --> 00:20:09,179

turn that big brain on to actually find

488

00:20:12,770 --> 00:20:10,559

some way to say it to people in a way

489

00:20:15,529 --> 00:20:12,780

they'll understand and I think that

490

00:20:16,909 --> 00:20:15,539

Feynman never Feynman probably had an

491

00:20:19,190 --> 00:20:16,919

ego like any number of other people but

492

00:20:20,090 --> 00:20:19,200

he never ever put his nose up in the air

493

00:20:23,390 --> 00:20:20,100

you feel like he could have gone and

494

00:20:25,610 --> 00:20:23,400

gotten a beer with a guy yeah 100 100 he

495

00:20:28,610 --> 00:20:25,620

he could be welcome in my house anytime

496

00:20:31,250 --> 00:20:28,620

he's a very cool dude very funny he was

497

00:20:32,990 --> 00:20:31,260

a funny guy too oh yeah people say he's

498

00:20:34,430 --> 00:20:33,000

like oh I bet you really love asthma for

499

00:20:36,289 --> 00:20:34,440

your authors he calls like well yeah I

500

00:20:38,570 --> 00:20:36,299

do and I'm named after him and it's just

501
00:20:40,430 --> 00:20:38,580
that uh you're full of asthma everybody

502
00:20:41,930 --> 00:20:40,440
say so whose huge role models like well

503
00:20:43,430 --> 00:20:41,940
Ben Franklin and Richard Feynman those

504
00:20:44,990 --> 00:20:43,440
are my two big ones I try to emulate

505
00:20:46,330 --> 00:20:45,000
yeah know followed very shortly

506
00:20:50,450 --> 00:20:46,340
afterwards

507
00:20:52,909 --> 00:20:50,460
and Richard Feynman uh it's just uh you

508
00:20:55,430 --> 00:20:52,919
know and he Dr he dressed right you know

509
00:20:58,190 --> 00:20:55,440
the the black tie and the the you know

510
00:21:00,230 --> 00:20:58,200
always wore suit style yeah yeah style

511
00:21:01,909 --> 00:21:00,240
yeah I liked him a lot

512
00:21:04,250 --> 00:21:01,919
um so let's talk about wormholes for a

513
00:21:08,230 --> 00:21:04,260

second and before we jump

514

00:21:11,930 --> 00:21:08,240

um wormholes today uh are definitely

515

00:21:15,230 --> 00:21:11,940

it's a it's a trending term

516

00:21:18,770 --> 00:21:15,240

um it is exploited throughout theater

517

00:21:20,990 --> 00:21:18,780

and and science fiction books now

518

00:21:23,390 --> 00:21:21,000

um it seems to be everywhere last week

519

00:21:25,070 --> 00:21:23,400

we'll go through that too as well uh

520

00:21:29,330 --> 00:21:25,080

what happened up at Lawrence Livermore

521

00:21:31,430 --> 00:21:29,340

uh which is uh crazy in of itself

522

00:21:34,029 --> 00:21:31,440

um but let's go let's let's go back to

523

00:21:39,590 --> 00:21:34,039

the beginning because when we talk about

524

00:21:42,409 --> 00:21:39,600

uh Einstein's field equations and uh the

525

00:21:46,310 --> 00:21:42,419

the fact that the Einstein Rosen bridge

526

00:21:49,549 --> 00:21:46,320

that was sort of later coined that it

527

00:21:52,750 --> 00:21:49,559

was it was demonstrated in in the math

528

00:21:54,950 --> 00:21:52,760

and in the equations but this wasn't

529

00:21:57,110 --> 00:21:54,960

necessarily something Einstein didn't

530

00:21:58,310 --> 00:21:57,120

call it a wormhole right no I think

531

00:22:00,230 --> 00:21:58,320

actually I think it might have been

532

00:22:03,830 --> 00:22:00,240

wheeler who came up with that Tom John

533

00:22:07,190 --> 00:22:03,840

Wheeler much much later but but uh other

534

00:22:09,130 --> 00:22:07,200

physicists yeah yeah uh other physicists

535

00:22:12,590 --> 00:22:09,140

went and looked at the field equations

536

00:22:14,409 --> 00:22:12,600

and extrapolated uh the Wormhole

537

00:22:17,330 --> 00:22:14,419

Einstein bridge out of it correct

538

00:22:19,070 --> 00:22:17,340

basically yeah and and you know again

539

00:22:20,270 --> 00:22:19,080

that the the field equation itself

540

00:22:22,669 --> 00:22:20,280

though that's actually more Emily

541

00:22:25,490 --> 00:22:22,679

noethilis woke but uh so you know that

542

00:22:26,870 --> 00:22:25,500

that's that is always a horrible and try

543

00:22:28,370 --> 00:22:26,880

to explain because you can do special

544

00:22:30,169 --> 00:22:28,380

relativity people but General relatively

545

00:22:31,610 --> 00:22:30,179

in that field equation is really you got

546

00:22:33,890 --> 00:22:31,620

to have that linear algebra background

547

00:22:35,870 --> 00:22:33,900

intense as to really not a stare at not

548

00:22:37,930 --> 00:22:35,880

get confused but it comes down to

549

00:22:40,730 --> 00:22:37,940

basically

550

00:22:42,950 --> 00:22:40,740

you have a certain famous valve you know

551

00:22:44,330 --> 00:22:42,960

you get the equation it sort of gives

552

00:22:45,890 --> 00:22:44,340

you the warm holes out of it yes they

553

00:22:47,210 --> 00:22:45,900

found certain places but you have the

554

00:22:49,310 --> 00:22:47,220

singularities there the place where you

555

00:22:51,049 --> 00:22:49,320

had the weird zeros in there and that's

556

00:22:52,370 --> 00:22:51,059

essentially where you start seeing not

557

00:22:55,070 --> 00:22:52,380

that these will prove in any way to be

558

00:22:57,529 --> 00:22:55,080

true but that in the math they can

559

00:22:59,390 --> 00:22:57,539

happen and that is one of those places I

560

00:23:01,789 --> 00:22:59,400

tend to differ with some of the other

561

00:23:04,549 --> 00:23:01,799

folks on this is I don't believe that

562

00:23:06,350 --> 00:23:04,559

math equals reality so I'm a little bit

563

00:23:08,450 --> 00:23:06,360

more skeptical on their existence seems

564

00:23:10,310 --> 00:23:08,460

I think with negative matter

565

00:23:12,169 --> 00:23:10,320

um and I mean I'm not alone in that

566

00:23:14,750 --> 00:23:12,179

Viewpoint we all respect Kip Thor and

567

00:23:16,130 --> 00:23:14,760

seeing as we all respect um alcubier but

568

00:23:17,330 --> 00:23:16,140

it's even though kind of schedule a lot

569

00:23:19,789 --> 00:23:17,340

of times when these things can be real

570

00:23:22,310 --> 00:23:19,799

but there's so many different aspects of

571

00:23:23,450 --> 00:23:22,320

the Wormhole can represent if true and

572

00:23:25,450 --> 00:23:23,460

what's messed up is you could actually

573

00:23:27,470 --> 00:23:25,460

have some versions of that or true

574

00:23:29,330 --> 00:23:27,480

contradictory to other ones that have

575

00:23:30,710 --> 00:23:29,340

completely different effects such as

576

00:23:33,110 --> 00:23:30,720

ones that open up into different

577

00:23:35,270 --> 00:23:33,120

universes or ones that were only one way

578

00:23:38,029 --> 00:23:35,280

ones that were two-way ones that went

579

00:23:39,770 --> 00:23:38,039

back in time and there's so many options

580

00:23:41,750 --> 00:23:39,780

that go there and consequences of it

581

00:23:43,070 --> 00:23:41,760

that even if they turn out to have to be

582

00:23:45,230 --> 00:23:43,080

true they're so fascinating as they as

583

00:23:46,630 --> 00:23:45,240

an actual mathematical and theoretical

584

00:23:49,789 --> 00:23:46,640

exercise

585

00:23:51,830 --> 00:23:49,799

so let's touch let's touch on on some of

586

00:23:54,409 --> 00:23:51,840

these different versions because and

587

00:23:58,190 --> 00:23:54,419

again jump in at any time and correct me

588

00:24:00,590 --> 00:23:58,200

okay uh I'm asking the questions but the

589

00:24:03,649 --> 00:24:00,600

questions may be asking correctly and so

590

00:24:04,909 --> 00:24:03,659

you can you can fix the question but

591

00:24:07,730 --> 00:24:04,919

um if I'm understanding everything

592

00:24:10,730 --> 00:24:07,740

correctly uh in the field equations work

593

00:24:13,669 --> 00:24:10,740

uh that everything was extrapolated out

594

00:24:16,270 --> 00:24:13,679

of it yes it was the Einstein Rosen

595

00:24:19,970 --> 00:24:16,280

bridge but that was a one-way street

596

00:24:21,590 --> 00:24:19,980

right that was a single direction that

597

00:24:23,810 --> 00:24:21,600

wasn't transversible

598

00:24:25,490 --> 00:24:23,820

right well it did again the awesome

599

00:24:27,470 --> 00:24:25,500

alternative options on that people come

600

00:24:29,210 --> 00:24:27,480

but since then but the usual notion was

601
00:24:30,470 --> 00:24:29,220
if you get through there you wouldn't be

602
00:24:32,630 --> 00:24:30,480
able to transmit matter through it at

603
00:24:34,490 --> 00:24:32,640
all it'd probably be destructive process

604
00:24:36,169 --> 00:24:34,500
and you could send mantle through it

605
00:24:37,370 --> 00:24:36,179
probably collapse on the way through so

606
00:24:39,169 --> 00:24:37,380
you send something through and then you

607
00:24:41,210 --> 00:24:39,179
can't convince out backwards because you

608
00:24:43,850 --> 00:24:41,220
don't know if they survived or not and

609
00:24:45,529 --> 00:24:43,860
that was generally held to be the idea

610
00:24:47,570 --> 00:24:45,539
for it regardless of whether they are

611
00:24:50,029 --> 00:24:47,580
intra Universal ones or they pop back

612
00:24:52,010 --> 00:24:50,039
out in this universe somewhere else

613
00:24:53,330 --> 00:24:52,020

that you know once you open one up bam

614

00:24:55,789 --> 00:24:53,340

close as soon as anything through

615

00:24:57,110 --> 00:24:55,799

possibly you know you could get more

616

00:24:58,789 --> 00:24:57,120

than one through though they've been

617

00:25:00,770 --> 00:24:58,799

revision set maybe you could keep it

618

00:25:02,090 --> 00:25:00,780

open for the wild four decade maybe it

619

00:25:05,990 --> 00:25:02,100

doesn't just pop shut the first time you

620

00:25:07,970 --> 00:25:06,000

said right exactly and so

621

00:25:10,010 --> 00:25:07,980

um the Einstein Rose and Bridge we'll

622

00:25:11,510 --> 00:25:10,020

stay with that because of its timeline

623

00:25:14,930 --> 00:25:11,520

right we're starting at the the

624

00:25:16,549 --> 00:25:14,940

beginning so let's just uh stay right

625

00:25:19,750 --> 00:25:16,559

there for a second

626

00:25:24,169 --> 00:25:19,760

um Einstein had a way

627

00:25:28,610 --> 00:25:24,179

of uh creating math

628

00:25:31,210 --> 00:25:28,620

from stuff that he hadn't seen okay he

629

00:25:34,610 --> 00:25:31,220

did this a lot obviously yeah

630

00:25:36,769 --> 00:25:34,620

gravity waves and and bending of space

631

00:25:41,149 --> 00:25:36,779

time and all of that he he couldn't see

632

00:25:43,669 --> 00:25:41,159

any of that he but he certainly uh did

633

00:25:45,350 --> 00:25:43,679

the work of of creating the math which

634

00:25:49,870 --> 00:25:45,360

is the case with the Einstein Rosen

635

00:25:53,330 --> 00:25:49,880

Bridge did he consider this a natural

636

00:25:54,470 --> 00:25:53,340

phenomena that was created with the

637

00:25:56,750 --> 00:25:54,480

universe

638

00:25:58,130 --> 00:25:56,760

I don't think he viewed it that way I

639

00:26:00,529 --> 00:25:58,140

mean us yes but he probably you know

640

00:26:01,490 --> 00:26:00,539

it's a theoretical thing anyway but uh I

641

00:26:03,590 --> 00:26:01,500

don't think he expected them to really

642

00:26:04,789 --> 00:26:03,600

pop up in nature much I feel bad by the

643

00:26:06,830 --> 00:26:04,799

way if I didn't say because there's two

644

00:26:08,630 --> 00:26:06,840

names on there Einstein and Rosen uh

645

00:26:11,330 --> 00:26:08,640

rosen's grandson was my chemistry

646

00:26:15,409 --> 00:26:13,789

is that right yeah long story on the

647

00:26:17,450 --> 00:26:15,419

background there but and he did work

648

00:26:18,789 --> 00:26:17,460

with so many Fascinating People too

649

00:26:21,350 --> 00:26:18,799

um you know yeah

650

00:26:23,390 --> 00:26:21,360

there's so many other people in you know

651
00:26:25,130 --> 00:26:23,400
involved with him who have their own

652
00:26:26,450 --> 00:26:25,140
incredibly fascinating Tales we see that

653
00:26:28,190 --> 00:26:26,460
more at the Manhattan Project because

654
00:26:31,190 --> 00:26:28,200
they were so stop stop stop stop stop

655
00:26:35,149 --> 00:26:31,200
stop stop stop I gotta put that in there

656
00:26:38,269 --> 00:26:35,159
you just did it again okay so you had

657
00:26:40,269 --> 00:26:38,279
Rosen right so I'm working with this guy

658
00:26:43,210 --> 00:26:40,279
his last name

659
00:26:45,590 --> 00:26:43,220
Oppenheimer oh

660
00:26:47,570 --> 00:26:45,600
yeah this is this is in the music

661
00:26:49,909 --> 00:26:47,580
industry now well you said Manhattan

662
00:26:53,029 --> 00:26:49,919
Project so that I had to put this so one

663
00:26:56,690 --> 00:26:53,039

day I was like uh so uh I just gotta ask

664

00:26:59,890 --> 00:26:56,700

you uh this this this right

665

00:27:02,630 --> 00:26:59,900

uh to my grandfather it looks like dang

666

00:27:05,330 --> 00:27:02,640

yeah it's weird right Six Degrees of

667

00:27:07,490 --> 00:27:05,340

Separation sometimes it's like two it

668

00:27:09,049 --> 00:27:07,500

can be surprising I mean it I did not

669

00:27:11,090 --> 00:27:09,059

even know till I was an adult that I had

670

00:27:12,230 --> 00:27:11,100

a an uncle and his his twin brother who

671

00:27:15,049 --> 00:27:12,240

were like famous linguists and

672

00:27:16,370 --> 00:27:15,059

archaeologists and I ironically read one

673

00:27:18,529 --> 00:27:16,380

of their walks before because I was in

674

00:27:20,810 --> 00:27:18,539

the area that I found fascinating so but

675

00:27:22,610 --> 00:27:20,820

uh yeah it's really a small world out

676
00:27:26,269 --> 00:27:22,620
there at times

677
00:27:29,570 --> 00:27:26,279
so uh going back to this uh whether

678
00:27:31,750 --> 00:27:29,580
these were creations of the universe

679
00:27:35,450 --> 00:27:31,760
right of nature

680
00:27:38,450 --> 00:27:35,460
or do you feel that Einstein was saying

681
00:27:41,269 --> 00:27:38,460
that this was a possibility of something

682
00:27:44,149 --> 00:27:41,279
that we could create are you saying that

683
00:27:45,590 --> 00:27:44,159
that's the way he approached it I I

684
00:27:47,210 --> 00:27:45,600
think he would have thought that it's

685
00:27:49,070 --> 00:27:47,220
it's I'm sure he would have thought of

686
00:27:51,230 --> 00:27:49,080
that he was pretty comprehensive and

687
00:27:52,850 --> 00:27:51,240
people you know this is It's kind of

688
00:27:54,289 --> 00:27:52,860

being the Fermi Paradox things after

689

00:27:56,029 --> 00:27:54,299

years and years of talking about having

690

00:27:57,230 --> 00:27:56,039

people talk to me about it almost

691

00:27:58,370 --> 00:27:57,240

everything you could imagine that

692

00:28:00,590 --> 00:27:58,380

someone's caught up with has been you

693

00:28:01,909 --> 00:28:00,600

know sent his way I'm sure every one of

694

00:28:03,890 --> 00:28:01,919

his colleagues students would have said

695

00:28:07,990 --> 00:28:03,900

hey Albert I was thinking the other day

696

00:28:10,610 --> 00:28:08,000

about your Einstein rosenbridge

697

00:28:11,990 --> 00:28:10,620

what if I did X so I'm I'm sure he must

698

00:28:13,490 --> 00:28:12,000

have thought that as an option yeah I'd

699

00:28:15,409 --> 00:28:13,500

be surprised we had somebody bring it up

700

00:28:16,610 --> 00:28:15,419

the way at least and when we we still

701
00:28:18,169 --> 00:28:16,620
consider an option we say how would we

702
00:28:20,450 --> 00:28:18,179
build these things and

703
00:28:22,190 --> 00:28:20,460
and that's that gets even trickier but

704
00:28:24,470 --> 00:28:22,200
might be possible this sort of a lot of

705
00:28:26,090 --> 00:28:24,480
potentially building them in the 90s I

706
00:28:27,130 --> 00:28:26,100
think made some made some headways to

707
00:28:29,330 --> 00:28:27,140
make the idea a little bit more

708
00:28:33,049 --> 00:28:29,340
plausible again and of course sort of

709
00:28:36,649 --> 00:28:33,059
kept on now what did you uh think of you

710
00:28:37,630 --> 00:28:36,659
know in 1928 when Hermann Weil uh you

711
00:28:40,190 --> 00:28:37,640
know German

712
00:28:43,130 --> 00:28:40,200
he's you know it's kind of weird he was

713
00:28:46,430 --> 00:28:43,140

a hybrid he was a philosopher

714

00:28:50,390 --> 00:28:46,440

theoretical physicist which which is an

715

00:28:52,549 --> 00:28:50,400

oxymoron today right it is sadly less

716

00:28:55,010 --> 00:28:52,559

common than I I'd like to see I tend to

717

00:28:57,950 --> 00:28:55,020

tell it that way myself so well you are

718

00:29:00,890 --> 00:28:57,960

definitely you're a philosophical and

719

00:29:02,630 --> 00:29:00,900

you're almost theological at times well

720

00:29:04,010 --> 00:29:02,640

I was thinking of a typical again

721

00:29:05,570 --> 00:29:04,020

because we have an episode coming upon

722

00:29:06,710 --> 00:29:05,580

his favorite one which was a deal make a

723

00:29:08,630 --> 00:29:06,720

point but

724

00:29:10,250 --> 00:29:08,640

um it's not that I feel that every

725

00:29:12,110 --> 00:29:10,260

scientist needs to have a background of

726

00:29:13,549 --> 00:29:12,120

philosophy and it's not I think the

727

00:29:15,110 --> 00:29:13,559

philosophy is really all that great of a

728

00:29:16,789 --> 00:29:15,120

fear to go studying as a major these

729

00:29:19,130 --> 00:29:16,799

days it's more that I feel like you

730

00:29:22,010 --> 00:29:19,140

really need to have that rooted

731

00:29:23,630 --> 00:29:22,020

background in classic philosophy if you

732

00:29:25,730 --> 00:29:23,640

really want to be discussing much beyond

733

00:29:27,169 --> 00:29:25,740

the technical aspects of Science and I

734

00:29:28,970 --> 00:29:27,179

see that with a lot of my colleagues

735

00:29:30,470 --> 00:29:28,980

where it's just like well you've now

736

00:29:32,990 --> 00:29:30,480

brought up a philosophical point that

737

00:29:35,649 --> 00:29:33,000

was you know Lane and slain you know

738

00:29:38,210 --> 00:29:35,659

decades ago or centuries ago

739

00:29:41,389 --> 00:29:38,220

let's be straight I did a show on this

740

00:29:46,250 --> 00:29:41,399

last night strangely enough uh where I

741

00:29:48,710 --> 00:29:46,260

discussed this uh in depth that we we

742

00:29:52,010 --> 00:29:48,720

you just said it you've got Newton and

743

00:29:54,230 --> 00:29:52,020

Einstein right the the two dudes Newton

744

00:29:57,230 --> 00:29:54,240

I am convinced

745

00:30:00,169 --> 00:29:57,240

that he would not have put things

746

00:30:04,549 --> 00:30:00,179

together the way that he did and that

747

00:30:06,049 --> 00:30:04,559

includes principia right that includes a

748

00:30:08,090 --> 00:30:06,059

calculus that include you know

749

00:30:12,049 --> 00:30:08,100

everything that he Advanced and you know

750

00:30:15,049 --> 00:30:12,059

an astronomy or if he didn't have his

751

00:30:18,350 --> 00:30:15,059

theological background his religious

752

00:30:22,789 --> 00:30:18,360

studies his Bible studies and his

753

00:30:26,570 --> 00:30:22,799

hermeticism and his Alchemy and his

754

00:30:29,149 --> 00:30:26,580

philosophy and the Enlightenment and

755

00:30:31,909 --> 00:30:29,159

everything else the physics and that

756

00:30:34,430 --> 00:30:31,919

side and the gravity we're a byproduct

757

00:30:35,870 --> 00:30:34,440

of of everything that he was and it

758

00:30:37,970 --> 00:30:35,880

allowed him to look in a certain

759

00:30:40,010 --> 00:30:37,980

direction he wouldn't have called

760

00:30:42,350 --> 00:30:40,020

himself a physical I mean the the uh the

761

00:30:43,970 --> 00:30:42,360

chair that that Newton held assigned

762

00:30:46,370 --> 00:30:43,980

Newton um well they didn't get it after

763

00:30:49,070 --> 00:30:46,380

him the the chair that Hocking held was

764

00:30:50,510 --> 00:30:49,080

the Isaac Newton chill of mathematics

765

00:30:51,950 --> 00:30:50,520

um at that time they were called a

766

00:30:53,630 --> 00:30:51,960

natural philosophy and pretty much been

767

00:30:55,730 --> 00:30:53,640

all science but it would have been

768

00:30:58,430 --> 00:30:55,740

absurd to have gone to college back then

769

00:30:59,510 --> 00:30:58,440

and say that you had a video style you

770

00:31:01,070 --> 00:30:59,520

know that would have been considered far

771

00:31:03,289 --> 00:31:01,080

more important than if he got looked at

772

00:31:04,370 --> 00:31:03,299

some ugly rocks what I you know the

773

00:31:05,690 --> 00:31:04,380

difference being there was so important

774

00:31:08,750 --> 00:31:05,700

to actually start getting that Hands-On

775

00:31:10,669 --> 00:31:08,760

practical experimental data and I think

776

00:31:13,730 --> 00:31:10,679

that's in some ways what can sign the

777

00:31:15,049 --> 00:31:13,740

classical era to stagnation was they

778

00:31:16,970 --> 00:31:15,059

were unwilling to go beyond the

779

00:31:18,590 --> 00:31:16,980

philosophical logic bids and sucking

780

00:31:20,149 --> 00:31:18,600

their hands dirty and you know

781

00:31:22,430 --> 00:31:20,159

experimenting you know finding out what

782

00:31:23,690 --> 00:31:22,440

happened if we did do the soil

783

00:31:25,430 --> 00:31:23,700

differently if we actually got our hands

784

00:31:27,830 --> 00:31:25,440

dirty and then ran some experiments and

785

00:31:29,090 --> 00:31:27,840

some tests but at the same time I could

786

00:31:31,490 --> 00:31:29,100

almost make the argument the other way

787

00:31:33,289 --> 00:31:31,500

these days is uh especially the

788

00:31:35,570 --> 00:31:33,299

theorists who are often very divorced

789

00:31:37,490 --> 00:31:35,580

from experimentalism anyway

790

00:31:39,710 --> 00:31:37,500

um in some of their work there is a

791

00:31:41,870 --> 00:31:39,720

tendency to have abandoned philosophy as

792

00:31:44,570 --> 00:31:41,880

saying this is like a competitor failed

793

00:31:46,789 --> 00:31:44,580

field of physics and it's it's maybe

794

00:31:48,289 --> 00:31:46,799

it's too spiritual or pseudo you know

795

00:31:50,630 --> 00:31:48,299

pseudoscientific I said well that's

796

00:31:51,889 --> 00:31:50,640

that's not it at all you know you have

797

00:31:53,870 --> 00:31:51,899

to actually be willing to study these

798

00:31:56,149 --> 00:31:53,880

fiances on the green yes you must focus

799

00:31:58,669 --> 00:31:56,159

on your specialty but you must not focus

800

00:32:00,950 --> 00:31:58,679

on your specialty and then foolishly say

801
00:32:02,570 --> 00:32:00,960
that it eliminates the other field be

802
00:32:04,190 --> 00:32:02,580
like saying that chemistry has no value

803
00:32:05,889 --> 00:32:04,200
because it's a subfural physics right

804
00:32:08,450 --> 00:32:05,899
right

805
00:32:13,149 --> 00:32:08,460
I'm going to be a specialist and I'm

806
00:32:15,529 --> 00:32:13,159
going to ignore everything else right

807
00:32:18,889 --> 00:32:15,539
there's a there's a world out there

808
00:32:21,110 --> 00:32:18,899
there's a reality out there and and you

809
00:32:23,330 --> 00:32:21,120
have to learn it and when we here's

810
00:32:25,010 --> 00:32:23,340
here's the other strange thing uh no

811
00:32:27,350 --> 00:32:25,020
we'll get back to wormholes in just a

812
00:32:30,850 --> 00:32:27,360
second but you just mentioned Socrates

813
00:32:34,250 --> 00:32:30,860

right or maybe it was Aristotle

814

00:32:36,289 --> 00:32:34,260

and uh yeah one of the two very nearly

815

00:32:38,810 --> 00:32:36,299

same things

816

00:32:42,190 --> 00:32:38,820

but both of them

817

00:32:45,950 --> 00:32:42,200

said the same thing that

818

00:32:49,909 --> 00:32:45,960

philosophy didn't start with them or the

819

00:32:52,430 --> 00:32:49,919

Greeks that it all came from Egypt and

820

00:32:54,350 --> 00:32:52,440

and then so when you follow the chain

821

00:32:57,889 --> 00:32:54,360

and the names that they have dropped

822

00:32:59,289 --> 00:32:57,899

over the years uh back then but uh have

823

00:33:02,710 --> 00:32:59,299

been documented

824

00:33:06,769 --> 00:33:02,720

it's 1500 years old

825

00:33:10,730 --> 00:33:06,779

1500 years prior to when Socrates uh

826

00:33:12,950 --> 00:33:10,740

visited Egypt in 300 BC civilization was

827

00:33:17,149 --> 00:33:12,960

already ancient when when Athens was the

828

00:33:19,430 --> 00:33:17,159

big place right right and and and to

829

00:33:21,830 --> 00:33:19,440

stay with that with that idea going

830

00:33:24,350 --> 00:33:21,840

through to today

831

00:33:26,409 --> 00:33:24,360

um Isaac Newton you know it's three 300

832

00:33:29,090 --> 00:33:26,419

years ago now I think he died in like

833

00:33:30,590 --> 00:33:29,100

1720 or something like that and we're in

834

00:33:36,590 --> 00:33:30,600

2000 so he was alive sometime in the

835

00:33:42,590 --> 00:33:39,889

whole period you know of 5 000 years of

836

00:33:43,509 --> 00:33:42,600

that science and and development of the

837

00:33:46,250 --> 00:33:43,519

world

838

00:33:48,110 --> 00:33:46,260

all of those scientists and you can call

839

00:33:50,149 --> 00:33:48,120

some of them physicists and astronomers

840

00:33:53,090 --> 00:33:50,159

and mathematicians

841

00:33:55,789 --> 00:33:53,100

um they were all philosophical they were

842

00:33:58,909 --> 00:33:55,799

all philosophers and they all had

843

00:34:02,149 --> 00:33:58,919

spiritual foundations it's a really

844

00:34:04,909 --> 00:34:02,159

really strange thing and it it that it

845

00:34:08,450 --> 00:34:04,919

just doesn't exist today it's it's just

846

00:34:10,310 --> 00:34:08,460

this denial I mean I I try to you know

847

00:34:11,810 --> 00:34:10,320

we're the shows because of mine is I try

848

00:34:13,010 --> 00:34:11,820

to actually you know everyone's got

849

00:34:14,270 --> 00:34:13,020

their personal beliefs and that's how

850

00:34:16,070 --> 00:34:14,280

they should tend to stay when you're

851
00:34:17,690 --> 00:34:16,080
trying to talk science but there's a

852
00:34:19,669 --> 00:34:17,700
difference between keeping your your

853
00:34:22,010 --> 00:34:19,679
your personal beliefs or your politics

854
00:34:23,210 --> 00:34:22,020
out of Science and pretending as though

855
00:34:25,010 --> 00:34:23,220
you should not have these things or

856
00:34:26,869 --> 00:34:25,020
they're bad to have whether or not you

857
00:34:28,790 --> 00:34:26,879
you whatever you have you don't have to

858
00:34:30,230 --> 00:34:28,800
abandon to go to science if you're

859
00:34:31,970 --> 00:34:30,240
religious you don't have to stop being

860
00:34:33,230 --> 00:34:31,980
religious to be in size that's your

861
00:34:35,329 --> 00:34:33,240
scientist you can go and have the you

862
00:34:37,250 --> 00:34:35,339
know these things all sometimes

863
00:34:39,470 --> 00:34:37,260

problematically together but they're not

864

00:34:41,270 --> 00:34:39,480

in any way antithetical and it's a shame

865

00:34:42,889 --> 00:34:41,280

that some folks do feel that way on the

866

00:34:43,909 --> 00:34:42,899

flip side obviously you know you don't

867

00:34:45,710 --> 00:34:43,919

have to have these things to have them

868

00:34:46,970 --> 00:34:45,720

go to window they're not matched but we

869

00:34:48,829 --> 00:34:46,980

start talking about whether or not you

870

00:34:49,909 --> 00:34:48,839

know the core they are what Newton the

871

00:34:50,770 --> 00:34:49,919

others are going they wanted to

872

00:34:52,790 --> 00:34:50,780

understand

873

00:34:54,649 --> 00:34:52,800

reality all around them and it wasn't

874

00:34:56,510 --> 00:34:54,659

just how does this rock fall down a hill

875

00:34:58,310 --> 00:34:56,520

that's not really why it even goes into

876

00:35:00,230 --> 00:34:58,320

physics you look up the giant starry

877

00:35:01,790 --> 00:35:00,240

night or you see that big picture of

878

00:35:06,710 --> 00:35:01,800

like the Deep field study you know you

879

00:35:08,690 --> 00:35:06,720

say why is this why is this why why does

880

00:35:10,430 --> 00:35:08,700

you know all of this Wolf the way it

881

00:35:12,050 --> 00:35:10,440

does what came before this what happened

882

00:35:14,030 --> 00:35:12,060

so I cut something in half over and over

883

00:35:16,910 --> 00:35:14,040

again all those questions that we have

884

00:35:18,470 --> 00:35:16,920

when we're kids going up in game wise on

885

00:35:19,970 --> 00:35:18,480

Theory which we'll see if I was stopping

886

00:35:21,050 --> 00:35:19,980

asking those questions that's why people

887

00:35:23,510 --> 00:35:21,060

go into this stuff they want to

888

00:35:24,829 --> 00:35:23,520

understand how things work and you know

889

00:35:25,910 --> 00:35:24,839

whether you know there are so many

890

00:35:28,190 --> 00:35:25,920

options

891

00:35:29,750 --> 00:35:28,200

for how that might be the case they

892

00:35:30,950 --> 00:35:29,760

don't you know the philosophy of whether

893

00:35:32,810 --> 00:35:30,960

it's a philosophy you're going for what

894

00:35:34,490 --> 00:35:32,820

theology to take a pick but to ignore

895

00:35:37,069 --> 00:35:34,500

that side

896

00:35:39,589 --> 00:35:37,079

to to just go ahead and say I'm going to

897

00:35:40,849 --> 00:35:39,599

bypass that option because I it will

898

00:35:42,890 --> 00:35:40,859

join my hands when I can't have them

899

00:35:44,510 --> 00:35:42,900

with signs that's wrong you know you

900

00:35:46,550 --> 00:35:44,520

don't have to go that way but you should

901
00:35:47,990 --> 00:35:46,560
leave the door open you shouldn't feel

902
00:35:50,390 --> 00:35:48,000
you have to

903
00:35:52,310 --> 00:35:50,400
not explore philosophy or not explore

904
00:35:54,050 --> 00:35:52,320
your spiritual side if you want to if

905
00:35:55,910 --> 00:35:54,060
you want to go into science they are not

906
00:35:57,230 --> 00:35:55,920
in order should you be afraid to look

907
00:35:59,150 --> 00:35:57,240
into science because you have those

908
00:36:00,530 --> 00:35:59,160
sides too I think the folks are afraid

909
00:36:02,390 --> 00:36:00,540
it's going to challenge their their

910
00:36:04,010 --> 00:36:02,400
beliefs if they go and learn science and

911
00:36:06,290 --> 00:36:04,020
so they're not allowed to hold the

912
00:36:08,710 --> 00:36:06,300
beliefs they previously had yeah and I

913
00:36:11,390 --> 00:36:08,720

have like an existential

914

00:36:13,250 --> 00:36:11,400

philosophical reason for thinking that

915

00:36:16,010 --> 00:36:13,260

and and not for the reasons you're

916

00:36:18,290 --> 00:36:16,020

correct I agree with you but I think uh

917

00:36:21,349 --> 00:36:18,300

there's another part to this it's just

918

00:36:24,410 --> 00:36:21,359

about freeing up your mind that's all

919

00:36:26,470 --> 00:36:24,420

just don't limit yourself don't close it

920

00:36:29,690 --> 00:36:26,480

down and don't deny and don't say no no

921

00:36:32,450 --> 00:36:29,700

you want to be able to uh if you're

922

00:36:34,930 --> 00:36:32,460

dealing with physics to to allow your

923

00:36:38,390 --> 00:36:34,940

mind to jump into another Direction

924

00:36:42,109 --> 00:36:38,400

because of a possibility that's all just

925

00:36:44,690 --> 00:36:42,119

get your mind your brain loosened up and

926
00:36:46,430 --> 00:36:44,700
and you do that with you know having an

927
00:36:47,930 --> 00:36:46,440
open mind and exploring other things

928
00:36:51,530 --> 00:36:47,940
that's the only reason

929
00:36:53,630 --> 00:36:51,540
uh for me to do it I don't know how they

930
00:36:54,890 --> 00:36:53,640
built Stonehenge I tend to take the

931
00:36:56,750 --> 00:36:54,900
Assumption there was normal humans

932
00:36:58,250 --> 00:36:56,760
walking with ahead of time but if I just

933
00:37:01,190 --> 00:36:58,260
rule out and say well there's no way it

934
00:37:02,030 --> 00:37:01,200
was more men from Atlantis I assume

935
00:37:03,890 --> 00:37:02,040
that's probably not the case but

936
00:37:05,450 --> 00:37:03,900
everybody said that's impossible and

937
00:37:07,250 --> 00:37:05,460
then someone comes by and this sort of

938
00:37:09,109 --> 00:37:07,260

thing does happen weirdo things you know

939

00:37:10,550 --> 00:37:09,119

weirdo at the time they seem normal to

940

00:37:12,710 --> 00:37:10,560

us now but they've seen weirdos to us

941

00:37:14,270 --> 00:37:12,720

then so he shows up says we got this

942

00:37:15,530 --> 00:37:14,280

dead Bob out of the back seat there and

943

00:37:17,569 --> 00:37:15,540

he happened we carry along his

944

00:37:18,650 --> 00:37:17,579

photograph and history book here that

945

00:37:20,390 --> 00:37:18,660

actually shows them building it from

946

00:37:28,270 --> 00:37:20,400

thousands of years ago what should we do

947

00:37:31,910 --> 00:37:30,470

I don't know if some of the weirdo

948

00:37:34,310 --> 00:37:31,920

things people pose about how the world

949

00:37:35,510 --> 00:37:34,320

walks ugly it turned out to be true I am

950

00:37:37,010 --> 00:37:35,520

pretty certain that weirdo things will

951

00:37:38,569 --> 00:37:37,020

turn out to have been true than that

952

00:37:40,370 --> 00:37:38,579

where you're done though like which

953

00:37:42,770 --> 00:37:40,380

direction that goes I don't know but if

954

00:37:44,270 --> 00:37:42,780

I close off my mind to them you know

955

00:37:46,010 --> 00:37:44,280

it's not so you open yourself to every

956

00:37:48,589 --> 00:37:46,020

theory that comes by the mood is not

957

00:37:51,069 --> 00:37:48,599

made of cheese right but you you have

958

00:37:53,569 --> 00:37:51,079

time probably

959

00:37:55,130 --> 00:37:53,579

could you do we know the upper layer is

960

00:37:57,890 --> 00:37:55,140

not but we haven't really dug down that

961

00:37:59,210 --> 00:37:57,900

deep you know if you close your mind off

962

00:38:01,550 --> 00:37:59,220

on too much

963

00:38:03,290 --> 00:38:01,560

um you know that it has issues well we

964

00:38:05,089 --> 00:38:03,300

use the hollow Moon fix for example

965

00:38:07,430 --> 00:38:05,099

we've never probe the moon very deep so

966

00:38:08,990 --> 00:38:07,440

it could be Hollow and I say well what's

967

00:38:10,370 --> 00:38:09,000

you know what if it was Hollywood mess

968

00:38:12,530 --> 00:38:10,380

up on the density test well they say

969

00:38:14,329 --> 00:38:12,540

it's artificial Planet what's one of the

970

00:38:16,250 --> 00:38:14,339

most common artificial Wars we talk

971

00:38:17,870 --> 00:38:16,260

about building on my show is we call a

972

00:38:20,329 --> 00:38:17,880

show world where you intentionally place

973

00:38:21,710 --> 00:38:20,339

a hypodense object like a black hole in

974

00:38:23,390 --> 00:38:21,720

the middle because it lets you make

975

00:38:25,970 --> 00:38:23,400

whatever gravity you want on the surface

976

00:38:28,190 --> 00:38:25,980

and so it's a hollow shell about a tiny

977

00:38:29,270 --> 00:38:28,200

little thing and that is a very logical

978

00:38:31,550 --> 00:38:29,280

if you've got the technology to make

979

00:38:32,810 --> 00:38:31,560

black holes there's a very logical way

980

00:38:35,510 --> 00:38:32,820

to do your ward building it makes more

981

00:38:37,550 --> 00:38:35,520

sense than the normal kind so you can't

982

00:38:39,410 --> 00:38:37,560

just close your head off because yes

983

00:38:43,069 --> 00:38:39,420

something might be wrong and it probably

984

00:38:44,930 --> 00:38:43,079

is but it might be right in ways you

985

00:38:46,910 --> 00:38:44,940

weren't expecting you know and it might

986

00:38:48,410 --> 00:38:46,920

turn out that you were wrong in ways you

987

00:38:50,990 --> 00:38:48,420

can never have imagined you know and and

988

00:38:53,569 --> 00:38:51,000

we know that we say that we say like a

989

00:38:55,609 --> 00:38:53,579

mantra and yet we still we kind of have

990

00:38:58,790 --> 00:38:55,619

to because we still do we still close

991

00:39:04,010 --> 00:38:58,800

our brain off you know the uh the the

992

00:39:06,589 --> 00:39:04,020

amount of physicists uh where we um uh

993

00:39:08,450 --> 00:39:06,599

start to compile some of the big brains

994

00:39:12,230 --> 00:39:08,460

out there

995

00:39:15,130 --> 00:39:12,240

um there has always been a fascination

996

00:39:18,050 --> 00:39:15,140

with wormholes for them and everybody

997

00:39:20,950 --> 00:39:18,060

you know has their own ideas behind it

998

00:39:24,050 --> 00:39:20,960

but then when we take what the Wormhole

999

00:39:27,170 --> 00:39:24,060

can be and what it suggests

1000

00:39:30,349 --> 00:39:27,180

we get all of the uh we get all of the

1001
00:39:34,609 --> 00:39:30,359
gifts you know we get time travel we get

1002
00:39:37,010 --> 00:39:34,619
to way travel uh uh uh faster than light

1003
00:39:41,690 --> 00:39:37,020
right the all of these things it's it's

1004
00:39:43,430 --> 00:39:41,700
the it's the gift box right it's it's a

1005
00:39:45,109 --> 00:39:43,440
Pandora's Box too if it turns out to be

1006
00:39:47,329 --> 00:39:45,119
true but yeah it's it's fullest I mean

1007
00:39:49,190 --> 00:39:47,339
uh infinite panel I jump up one hole one

1008
00:39:51,410 --> 00:39:49,200
mouth goes into the middle of a a star

1009
00:39:52,790 --> 00:39:51,420
and the other one comes out you'll heal

1010
00:39:53,990 --> 00:39:52,800
and that wouldn't actually be like a

1011
00:39:55,190 --> 00:39:54,000
flamethrow

1012
00:39:56,690 --> 00:39:55,200
um you know you stop just pulling power

1013
00:39:58,609 --> 00:39:56,700

out right there it's actually a fusion

1014

00:40:00,230 --> 00:39:58,619

reactor you don't want to build one just

1015

00:40:02,270 --> 00:40:00,240

follow the one from the Sun and do it

1016

00:40:04,190 --> 00:40:02,280

directly you know that becomes your way

1017

00:40:05,630 --> 00:40:04,200

of running your spaceships you throw one

1018

00:40:06,829 --> 00:40:05,640

into the thing in the hole and the other

1019

00:40:07,849 --> 00:40:06,839

end is in the back your spaceship it's

1020

00:40:09,950 --> 00:40:07,859

just a rocker flame out the back

1021

00:40:10,970 --> 00:40:09,960

definitely

1022

00:40:12,710 --> 00:40:10,980

um there are so many things to do with

1023

00:40:14,150 --> 00:40:12,720

one of those things yeah if they walk

1024

00:40:16,550 --> 00:40:14,160

and depending on how they work too

1025

00:40:19,970 --> 00:40:16,560

before we get to the break I want to

1026
00:40:21,069 --> 00:40:19,980
talk about uh I'm gonna jump ahead just

1027
00:40:24,069 --> 00:40:21,079
a little bit

1028
00:40:27,890 --> 00:40:24,079
the way that

1029
00:40:30,609 --> 00:40:27,900
Wormhole started to get uh visually

1030
00:40:32,690 --> 00:40:30,619
developed out of the math

1031
00:40:37,010 --> 00:40:32,700
it's a sphere

1032
00:40:38,829 --> 00:40:37,020
and before and the sphere is more of a

1033
00:40:42,170 --> 00:40:38,839
protection

1034
00:40:46,010 --> 00:40:42,180
we'll get into that I mean these are my

1035
00:40:48,950 --> 00:40:46,020
my minds but the way that the math

1036
00:40:51,829 --> 00:40:48,960
started to depict these

1037
00:40:55,190 --> 00:40:51,839
um and physicists then have to explain

1038
00:40:58,430 --> 00:40:55,200

to us visually what the math is right

1039

00:41:00,170 --> 00:40:58,440

because we don't see what the math is we

1040

00:41:04,670 --> 00:41:00,180

have to be told what the math is right

1041

00:41:06,349 --> 00:41:04,680

okay so anyway but instead of like

1042

00:41:09,109 --> 00:41:06,359

umbilical cords

1043

00:41:13,069 --> 00:41:09,119

you know jumping around the universe

1044

00:41:16,190 --> 00:41:13,079

uh some biological looking tube

1045

00:41:17,329 --> 00:41:16,200

it's actually been represented as a

1046

00:41:21,349 --> 00:41:17,339

sphere

1047

00:41:23,450 --> 00:41:21,359

right and and is that is that how you

1048

00:41:25,910 --> 00:41:23,460

picture it when we talk about wormholes

1049

00:41:27,230 --> 00:41:25,920

I mean I I am old school I always

1050

00:41:30,290 --> 00:41:27,240

picture these things even though it's

1051

00:41:32,210 --> 00:41:30,300

not accurate as as that Big Grid with

1052

00:41:34,190 --> 00:41:32,220

the tunnel coming down out of it the big

1053

00:41:35,450 --> 00:41:34,200

tube that connects somewhere else and

1054

00:41:36,650 --> 00:41:35,460

and that's accurate you and

1055

00:41:37,670 --> 00:41:36,660

two-dimensional look at it you know if

1056

00:41:40,069 --> 00:41:37,680

you're trying to do it mathematically

1057

00:41:42,170 --> 00:41:40,079

that's fine but uh it is the big sphere

1058

00:41:44,450 --> 00:41:42,180

it is a big sphere and if I knew how to

1059

00:41:46,370 --> 00:41:44,460

describe what the equivalent of a a

1060

00:41:48,230 --> 00:41:46,380

skinny Villa tunnel was in three

1061

00:41:50,150 --> 00:41:48,240

dimensions I I would but I'm not even

1062

00:41:53,329 --> 00:41:50,160

you know I don't know how to represent

1063

00:41:54,589 --> 00:41:53,339

this pencil in my hand as a tunnel if I

1064

00:41:55,910 --> 00:41:54,599

add an extra Dimension to it I don't

1065

00:41:58,670 --> 00:41:55,920

know how to describe it would be

1066

00:42:00,109 --> 00:41:58,680

spherical and uh so it is very hard to

1067

00:42:02,390 --> 00:42:00,119

visualize and that's why I stick to the

1068

00:42:03,589 --> 00:42:02,400

2D version but we know what the fun end

1069

00:42:05,390 --> 00:42:03,599

would look like in the back end would

1070

00:42:07,370 --> 00:42:05,400

look like it would be a very big sphere

1071

00:42:08,870 --> 00:42:07,380

you know that's how it is it's not a

1072

00:42:11,030 --> 00:42:08,880

portal like in Stargate your shipping

1073

00:42:12,589 --> 00:42:11,040

through well I can DS9 or any of the

1074

00:42:14,630 --> 00:42:12,599

favorites you know they the way they

1075

00:42:16,550 --> 00:42:14,640

show the big portal it is much more like

1076

00:42:18,050 --> 00:42:16,560

in the film Interstellar it's almost The

1077

00:42:19,849 --> 00:42:18,060

only positive thing I can say about that

1078

00:42:22,370 --> 00:42:19,859

film much of Christopher Nolan and Gip

1079

00:42:25,609 --> 00:42:22,380

Thorne is the visuals were stunning and

1080

00:42:27,829 --> 00:42:25,619

and accurate about the black hole well

1081

00:42:29,690 --> 00:42:27,839

um the way that Nolan

1082

00:42:32,650 --> 00:42:29,700

um Nolan's not a physicist everybody

1083

00:42:34,970 --> 00:42:32,660

he's a director

1084

00:42:37,250 --> 00:42:34,980

everybody has no missteps sometimes

1085

00:42:40,550 --> 00:42:37,260

that's right he's done some really good

1086

00:42:44,270 --> 00:42:40,560

stuff like Interstellar uh Interstellar

1087

00:42:45,770 --> 00:42:44,280

uh yeah I love Inception the science

1088

00:42:50,210 --> 00:42:45,780

behind Inception is horrible that's

1089

00:42:55,010 --> 00:42:50,220

amazing movie it's fun to watch so when

1090

00:42:58,550 --> 00:42:55,020

um when they set that up uh and the trip

1091

00:43:00,770 --> 00:42:58,560

is being planned uh they go okay the

1092

00:43:03,650 --> 00:43:00,780

entrance to the Wormhole is here right

1093

00:43:06,109 --> 00:43:03,660

and they point you know okay and so and

1094

00:43:08,150 --> 00:43:06,119

now Matthew McConaughey he's off he's

1095

00:43:11,450 --> 00:43:08,160

running right he's in his you know

1096

00:43:14,809 --> 00:43:11,460

spaceship and he's cruising and and I

1097

00:43:18,230 --> 00:43:14,819

was waiting to see

1098

00:43:20,569 --> 00:43:18,240

a tube right with an entrance uh on the

1099

00:43:23,390 --> 00:43:20,579

front of it and yeah

1100

00:43:26,930 --> 00:43:23,400

I went wow so they're going with Kip's

1101

00:43:28,490 --> 00:43:26,940

uh original idea of it being his fear

1102

00:43:29,650 --> 00:43:28,500

and that's all it was sitting out in the

1103

00:43:33,349 --> 00:43:29,660

middle of space

1104

00:43:34,730 --> 00:43:33,359

it's it's just sitting there

1105

00:43:36,050 --> 00:43:34,740

and then for you it's just gonna look

1106

00:43:37,910 --> 00:43:36,060

like a big circle but it's a sphere just

1107

00:43:39,710 --> 00:43:37,920

like a planet and that's the easy part

1108

00:43:41,390 --> 00:43:39,720

to visualize the problem is we are

1109

00:43:43,190 --> 00:43:41,400

showing the portal as a 2d portal it's

1110

00:43:44,569 --> 00:43:43,200

the hole in the wall the tube makes so

1111

00:43:45,710 --> 00:43:44,579

much sense the path you're going to but

1112

00:43:48,470 --> 00:43:45,720

again you can't

1113

00:43:50,210 --> 00:43:48,480

you know a one-dimensional line you know

1114

00:43:51,829 --> 00:43:50,220

is is easy to represent a

1115

00:43:54,050 --> 00:43:51,839

two-dimensional flat space that's

1116

00:43:55,609 --> 00:43:54,060

easy represent again how do you do a

1117

00:43:57,890 --> 00:43:55,619

quarter in three dimensions that way

1118

00:43:59,030 --> 00:43:57,900

that people can visualize uh you know

1119

00:44:00,410 --> 00:43:59,040

other the fact that tunnel would be

1120

00:44:03,230 --> 00:44:00,420

three-dimensional add another dimension

1121

00:44:04,970 --> 00:44:03,240

of that and visualize that and I think

1122

00:44:06,710 --> 00:44:04,980

that they did a pretty good job on that

1123

00:44:09,109 --> 00:44:06,720

you know no complaints there but my

1124

00:44:11,089 --> 00:44:09,119

complaints are usually about the some of

1125

00:44:12,770 --> 00:44:11,099

the plot points in terms of living

1126
00:44:15,589 --> 00:44:12,780
around the black hole and things like

1127
00:44:18,109 --> 00:44:15,599
right right right right right yeah and

1128
00:44:20,690 --> 00:44:18,119
Kip Thorne's book uh the science of

1129
00:44:23,030 --> 00:44:20,700
interstellar he obviously spent you know

1130
00:44:25,069 --> 00:44:23,040
half of the book is is wormholes and and

1131
00:44:27,410 --> 00:44:25,079
he points out to post the movie Young

1132
00:44:29,690 --> 00:44:27,420
you know not quite nil and perfectly

1133
00:44:31,970 --> 00:44:29,700
it's not like he's it you you you're the

1134
00:44:33,950 --> 00:44:31,980
scientific consultant to a movie that's

1135
00:44:36,050 --> 00:44:33,960
trying to be approachable to humans who

1136
00:44:37,370 --> 00:44:36,060
are not physicists to watch and to be

1137
00:44:39,109 --> 00:44:37,380
honest if I don't think I'd have enjoyed

1138
00:44:42,790 --> 00:44:39,119

watching a very physically accurate one

1139

00:44:45,230 --> 00:44:42,800

either so right he did a great job

1140

00:44:47,690 --> 00:44:45,240

yeah that would have been boring if it

1141

00:44:49,370 --> 00:44:47,700

would have been Rick and Morty did the

1142

00:44:50,690 --> 00:44:49,380

episode not that long back we're like oh

1143

00:44:53,150 --> 00:44:50,700

this video game lets us turn up the

1144

00:44:54,050 --> 00:44:53,160

realism so they dial up like nine or ten

1145

00:44:55,990 --> 00:44:54,060

it's like here you're gonna be an

1146

00:44:58,670 --> 00:44:56,000

asteroid might or you die of old age

1147

00:44:59,530 --> 00:44:58,680

yeah yeah yeah yeah yeah I saw that too

1148

00:45:02,809 --> 00:44:59,540

much

1149

00:45:04,670 --> 00:45:02,819

Rick and Morty by the way the best

1150

00:45:07,550 --> 00:45:04,680

television series in the history of

1151

00:45:09,109 --> 00:45:07,560

mankind uh yeah no I mean it's it's very

1152

00:45:10,730 --> 00:45:09,119

nihilistic at times which tends to be

1153

00:45:13,010 --> 00:45:10,740

kind of antithetical to my world view

1154

00:45:14,809 --> 00:45:13,020

but it's it is really good yeah okay

1155

00:45:15,950 --> 00:45:14,819

it's so good man I think there was a

1156

00:45:17,510 --> 00:45:15,960

joke one of the people had was like

1157

00:45:20,210 --> 00:45:17,520

sometimes it seems like they must have a

1158

00:45:23,650 --> 00:45:20,220

portal under your head and say yeah vice

1159

00:45:29,030 --> 00:45:27,470

oh man so uh don't get me out in a Rick

1160

00:45:30,410 --> 00:45:29,040

and Morty because we'll do the rest of

1161

00:45:35,390 --> 00:45:30,420

the show on that

1162

00:45:37,970 --> 00:45:35,400

um with um uh with this though

1163

00:45:40,430 --> 00:45:37,980

um and the ideas that are are being put

1164

00:45:45,109 --> 00:45:40,440

out there in into the public

1165

00:45:48,650 --> 00:45:45,119

uh when we see the travel inside of a

1166

00:45:51,890 --> 00:45:48,660

wormhole uh like uh going back to the

1167

00:45:55,490 --> 00:45:51,900

movie contact right or they're

1168

00:45:57,829 --> 00:45:55,500

um there is time invested inside of the

1169

00:45:59,870 --> 00:45:57,839

Wormhole that is accurate too it does

1170

00:46:02,150 --> 00:45:59,880

take time to travel people

1171

00:46:04,069 --> 00:46:02,160

there's a traversing time and it's it's

1172

00:46:06,109 --> 00:46:04,079

it is the instant when she down there

1173

00:46:07,309 --> 00:46:06,119

but you could like the original notion

1174

00:46:10,130 --> 00:46:07,319

on a lot of the wormholes so they had to

1175

00:46:12,589 --> 00:46:10,140

be big like the hundreds of Stellar

1176
00:46:14,630 --> 00:46:12,599
masses big bigger than most stars big in

1177
00:46:17,329 --> 00:46:14,640
terms of mass and it could take you

1178
00:46:18,829 --> 00:46:17,339
months to fall down one and so now that

1179
00:46:20,870 --> 00:46:18,839
could be done shorter or faster like

1180
00:46:23,210 --> 00:46:20,880
many things it depends on two users can

1181
00:46:25,670 --> 00:46:23,220
say but it wasn't walking in one side

1182
00:46:26,990 --> 00:46:25,680
pop out the other and it's also not like

1183
00:46:28,730 --> 00:46:27,000
in Stargate where you step in and

1184
00:46:30,530 --> 00:46:28,740
there's a long motion you know cool

1185
00:46:32,510 --> 00:46:30,540
little sequence for the film and then

1186
00:46:34,970 --> 00:46:32,520
you step out same step you know you're

1187
00:46:37,250 --> 00:46:34,980
traveling there is a travel time there

1188
00:46:39,470 --> 00:46:37,260

and you're not in a frozen moment of

1189

00:46:41,650 --> 00:46:39,480

like you know special effects there you

1190

00:46:45,290 --> 00:46:41,660

know videos

1191

00:46:48,670 --> 00:46:45,300

space hasn't been folded right that's

1192

00:46:50,630 --> 00:46:48,680

not what uh no it's only been connected

1193

00:46:52,370 --> 00:46:50,640

well I mean you can look at it either

1194

00:46:55,010 --> 00:46:52,380

way there's still the time to fall down

1195

00:46:57,410 --> 00:46:55,020

into it you know let's say you you've

1196

00:47:00,349 --> 00:46:57,420

got to go into the Wormhole and go

1197

00:47:02,990 --> 00:47:00,359

through it and there is I

1198

00:47:04,490 --> 00:47:03,000

um there's because there was oh so many

1199

00:47:06,589 --> 00:47:04,500

different versions of these including

1200

00:47:09,170 --> 00:47:06,599

you know besides the rose and Eisen

1201
00:47:11,150 --> 00:47:09,180
rosenbridge uh like uh in Event Horizon

1202
00:47:13,970 --> 00:47:11,160
where they do the classic which

1203
00:47:16,309 --> 00:47:13,980
is a sadly underappreciated terrible

1204
00:47:18,349 --> 00:47:16,319
film but Event Horizon they show I can't

1205
00:47:20,089 --> 00:47:18,359
know the actor's name right now uh he's

1206
00:47:21,890 --> 00:47:20,099
in so many things he's he's the

1207
00:47:23,569 --> 00:47:21,900
scientist though Dr Whale he shows him

1208
00:47:25,569 --> 00:47:23,579
for a piece of paper and stabs a pencil

1209
00:47:38,450 --> 00:47:25,579
to it and it's closer

1210
00:47:42,109 --> 00:47:40,670
but anyway the the fellow fun there who

1211
00:47:43,550 --> 00:47:42,119
isn't so many things that does so many

1212
00:47:45,109 --> 00:47:43,560
good rules

1213
00:47:46,490 --> 00:47:45,119

um he uh you know he's showing that

1214

00:47:47,510 --> 00:47:46,500

that's the bullying situation where you

1215

00:47:49,130 --> 00:47:47,520

thought you'd be some you know piece of

1216

00:47:50,390 --> 00:47:49,140

paper together and then poke a hole

1217

00:47:56,450 --> 00:47:50,400

through it and that's to connect to your

1218

00:47:58,210 --> 00:47:56,460

mask damn Neil Sam Neal Samuel yeah okay

1219

00:48:00,470 --> 00:47:58,220

um and

1220

00:48:01,370 --> 00:48:00,480

now I'm confusing him with cheer meows

1221

00:48:02,510 --> 00:48:01,380

because I picture him and so there's

1222

00:48:04,670 --> 00:48:02,520

some other rules there but it doesn't

1223

00:48:07,250 --> 00:48:04,680

matter no he was in Jurassic Park man

1224

00:48:09,650 --> 00:48:07,260

Sam Neal yeah yeah

1225

00:48:10,790 --> 00:48:09,660

um great actor uh great demonstration

1226

00:48:12,290 --> 00:48:10,800

there but the other one is we say well

1227

00:48:14,390 --> 00:48:12,300

we're gonna put these things I'm gonna

1228

00:48:15,829 --> 00:48:14,400

take a balloon and I'm you know a little

1229

00:48:17,510 --> 00:48:15,839

too software I'm gonna poke it in two

1230

00:48:19,370 --> 00:48:17,520

different places and reach for the

1231

00:48:20,809 --> 00:48:19,380

middle of each connected to that's more

1232

00:48:22,430 --> 00:48:20,819

of your tunnel that you'll be traversing

1233

00:48:23,630 --> 00:48:22,440

version and if you're doing three

1234

00:48:27,109 --> 00:48:23,640

dimensions let's say that's more

1235

00:48:28,910 --> 00:48:27,119

accurate I'm taking this big balloon and

1236

00:48:30,170 --> 00:48:28,920

I'm piking my fingers together on two

1237

00:48:31,970 --> 00:48:30,180

two sides but they don't have to be

1238

00:48:34,370 --> 00:48:31,980

opposite until they connect somewhere

1239

00:48:36,290 --> 00:48:34,380

and there's a tunnel there and that's

1240

00:48:38,990 --> 00:48:36,300

more of your traversal distance thing

1241

00:48:40,490 --> 00:48:39,000

only that don't think of this being like

1242

00:48:41,510 --> 00:48:40,500

the radius of the distance between the

1243

00:48:43,309 --> 00:48:41,520

things or anything like that it's going

1244

00:48:45,050 --> 00:48:43,319

to be much shorter than that but it is a

1245

00:48:47,450 --> 00:48:45,060

traversable distance you're following

1246

00:48:50,329 --> 00:48:47,460

and you can have things in there that

1247

00:48:53,030 --> 00:48:50,339

would be unexpected like um the usual

1248

00:48:54,410 --> 00:48:53,040

notion is wow I can make me uh you know

1249

00:48:56,030 --> 00:48:54,420

perpetual motion machine because I'm

1250

00:48:59,089 --> 00:48:56,040

going to open up two gateways right the

1251
00:49:01,730 --> 00:48:59,099
Gateway above that falls down and it was

1252
00:49:03,589 --> 00:49:01,740
back to the top so portal a drops goes

1253
00:49:04,910 --> 00:49:03,599
back up the top again keeps dropping and

1254
00:49:06,589 --> 00:49:04,920
I put some ball in there it keeps

1255
00:49:07,970 --> 00:49:06,599
falling down maybe I put a water wheel

1256
00:49:09,530 --> 00:49:07,980
on there on this wallet keeps falling

1257
00:49:10,910 --> 00:49:09,540
down to the portal starts back at the

1258
00:49:12,829 --> 00:49:10,920
top grab it pulls out more and keeps

1259
00:49:13,970 --> 00:49:12,839
going down there that's not how that's

1260
00:49:15,950 --> 00:49:13,980
going to work one thing of course

1261
00:49:18,109 --> 00:49:15,960
gravity is not an infinite power source

1262
00:49:19,730 --> 00:49:18,119
but it will actually lose speeds it goes

1263
00:49:21,230 --> 00:49:19,740

back up if I drop a ball to that portal

1264

00:49:26,710 --> 00:49:21,240

and it goes back up to the one hole up

1265

00:49:32,089 --> 00:49:30,410

this is one of the most important let's

1266

00:49:36,589 --> 00:49:32,099

let's go with fundamental

1267

00:49:38,930 --> 00:49:36,599

uh points with wormholes E.T

1268

00:49:41,510 --> 00:49:38,940

uh you know some Advanced civilization

1269

00:49:43,849 --> 00:49:41,520

uh out there that has figured out

1270

00:49:46,250 --> 00:49:43,859

wormholes like we we have now figured

1271

00:49:48,770 --> 00:49:46,260

them out right but they are taking

1272

00:49:49,690 --> 00:49:48,780

advantage of them so

1273

00:49:53,270 --> 00:49:49,700

ET

1274

00:49:54,670 --> 00:49:53,280

uses a wormhole to get to our star

1275

00:49:58,970 --> 00:49:54,680

system

1276

00:50:02,150 --> 00:49:58,980

when they exit the wormhole

1277

00:50:02,990 --> 00:50:02,160

what speed are they traveling good

1278

00:50:03,770 --> 00:50:03,000

question

1279

00:50:07,069 --> 00:50:03,780

um

1280

00:50:09,050 --> 00:50:07,079

you know do you shoot out at faster than

1281

00:50:12,010 --> 00:50:09,060

the speed of light and go past the sun

1282

00:50:14,450 --> 00:50:12,020

in eight seconds or

1283

00:50:16,309 --> 00:50:14,460

no you won't but here's the thing on

1284

00:50:18,650 --> 00:50:16,319

there like if you're coming out with a

1285

00:50:20,030 --> 00:50:18,660

speed between your two points every

1286

00:50:21,589 --> 00:50:20,040

billion light years you get away from

1287

00:50:23,270 --> 00:50:21,599

Earth you add seven percent of light

1288

00:50:25,010 --> 00:50:23,280

speed to your velocity and that does let

1289

00:50:26,450 --> 00:50:25,020

you go super luminal right that's one of

1290

00:50:27,710 --> 00:50:26,460

the few ways around we all say nothing

1291

00:50:29,809 --> 00:50:27,720

in the universe can go faster on speed

1292

00:50:30,890 --> 00:50:29,819

of light and they have to minimally say

1293

00:50:32,510 --> 00:50:30,900

well most the universe is actually

1294

00:50:34,490 --> 00:50:32,520

moving away from us at faster the speed

1295

00:50:35,870 --> 00:50:34,500

of light but it's because the universe

1296

00:50:37,849 --> 00:50:35,880

is expanding its size very quickly

1297

00:50:39,410 --> 00:50:37,859

nothing's actually moving that quick you

1298

00:50:41,270 --> 00:50:39,420

don't get to carry that velocity with

1299

00:50:43,190 --> 00:50:41,280

you presumably they always have the

1300

00:50:44,990 --> 00:50:43,200

caveats on that so if you went to a

1301
00:50:48,109 --> 00:50:45,000
wormhole going say half speed of light

1302
00:50:49,910 --> 00:50:48,119
locally you have to adjust you know are

1303
00:50:51,290 --> 00:50:49,920
you adjusting to add the difference in

1304
00:50:53,390 --> 00:50:51,300
velocity which you get two points there

1305
00:50:55,430 --> 00:50:53,400
if I open up a wormhole from the surface

1306
00:50:56,750 --> 00:50:55,440
of Earth to the surface of Mars and I'm

1307
00:50:58,130 --> 00:50:56,760
going to be cured by being hit by a

1308
00:51:00,829 --> 00:50:58,140
cliff because I forgot to change my

1309
00:51:04,549 --> 00:51:00,839
rotational velocity right it spins right

1310
00:51:06,049 --> 00:51:04,559
orbits and I'm all the way back to Isaac

1311
00:51:07,970 --> 00:51:06,059
asthma at least they will play with that

1312
00:51:10,250 --> 00:51:07,980
in sci-fi what would happen you know in

1313
00:51:12,290 --> 00:51:10,260

terms of do I go back in time and and

1314

00:51:14,089 --> 00:51:12,300

end up inside of a cliff or realized I'm

1315

00:51:16,309 --> 00:51:14,099

halfway across the Galaxy from where

1316

00:51:18,890 --> 00:51:16,319

Earth is and I'm in the vacuum of empty

1317

00:51:20,750 --> 00:51:18,900

Galactic space because oh it's not there

1318

00:51:23,210 --> 00:51:20,760

anymore you know what is that fixed

1319

00:51:24,290 --> 00:51:23,220

location and the symbol answers we have

1320

00:51:25,670 --> 00:51:24,300

no idea

1321

00:51:26,630 --> 00:51:25,680

you know we you know until you actually

1322

00:51:28,430 --> 00:51:26,640

get one of these and this is the

1323

00:51:30,770 --> 00:51:28,440

experimental thing we can do so much

1324

00:51:32,930 --> 00:51:30,780

checking on math but unless we actually

1325

00:51:34,490 --> 00:51:32,940

can build one and check it we wouldn't

1326

00:51:36,170 --> 00:51:34,500

really know the answer that question and

1327

00:51:38,089 --> 00:51:36,180

not like let's conform this we don't

1328

00:51:40,370 --> 00:51:38,099

have the data and I don't think that any

1329

00:51:42,829 --> 00:51:40,380

real theory on this could until we

1330

00:51:45,170 --> 00:51:42,839

actually had something to look at

1331

00:51:46,430 --> 00:51:45,180

um so we could say I don't expect that

1332

00:51:47,930 --> 00:51:46,440

you would go to the top of all these

1333

00:51:49,849 --> 00:51:47,940

things you'd lose your you'd lose your

1334

00:51:52,010 --> 00:51:49,859

momentum along the way we should assume

1335

00:51:53,210 --> 00:51:52,020

whatever your velocity is here yes that

1336

00:51:55,309 --> 00:51:53,220

would translate to where you're going

1337

00:51:56,390 --> 00:51:55,319

which make it quite a weapon but did but

1338

00:51:58,670 --> 00:51:56,400

you still presumably have to take into

1339

00:51:59,690 --> 00:51:58,680

account something like expansion and

1340

00:52:02,210 --> 00:51:59,700

then whether or not you pick up speed

1341

00:52:03,950 --> 00:52:02,220

from jumping across galaxies and you've

1342

00:52:05,329 --> 00:52:03,960

got that expanding humble expansion do

1343

00:52:06,950 --> 00:52:05,339

you pick it up or does it get to get out

1344

00:52:08,930 --> 00:52:06,960

same as the ball falling down and then

1345

00:52:09,650 --> 00:52:08,940

losing speed on the way back up we don't

1346

00:52:13,750 --> 00:52:09,660

know

1347

00:52:16,730 --> 00:52:13,760

and but aren't you protected with uh an

1348

00:52:18,530 --> 00:52:16,740

electromagnetic shell from the rest of

1349

00:52:21,109 --> 00:52:18,540

space

1350

00:52:25,309 --> 00:52:22,849

this because in the past aspect of how

1351

00:52:28,190 --> 00:52:25,319

you actually build a wall which is part

1352

00:52:30,010 --> 00:52:28,200

of the theory behind wormholes is the

1353

00:52:33,290 --> 00:52:30,020

negative energy you know building this

1354

00:52:35,950 --> 00:52:33,300

electromagnetic uh shell

1355

00:52:38,690 --> 00:52:35,960

um and so I think you would be

1356

00:52:41,809 --> 00:52:38,700

uh non-effective but then then again

1357

00:52:43,490 --> 00:52:41,819

this is like the most non-trivial part

1358

00:52:48,109 --> 00:52:43,500

of all of this

1359

00:52:50,569 --> 00:52:48,119

um to uh to wonder about because when

1360

00:52:54,049 --> 00:52:50,579

Matthew McConaughey when he enters I

1361

00:52:56,870 --> 00:52:54,059

hate to compare Hollywood but but Kip

1362

00:52:58,490 --> 00:52:56,880

Thorne addressed all of these issues in

1363

00:53:02,089 --> 00:52:58,500

the movie he wanted it to be as

1364

00:53:03,890 --> 00:53:02,099

realistic as possible so when uh

1365

00:53:05,569 --> 00:53:03,900

McConaughey enters the Wormhole when he

1366

00:53:06,589 --> 00:53:05,579

comes out of it he's not pumping the

1367

00:53:09,109 --> 00:53:06,599

brakes

1368

00:53:12,230 --> 00:53:09,119

right it's not like he shot out of that

1369

00:53:14,750 --> 00:53:12,240

thing super luminal or half the speed of

1370

00:53:17,390 --> 00:53:14,760

light right and had to slow down he was

1371

00:53:19,430 --> 00:53:17,400

already there and parked in space

1372

00:53:20,750 --> 00:53:19,440

the generally speaking I mean it depends

1373

00:53:23,150 --> 00:53:20,760

on how you're building the black hole I

1374

00:53:24,829 --> 00:53:23,160

mean the world course but the usual

1375

00:53:27,410 --> 00:53:24,839

loose notion is it's a modified black

1376

00:53:28,790 --> 00:53:27,420

hole and it's a very massive one as

1377

00:53:30,290 --> 00:53:28,800

you're falling into a black hole you

1378

00:53:31,730 --> 00:53:30,300

pick up a lot of speed you are

1379

00:53:34,250 --> 00:53:31,740

essentially going to be accelerating to

1380

00:53:36,589 --> 00:53:34,260

within you know kissing distance of of

1381

00:53:38,329 --> 00:53:36,599

the speed of light but on the other end

1382

00:53:40,490 --> 00:53:38,339

you're falling out of a black hole

1383

00:53:43,130 --> 00:53:40,500

essentially so you're going to lose a

1384

00:53:44,569 --> 00:53:43,140

lot of specio up a wormhole should add

1385

00:53:46,130 --> 00:53:44,579

your speed as you're going down that

1386

00:53:47,450 --> 00:53:46,140

makes sense to transverse it very quick

1387

00:53:49,309 --> 00:53:47,460

in many ways and then you're going to

1388

00:53:50,809 --> 00:53:49,319

lose on the way back up so you shouldn't

1389

00:53:54,530 --> 00:53:50,819

really come out with anything different

1390

00:53:55,849 --> 00:53:54,540

in velocity in that respect but then you

1391

00:53:57,589 --> 00:53:55,859

start trying to figure out how you know

1392

00:53:59,270 --> 00:53:57,599

what direction is my velocity as I'm

1393

00:54:03,069 --> 00:53:59,280

going in how does that pop out you're

1394

00:54:06,770 --> 00:54:03,079

coming out with something velocity wise

1395

00:54:09,230 --> 00:54:06,780

okay okay okay very good we're not I

1396

00:54:12,650 --> 00:54:09,240

don't have to time the brake exactly but

1397

00:54:15,470 --> 00:54:12,660

what if you went against the grain

1398

00:54:18,650 --> 00:54:15,480

you went Upstream in the expansion of

1399

00:54:21,410 --> 00:54:18,660

space and and or the opposite what if

1400

00:54:24,290 --> 00:54:21,420

you were going Downstream in the

1401
00:54:25,670 --> 00:54:24,300
expansion of space right now well yeah

1402
00:54:28,069 --> 00:54:25,680
you could do that that's the you you

1403
00:54:29,089 --> 00:54:28,079
have the normally the Wormhole you

1404
00:54:31,069 --> 00:54:29,099
shouldn't be able to go back to before

1405
00:54:33,290 --> 00:54:31,079
you made the one more time travel wise

1406
00:54:35,450 --> 00:54:33,300
but you know there's ways to get around

1407
00:54:38,329 --> 00:54:35,460
things like that too but uh you've got

1408
00:54:39,710 --> 00:54:38,339
this Wormhole that's earlier in uh the

1409
00:54:41,930 --> 00:54:39,720
Universe on one side than the other

1410
00:54:43,730 --> 00:54:41,940
expense to a different rate then it's

1411
00:54:45,650 --> 00:54:43,740
moving at different speed between two

1412
00:54:47,030 --> 00:54:45,660
galaxies a different rate the woman who

1413
00:54:49,970 --> 00:54:47,040

you open up an Android you know not

1414

00:54:51,349 --> 00:54:49,980

saying let's uh well the other for some

1415

00:54:52,730 --> 00:54:51,359

further away Galaxy a billion light

1416

00:54:54,470 --> 00:54:52,740

years away

1417

00:54:56,630 --> 00:54:54,480

um you're moving Samsung Light Speed the

1418

00:54:59,150 --> 00:54:56,640

time is moving slower on that into that

1419

00:55:01,250 --> 00:54:59,160

of that one poor now if you come out

1420

00:55:02,630 --> 00:55:01,260

that thing is it early on time that's

1421

00:55:05,270 --> 00:55:02,640

what we're assuming but then the

1422

00:55:07,790 --> 00:55:05,280

question is is the Celestia coming out

1423

00:55:09,470 --> 00:55:07,800

slower now for you whose expansion of

1424

00:55:10,750 --> 00:55:09,480

speed are you using right right right

1425

00:55:12,589 --> 00:55:10,760

right right

1426

00:55:15,230 --> 00:55:12,599

that's what I'm saying if you're going

1427

00:55:18,770 --> 00:55:15,240

upstream or Downstream depending on your

1428

00:55:19,970 --> 00:55:18,780

direction in space right I mean there

1429

00:55:21,530 --> 00:55:19,980

are a lot of theories about how this

1430

00:55:23,510 --> 00:55:21,540

should be you know a lot of people have

1431

00:55:24,770 --> 00:55:23,520

gone through amazingly good maths here

1432

00:55:26,990 --> 00:55:24,780

I'm not going to debate the math amount

1433

00:55:28,970 --> 00:55:27,000

in fact I don't understand it as well as

1434

00:55:30,710 --> 00:55:28,980

most of those folks who are Specialists

1435

00:55:32,210 --> 00:55:30,720

on this but at the same time that is

1436

00:55:34,549 --> 00:55:32,220

what it is it's the math and it's not

1437

00:55:36,770 --> 00:55:34,559

ion clad without the ability to really

1438

00:55:39,290 --> 00:55:36,780

get one of these things and say

1439

00:55:40,790 --> 00:55:39,300

so much of it is a guess so I can't

1440

00:55:42,109 --> 00:55:40,800

tell you that if you come out of these

1441

00:55:44,030 --> 00:55:42,119

things you're going to be moving at

1442

00:55:45,710 --> 00:55:44,040

steps of of light speed now because

1443

00:55:47,930 --> 00:55:45,720

that's the expansion that Galaxy is now

1444

00:55:49,730 --> 00:55:47,940

or when the thing Force forms say a

1445

00:55:51,829 --> 00:55:49,740

billion years ago maybe it's six percent

1446

00:55:54,410 --> 00:55:51,839

I hope maybe it's exactly zero because

1447

00:55:55,549 --> 00:55:54,420

you come out without that velocity and

1448

00:55:57,230 --> 00:55:55,559

they're all

1449

00:55:59,329 --> 00:55:57,240

um again we have a lot of good

1450

00:56:00,230 --> 00:55:59,339

theoretical treatments they don't all

1451
00:56:02,630 --> 00:56:00,240
agree

1452
00:56:05,030 --> 00:56:02,640
um and they all fundamentally just

1453
00:56:06,349 --> 00:56:05,040
theoretical so any almost any of the

1454
00:56:07,549 --> 00:56:06,359
stories we've seen presented could be

1455
00:56:11,290 --> 00:56:07,559
true

1456
00:56:14,569 --> 00:56:11,300
okay so E.T again

1457
00:56:18,170 --> 00:56:14,579
Wormhole our star system which would

1458
00:56:19,609 --> 00:56:18,180
explain a lot too as well that one of

1459
00:56:22,130 --> 00:56:19,619
the reasons why we don't see a whole lot

1460
00:56:23,930 --> 00:56:22,140
of interstellar traffic

1461
00:56:26,089 --> 00:56:23,940
um is because

1462
00:56:28,549 --> 00:56:26,099
it's Wormhole travel and we wouldn't

1463
00:56:31,370 --> 00:56:28,559

necessarily uh pick those up with radio

1464

00:56:33,770 --> 00:56:31,380

telescopes or the Hubble or or if it

1465

00:56:36,410 --> 00:56:33,780

takes 600 some solo masses to build one

1466

00:56:38,030 --> 00:56:36,420

you probably don't want to be using more

1467

00:56:39,170 --> 00:56:38,040

than maybe one for every few or a

1468

00:56:40,430 --> 00:56:39,180

hundred thousand stars or you're

1469

00:56:43,250 --> 00:56:40,440

devoting most of your Mast ability to

1470

00:56:46,130 --> 00:56:43,260

one more unless unless it's not that

1471

00:56:47,870 --> 00:56:46,140

difficult maybe it's easier like the

1472

00:56:50,569 --> 00:56:47,880

Egyptians who built the pyramids right

1473

00:56:51,950 --> 00:56:50,579

they did it because it was easy and no

1474

00:56:53,510 --> 00:56:51,960

consequences like how does the Wormhole

1475

00:56:55,250 --> 00:56:53,520

work but also how small can I make it

1476

00:56:57,349 --> 00:56:55,260

like if I can make a wormhole so small

1477

00:56:59,270 --> 00:56:57,359

then cheap then I can fit one in

1478

00:57:01,010 --> 00:56:59,280

somebody's house then maybe I have my

1479

00:57:03,230 --> 00:57:01,020

house built on 15 different planets and

1480

00:57:06,470 --> 00:57:03,240

the doors are actually doorways but

1481

00:57:10,190 --> 00:57:06,480

that's exactly okay so now let's go back

1482

00:57:12,049 --> 00:57:10,200

so ET arrives here and now you just said

1483

00:57:14,150 --> 00:57:12,059

Andromeda but it wasn't that far away

1484

00:57:16,790 --> 00:57:14,160

right okay but let's say in prominence

1485

00:57:18,470 --> 00:57:16,800

what 12 12 and a half two million light

1486

00:57:20,450 --> 00:57:18,480

years or two million change yeah yeah

1487

00:57:22,130 --> 00:57:20,460

two million light years and change okay

1488

00:57:23,870 --> 00:57:22,140

so

1489

00:57:25,270 --> 00:57:23,880

um you say 12 I say two it's called

1490

00:57:28,970 --> 00:57:25,280

close enough

1491

00:57:30,710 --> 00:57:28,980

but uh the closest galaxy to us and they

1492

00:57:31,870 --> 00:57:30,720

arrive here

1493

00:57:34,130 --> 00:57:31,880

um

1494

00:57:36,650 --> 00:57:34,140

what happens

1495

00:57:39,109 --> 00:57:36,660

to the time

1496

00:57:42,410 --> 00:57:39,119

from their origin

1497

00:57:45,410 --> 00:57:42,420

so in other words right I mean do they

1498

00:57:47,210 --> 00:57:45,420

uh if if that indeed happens what

1499

00:57:48,710 --> 00:57:47,220

happens to the origin time the point of

1500

00:57:51,710 --> 00:57:48,720

origin and then you turn around and you

1501
00:57:53,990 --> 00:57:51,720
go back home Through the Wormhole and

1502
00:57:55,910 --> 00:57:54,000
you go back and you go okay Earth was

1503
00:58:01,150 --> 00:57:55,920
cool what are you talking about we just

1504
00:58:05,569 --> 00:58:03,170
you know if you got when you start

1505
00:58:07,130 --> 00:58:05,579
throwing in temporal paradoxes it might

1506
00:58:08,690 --> 00:58:07,140
easily be that the only way you let the

1507
00:58:09,710 --> 00:58:08,700
stuff get you the only way it could be

1508
00:58:12,170 --> 00:58:09,720
used because some of these things like

1509
00:58:14,210 --> 00:58:12,180
kind of forcibly end up with these kind

1510
00:58:16,309 --> 00:58:14,220
of sulfur rates or self-correct is you

1511
00:58:18,470 --> 00:58:16,319
could be in a situation where your Fast

1512
00:58:21,049 --> 00:58:18,480
Night travel always automatically erased

1513
00:58:22,790 --> 00:58:21,059

it's its usage

1514

00:58:23,630 --> 00:58:22,800

um and indeed Alistair Reynolds plays

1515

00:58:25,130 --> 00:58:23,640

that when somebody's novels but

1516

00:58:27,470 --> 00:58:25,140

basically every civilization that goes

1517

00:58:29,450 --> 00:58:27,480

fast on light ends up basically erasing

1518

00:58:31,790 --> 00:58:29,460

themselves

1519

00:58:35,210 --> 00:58:31,800

so do you have to

1520

00:58:37,490 --> 00:58:35,220

do you have to then consider

1521

00:58:39,349 --> 00:58:37,500

all of your destinations and then the

1522

00:58:41,510 --> 00:58:39,359

return trip back home

1523

00:58:43,910 --> 00:58:41,520

you have to factor in time travel to

1524

00:58:48,109 --> 00:58:43,920

that so you know that you're arriving

1525

00:58:49,910 --> 00:58:48,119

and departing and returning at the time

1526

00:58:52,849 --> 00:58:49,920

that you need to do all this so you

1527

00:58:55,270 --> 00:58:52,859

people remember your name right because

1528

00:58:59,390 --> 00:58:55,280

what if you're off by a thousand years

1529

00:59:01,430 --> 00:58:59,400

it's it is very well the moment you put

1530

00:59:03,650 --> 00:59:01,440

time travel in any equation I mean I

1531

00:59:05,569 --> 00:59:03,660

didn't episode that some months back it

1532

00:59:07,309 --> 00:59:05,579

gets bad like one of our conclusions

1533

00:59:08,450 --> 00:59:07,319

from our episode time was if you're in a

1534

00:59:10,549 --> 00:59:08,460

situation where you have alternating

1535

00:59:12,530 --> 00:59:10,559

timelines on each other on Universe you

1536

00:59:14,210 --> 00:59:12,540

know each individual what if has so many

1537

00:59:16,370 --> 00:59:14,220

options that there's like a trillion new

1538

00:59:18,770 --> 00:59:16,380

Futures every second for each one which

1539

00:59:20,750 --> 00:59:18,780

means if I'm say a million years ahead

1540

00:59:22,309 --> 00:59:20,760

in time or a thousand whatever is it's a

1541

00:59:24,230 --> 00:59:22,319

trillion trillion trillion trillion

1542

00:59:26,569 --> 00:59:24,240

trillion different universes and let's

1543

00:59:28,789 --> 00:59:26,579

say just one in a million those says

1544

00:59:30,710 --> 00:59:28,799

they want to go back and invade today so

1545

00:59:32,150 --> 00:59:30,720

yeah portals opening up of all me snap

1546

00:59:34,849 --> 00:59:32,160

you out from five trillion different

1547

00:59:36,589 --> 00:59:34,859

timelines all Innovative right now as

1548

00:59:38,569 --> 00:59:36,599

they're unloading in the soldiers upon

1549

00:59:40,370 --> 00:59:38,579

the battlefield the planet collapses a

1550

00:59:42,710 --> 00:59:40,380

black hole under its new Mass

1551
00:59:44,510 --> 00:59:42,720
yeah that's the kind of weird thing but

1552
00:59:46,970 --> 00:59:44,520
you have to factor in a temporal

1553
00:59:48,289 --> 00:59:46,980
paradoxes and that's a self-correcting

1554
00:59:50,210 --> 00:59:48,299
factor to some degree because if you

1555
00:59:52,490 --> 00:59:50,220
went back in time and made a black hole

1556
00:59:55,970 --> 00:59:52,500
out of the planets that should kill off

1557
00:59:58,490 --> 00:59:55,980
the the other timelines surroundings and

1558
01:00:00,530 --> 00:59:58,500
yeah that's that's one of the reasons

1559
01:00:02,450 --> 01:00:00,540
why I love Rick and Morty too as well

1560
01:00:04,549 --> 01:00:02,460
right there

1561
01:00:06,170 --> 01:00:04,559
um oh okay so

1562
01:00:10,370 --> 01:00:06,180
I'm gonna take a break here in just a

1563
01:00:12,650 --> 01:00:10,380

second but before we do that the when

1564

01:00:15,170 --> 01:00:12,660

you see something like it it's used so

1565

01:00:18,170 --> 01:00:15,180

often in in science fiction today you

1566

01:00:22,309 --> 01:00:18,180

see it constantly but they don't factor

1567

01:00:24,410 --> 01:00:22,319

in or don't warn you about the issues so

1568

01:00:26,750 --> 01:00:24,420

if we're turning around and we're

1569

01:00:28,210 --> 01:00:26,760

returning back to Earth At warp speed

1570

01:00:33,789 --> 01:00:28,220

right

1571

01:00:37,670 --> 01:00:33,799

for a day but we we travel you know

1572

01:00:40,250 --> 01:00:37,680

you know and and we pull up to Earth

1573

01:00:43,670 --> 01:00:40,260

um nobody is talking about what time it

1574

01:00:46,010 --> 01:00:43,680

is right the the writers and the

1575

01:00:49,370 --> 01:00:46,020

director are just assuming that the

1576

01:00:51,710 --> 01:00:49,380

audience is assuming that we're just all

1577

01:00:56,109 --> 01:00:51,720

on the same page the same calendar the

1578

01:00:58,910 --> 01:00:56,119

same Google uh contact staring program

1579

01:01:01,609 --> 01:00:58,920

and that uh we're all we're all

1580

01:01:04,609 --> 01:01:01,619

synchronized uh to Greenwich

1581

01:01:06,410 --> 01:01:04,619

right Greenwich mean time but that that

1582

01:01:09,430 --> 01:01:06,420

that cannot be the case if you're

1583

01:01:12,289 --> 01:01:09,440

zipping around the universe uh

1584

01:01:14,030 --> 01:01:12,299

you know sub lumos I don't know how time

1585

01:01:15,770 --> 01:01:14,040

works there's a lot of mysteries where

1586

01:01:17,390 --> 01:01:15,780

time is concerned to say at least but we

1587

01:01:18,829 --> 01:01:17,400

do in some ways it doesn't work and it

1588

01:01:20,809 --> 01:01:18,839

doesn't look as one flat clock

1589

01:01:23,210 --> 01:01:20,819

everywhere the same place and same speed

1590

01:01:25,730 --> 01:01:23,220

they all posted universal time just run

1591

01:01:27,530 --> 01:01:25,740

slower you know and faster too you know

1592

01:01:30,950 --> 01:01:27,540

the The Intergalactic void is where it

1593

01:01:32,270 --> 01:01:30,960

runs closest to Flat real you know and

1594

01:01:33,530 --> 01:01:32,280

it might not be that big of a time

1595

01:01:35,270 --> 01:01:33,540

difference they are compared to what is

1596

01:01:39,530 --> 01:01:35,280

Sagittarius A where it's a giant black

1597

01:01:42,770 --> 01:01:39,540

hole but yeah time is not this this

1598

01:01:44,210 --> 01:01:42,780

separate independent thing and you know

1599

01:01:46,549 --> 01:01:44,220

whether you would almost regardless of

1600

01:01:48,650 --> 01:01:46,559

what FTL method you're using even when

1601
01:01:51,049 --> 01:01:48,660
it doesn't invoke you know time travel

1602
01:01:54,829 --> 01:01:51,059
back in time it always messes with time

1603
01:01:56,750 --> 01:01:54,839
always you you never ever gonna like the

1604
01:01:58,250 --> 01:01:56,760
arrive on departure dates at at a

1605
01:02:00,530 --> 01:01:58,260
Spaceport they are never going to look

1606
01:02:06,130 --> 01:02:02,809
your arrival

1607
01:02:10,030 --> 01:02:06,140
was last week right

1608
01:02:12,650 --> 01:02:10,040
thank you for the party line

1609
01:02:14,390 --> 01:02:12,660
I think let's take our break right here

1610
01:02:15,170 --> 01:02:14,400
this is Fade to Black I'm your assuming

1611
01:02:17,870 --> 01:02:15,180
church tonight we're talking about

1612
01:02:19,730 --> 01:02:17,880
wormholes and E.T more with Isaac Arthur

1613
01:02:22,130 --> 01:02:19,740

when we come back after this short break

1614

01:02:24,470 --> 01:02:22,140

stay with us

1615

01:02:26,809 --> 01:02:24,480

this is Jimmy Church of Fade to Black

1616

01:02:29,030 --> 01:02:26,819

please visit all of our sponsors we're

1617

01:02:30,710 --> 01:02:29,040

taking a quick break here all of the

1618

01:02:33,770 --> 01:02:30,720

links are below

1619

01:02:36,109 --> 01:02:33,780

and we'll be right back

1620

01:02:37,030 --> 01:02:36,119

check out Billy Carson's Forbidden

1621

01:02:39,190 --> 01:02:37,040

Knowledge

1622

01:02:41,210 --> 01:02:39,200

forbiddenknowledge.com or

1623

01:02:45,170 --> 01:02:41,220

forbiddenknowledge.tv where you can get

1624

01:02:47,690 --> 01:02:45,180

access to over 6 000 videos movies TV

1625

01:02:49,670 --> 01:02:47,700

series exclusive documentaries like the

1626
01:02:51,130 --> 01:02:49,680
Black Knight satellite you can do it all

1627
01:02:55,730 --> 01:02:51,140
for just

1628
01:02:57,950 --> 01:02:55,740
7.77 per month for 77 per year after the

1629
01:02:59,930 --> 01:02:57,960
three-day trial which is also totally

1630
01:03:03,730 --> 01:02:59,940
free to check out it's all simple to do

1631
01:03:06,130 --> 01:03:03,740
Billy Carson is the best it's simple

1632
01:03:08,390 --> 01:03:06,140
forbiddenknowledge.com or

1633
01:03:12,349 --> 01:03:08,400
forbiddenknowledge.tv that's the number

1634
01:03:17,030 --> 01:03:14,690
I will be hosting an mcing the conscious

1635
01:03:20,210 --> 01:03:17,040
life Expo this February 10th through the

1636
01:03:22,549 --> 01:03:20,220
13th at The Lax Hilton right here in Los

1637
01:03:24,829 --> 01:03:22,559
Angeles California 200 speakers

1638
01:03:27,049 --> 01:03:24,839

including Linda Moulton Howe Bashar

1639

01:03:29,690 --> 01:03:27,059

Deborah King George Nori Daniel Sheehan

1640

01:03:33,829 --> 01:03:29,700

Scott Walter Sean Stone and David Wolfe

1641

01:03:37,190 --> 01:03:33,839

over 200 vendors special events this is

1642

01:03:39,530 --> 01:03:37,200

the biggest event of its kind on planet

1643

01:03:41,829 --> 01:03:39,540

Earth you've got to come and hang out

1644

01:03:43,789 --> 01:03:41,839

with all of us tickets and info at

1645

01:03:45,349 --> 01:03:43,799

consciouslifeexpo.com the links are

1646

01:03:48,589 --> 01:03:45,359

below

1647

01:03:51,710 --> 01:03:48,599

on Saturday April 1st that's right April

1648

01:03:53,930 --> 01:03:51,720

Fool's Day 2023 I will be hosting the

1649

01:03:57,410 --> 01:03:53,940

peripod festival at the Hyatt Regency

1650

01:03:59,930 --> 01:03:57,420

right here in Valencia California it's a

1651
01:04:02,990 --> 01:03:59,940
live one-day podcast Awards it's a film

1652
01:04:05,030 --> 01:04:03,000
festival it's a full-on media event

1653
01:04:06,829 --> 01:04:05,040
we're going to have Sky watching it's

1654
01:04:09,650 --> 01:04:06,839
going to be a Lifetime Achievement Award

1655
01:04:11,630 --> 01:04:09,660
presented to Melinda Moulton Howe right

1656
01:04:13,730 --> 01:04:11,640
now you can submit your podcast your

1657
01:04:16,430 --> 01:04:13,740
film your TV series any of your

1658
01:04:18,410 --> 01:04:16,440
paranormal media for consideration you

1659
01:04:21,609 --> 01:04:18,420
can do all of that on the links below

1660
01:04:23,569 --> 01:04:21,619
for info and tickets go to

1661
01:04:26,589 --> 01:04:23,579
parapodfilmfest.com that's

1662
01:04:32,270 --> 01:04:30,650
April 7th through the 14th 2023 I'll be

1663
01:04:35,210 --> 01:04:32,280

hosting and presenting on the hidden

1664

01:04:37,849 --> 01:04:35,220

secrets seminar at Sea cruise from Los

1665

01:04:40,190 --> 01:04:37,859

Angeles to the Mexican Riviera I'm the

1666

01:04:42,770 --> 01:04:40,200

Navigator of the Seas that's right up

1667

01:04:44,450 --> 01:04:42,780

top a giant water slide you've got to

1668

01:04:46,370 --> 01:04:44,460

check out the Navigator of the Seas it's

1669

01:04:48,710 --> 01:04:46,380

amazing we've got Scott Walter Adam

1670

01:04:51,650 --> 01:04:48,720

Apollo Nick Pope Brad Olson Vivian

1671

01:04:53,930 --> 01:04:51,660

Chavez Jason shirka Robert Grant Reuben

1672

01:04:56,270 --> 01:04:53,940

Langdon and another 12 amazing speakers

1673

01:04:57,730 --> 01:04:56,280

and presenters it's all simple to do

1674

01:05:00,109 --> 01:04:57,740

just visit

1675

01:05:03,829 --> 01:05:00,119

divinetravels.com forward slash hidden

1676
01:05:06,109 --> 01:05:03,839
secrets 2023 you know you want to go on

1677
01:05:09,530 --> 01:05:06,119
a cruise with me

1678
01:05:12,349 --> 01:05:09,540
River Moon coffee makers of the Fade to

1679
01:05:14,170 --> 01:05:12,359
Black blend truly the best coffee on

1680
01:05:16,430 --> 01:05:14,180
planet Earth just visit

1681
01:05:18,289 --> 01:05:16,440
rivermoonwellness.com or or their Amazon

1682
01:05:19,730 --> 01:05:18,299
store it's all simple to do you can

1683
01:05:21,829 --> 01:05:19,740
check out the Fade to Black blend the

1684
01:05:24,470 --> 01:05:21,839
game changer Blend or any of their black

1685
01:05:28,250 --> 01:05:24,480
moon wellness products it's the only

1686
01:05:37,849 --> 01:05:28,260
coffee I drink it is the best and it's

1687
01:05:41,750 --> 01:05:40,069
all right Welcome Back Fade to Black I'm

1688
01:05:44,210 --> 01:05:41,760

your host Timmy church and tonight Our

1689

01:05:48,950 --> 01:05:44,220

Guest is Isaac Arthur we're discussing

1690

01:05:51,289 --> 01:05:48,960

wormholes and I have a wormhole uh that

1691

01:05:55,789 --> 01:05:51,299

is running right now and I am able to

1692

01:05:57,950 --> 01:05:55,799

observe Isaac on the other end of our

1693

01:05:59,210 --> 01:05:57,960

Einstein Rosen bridge and he's back with

1694

01:06:03,950 --> 01:05:59,220

us

1695

01:06:06,950 --> 01:06:03,960

right there Isaac that's a wormhole in

1696

01:06:09,650 --> 01:06:06,960

action right now we are wormholing the

1697

01:06:13,970 --> 01:06:09,660

uh the announcement came on November

1698

01:06:16,490 --> 01:06:13,980

30th uh just over a month ago uh about

1699

01:06:19,190 --> 01:06:16,500

for the first time that scientists have

1700

01:06:21,410 --> 01:06:19,200

created a wormhole and they did it uh

1701

01:06:23,870 --> 01:06:21,420

with a quantum computer they did it with

1702

01:06:26,930 --> 01:06:23,880

uh now this is all from memory so don't

1703

01:06:30,410 --> 01:06:26,940

don't assume me if I'm wrong uh with a

1704

01:06:34,309 --> 01:06:30,420

quantum computer called Sycamore and uh

1705

01:06:38,029 --> 01:06:34,319

they the description of it

1706

01:06:42,470 --> 01:06:38,039

was uh in the press release and and the

1707

01:06:47,270 --> 01:06:42,480

words that were used was that it was uh

1708

01:06:51,529 --> 01:06:47,280

a teleportation through a hologram

1709

01:06:52,630 --> 01:06:51,539

right and Quantum qubit Quantum

1710

01:06:55,390 --> 01:06:52,640

information

1711

01:06:59,410 --> 01:06:55,400

passed through

1712

01:07:02,470 --> 01:06:59,420

this hologram uh Wormhole

1713

01:07:06,589 --> 01:07:02,480

very small yes

1714

01:07:09,650 --> 01:07:06,599

and very tiny it's not like anybody was

1715

01:07:13,970 --> 01:07:09,660

driving a car through it at this point

1716

01:07:17,150 --> 01:07:13,980

um but uh at least the ideas for the

1717

01:07:20,809 --> 01:07:17,160

Einstein Rosen Bridge seemed to be now

1718

01:07:22,730 --> 01:07:20,819

firmly seated in reality kind of it was

1719

01:07:25,670 --> 01:07:22,740

a simulation in the end it was being

1720

01:07:27,289 --> 01:07:25,680

simply on a quantum computer now it is a

1721

01:07:29,510 --> 01:07:27,299

pretty big deal in terms of what they've

1722

01:07:30,950 --> 01:07:29,520

discovered from that modeling but they

1723

01:07:32,930 --> 01:07:30,960

didn't really open up a portal and move

1724

01:07:34,190 --> 01:07:32,940

it at the same time there's some of

1725

01:07:36,529 --> 01:07:34,200

these ideas are already still pretty

1726

01:07:38,210 --> 01:07:36,539

firmly in in the mix like we've been

1727

01:07:40,250 --> 01:07:38,220

doing quantum teleportation for a while

1728

01:07:42,170 --> 01:07:40,260

and you know that is part of how Quantum

1729

01:07:44,329 --> 01:07:42,180

Computing works the principle is that

1730

01:07:46,849 --> 01:07:44,339

Quantum Computing work on the principles

1731

01:07:49,250 --> 01:07:46,859

that Fusion installers works on all

1732

01:07:50,690 --> 01:07:49,260

requires teleportation to walk so this

1733

01:07:53,089 --> 01:07:50,700

is a way to move stuff where it's not

1734

01:07:55,970 --> 01:07:53,099

supposed to be yet that is

1735

01:07:57,589 --> 01:07:55,980

for me baked into reality same you know

1736

01:07:59,210 --> 01:07:57,599

like um

1737

01:08:01,670 --> 01:07:59,220

again well I can't think of his name

1738

01:08:04,670 --> 01:08:01,680

right now another very famous physicist

1739

01:08:06,890 --> 01:08:04,680

known for the EPA equals ER Paradox

1740

01:08:08,829 --> 01:08:06,900

um he is of the opinion there's always

1741

01:08:11,569 --> 01:08:08,839

possibly like electrons could actually

1742

01:08:14,870 --> 01:08:11,579

be tiny little black holes you know

1743

01:08:16,910 --> 01:08:14,880

there's so many title options it's going

1744

01:08:18,110 --> 01:08:16,920

to indicate yes these things probably

1745

01:08:20,689 --> 01:08:18,120

have

1746

01:08:22,789 --> 01:08:20,699

some kind of basic reality to them you

1747

01:08:24,829 --> 01:08:22,799

know when we do a simulation like that

1748

01:08:26,990 --> 01:08:24,839

obviously it's it's it's trying to see

1749

01:08:28,010 --> 01:08:27,000

under what conditions and I think they

1750

01:08:31,189 --> 01:08:28,020

thought that it kind of proved the

1751

01:08:33,590 --> 01:08:31,199

holographic principle I don't agree it's

1752

01:08:35,749 --> 01:08:33,600

evidence that helps to kind of bring it

1753

01:08:37,430 --> 01:08:35,759

in there but at the same time I don't

1754

01:08:40,970 --> 01:08:37,440

want to make too much out of Discovery

1755

01:08:43,430 --> 01:08:40,980

but it was a big one yeah okay so here's

1756

01:08:46,729 --> 01:08:43,440

the press release physicists have

1757

01:08:49,430 --> 01:08:46,739

created the first ever Wormhole a kind

1758

01:08:51,289 --> 01:08:49,440

of tunnel theorized in 1935 by Albert

1759

01:08:53,150 --> 01:08:51,299

Einstein and Nathan Rosen that leads

1760

01:08:57,349 --> 01:08:53,160

from one place to another by passing

1761

01:09:00,950 --> 01:08:57,359

into an extra dimension of space

1762

01:09:03,950 --> 01:09:00,960

um The Wormhole emerged like a hologram

1763

01:09:06,769 --> 01:09:03,960

out of quantum bits of information or

1764

01:09:08,570 --> 01:09:06,779

qubits uh stored in circuits by

1765

01:09:10,970 --> 01:09:08,580

manipulating the qubits the physicists

1766

01:09:14,510 --> 01:09:10,980

then sent the information Through the

1767

01:09:19,430 --> 01:09:14,520

Wormhole as reported in the journal

1768

01:09:20,809 --> 01:09:19,440

Nature the team led by Maria sarapolu of

1769

01:09:23,150 --> 01:09:20,819

California Institute of Technology

1770

01:09:25,070 --> 01:09:23,160

Implement implemented the Wormhole

1771

01:09:26,570 --> 01:09:25,080

telepatient protocol using Google's

1772

01:09:29,990 --> 01:09:26,580

quantum computer a device called

1773

01:09:32,030 --> 01:09:30,000

Sycamore in Santa Barbara California it

1774

01:09:34,070 --> 01:09:32,040

was the first of its kind quantum

1775

01:09:37,729 --> 01:09:34,080

gravity experiments

1776

01:09:40,610 --> 01:09:37,739

and so that's that's the wording

1777

01:09:44,090 --> 01:09:40,620

um in in in the press release are we

1778

01:09:46,809 --> 01:09:44,100

reading it did the Press manipulate this

1779

01:09:48,650 --> 01:09:46,819

into something else or yes

1780

01:09:50,950 --> 01:09:48,660

it's always it's always a little bit

1781

01:09:53,150 --> 01:09:50,960

changed around but not exactly

1782

01:09:54,830 --> 01:09:53,160

everything I mean anything you do with

1783

01:09:56,630 --> 01:09:54,840

that scale is being done with like one

1784

01:09:58,250 --> 01:09:56,640

or two particles we do quantum

1785

01:10:00,650 --> 01:09:58,260

teleportation it's one or two particles

1786

01:10:04,010 --> 01:10:00,660

it isn't unfair to say that they are

1787

01:10:06,590 --> 01:10:04,020

moving something from A to B uh on both

1788

01:10:07,910 --> 01:10:06,600

that qubit right it's just that what

1789

01:10:11,270 --> 01:10:07,920

they're really doing is testing a

1790

01:10:12,890 --> 01:10:11,280

principle in more

1791

01:10:14,209 --> 01:10:12,900

yeah I'm gonna get myself in trouble and

1792

01:10:16,370 --> 01:10:14,219

probably be slightly wrong if I finish

1793

01:10:19,130 --> 01:10:16,380

that I would say the story is a little

1794

01:10:20,870 --> 01:10:19,140

bit overhyped they didn't really make a

1795

01:10:23,570 --> 01:10:20,880

wormhole Wormhole by people are thinking

1796

01:10:25,550 --> 01:10:23,580

this is this is more of a Quantum

1797

01:10:29,209 --> 01:10:25,560

Computing check of the principle that

1798

01:10:30,770 --> 01:10:29,219

data can move uh for me to be along a

1799

01:10:32,750 --> 01:10:30,780

one more

1800

01:10:34,430 --> 01:10:32,760

oh that's what they said you know it's

1801

01:10:38,750 --> 01:10:34,440

almost impossible to discuss Quantum

1802

01:10:40,209 --> 01:10:38,760

scenes how to sync the Titanic by Isaac

1803

01:10:47,689 --> 01:10:40,219

Arthur

1804

01:10:49,550 --> 01:10:47,699

so it comes the job a lot um I mean it's

1805

01:10:52,490 --> 01:10:49,560

it's a reality almost every science

1806

01:10:53,390 --> 01:10:52,500

article can be a little bit extreme like

1807

01:10:56,750 --> 01:10:53,400

um

1808

01:10:58,130 --> 01:10:56,760

Break Even uh on on Fusion that was the

1809

01:10:59,390 --> 01:10:58,140

other big one for the last couple months

1810

01:11:00,830 --> 01:10:59,400

and it's not they didn't make huge

1811

01:11:02,390 --> 01:11:00,840

progress on that but we declared that

1812

01:11:03,770 --> 01:11:02,400

before because autopilots where do I

1813

01:11:06,110 --> 01:11:03,780

actually you know where do I actually

1814

01:11:08,149 --> 01:11:06,120

say I've set the line like um you know

1815

01:11:09,770 --> 01:11:08,159

if your businesses Break Even accept

1816

01:11:11,450 --> 01:11:09,780

that you're not including your debt

1817

01:11:12,890 --> 01:11:11,460

payments you're not actually making a

1818

01:11:14,149 --> 01:11:12,900

profit and it's kind of like what it

1819

01:11:15,830 --> 01:11:14,159

tends to be with Fusion technology we

1820

01:11:17,330 --> 01:11:15,840

even say we made an improvement that

1821

01:11:19,729 --> 01:11:17,340

let's just use less energy to get the

1822

01:11:21,830 --> 01:11:19,739

result out of fusion uh but until you

1823

01:11:24,050 --> 01:11:21,840

can actually run the generator that's

1824

01:11:26,270 --> 01:11:24,060

powering the fusion device on itself

1825

01:11:28,070 --> 01:11:26,280

you're not actually at break even yet

1826

01:11:31,430 --> 01:11:28,080

can I can I ask you a question about

1827

01:11:32,830 --> 01:11:31,440

that experiment I am really confused

1828

01:11:35,870 --> 01:11:32,840

about something

1829

01:11:40,070 --> 01:11:35,880

and and it's this

1830

01:11:45,590 --> 01:11:40,080

our son at its stage our son right here

1831

01:11:47,870 --> 01:11:45,600

our our sun at its stage at its age of

1832

01:11:50,630 --> 01:11:47,880

development right now it's got a

1833

01:11:54,950 --> 01:11:50,640

hydrogen core and it's burning

1834

01:11:58,430 --> 01:11:54,960

um at at about uh 10 million degrees

1835

01:12:01,010 --> 01:11:58,440

right and it's got a helium shell on the

1836

01:12:03,649 --> 01:12:01,020

outside and the fusion process is

1837

01:12:06,410 --> 01:12:03,659

happening but but it's it's it's 10

1838

01:12:08,450 --> 01:12:06,420

million degrees and it's a very

1839

01:12:14,270 --> 01:12:08,460

comfortable thing that is running there

1840

01:12:18,189 --> 01:12:14,280

the fusion process that uh was reported

1841

01:12:21,590 --> 01:12:18,199

on uh a month and a half ago is

1842

01:12:24,290 --> 01:12:21,600

150 million degrees yeah and so that's

1843

01:12:26,750 --> 01:12:24,300

phase two of our sun when we have a

1844

01:12:30,110 --> 01:12:26,760

helium core with a hydrogen outer shell

1845

01:12:32,750 --> 01:12:30,120

and and that it it and to do the fusion

1846

01:12:34,910 --> 01:12:32,760

of helium particles at that point it's

1847

01:12:37,729 --> 01:12:34,920

extreme temperatures it's 150 million

1848

01:12:40,490 --> 01:12:37,739

degrees and that's what why aren't they

1849

01:12:43,370 --> 01:12:40,500

I just don't understand this you know

1850

01:12:47,570 --> 01:12:43,380

they're you know 200 lasers to get these

1851

01:12:50,930 --> 01:12:47,580

pallets you know up to a 150 million

1852

01:12:53,750 --> 01:12:50,940

degrees why aren't they doing this at at

1853

01:12:55,070 --> 01:12:53,760

10 million degrees with hydrogen this is

1854

01:12:56,870 --> 01:12:55,080

this is the key thing to say it's hard

1855

01:12:58,370 --> 01:12:56,880

to emulate the conditions inside the Sun

1856

01:13:00,229 --> 01:12:58,380

and that is a true statement but the

1857

01:13:01,250 --> 01:13:00,239

problem is we don't want to emulate the

1858

01:13:03,770 --> 01:13:01,260

conditions at the core of the Sun

1859

01:13:06,530 --> 01:13:03,780

because that's not enough Fusion in all

1860

01:13:10,130 --> 01:13:06,540

sun is designed to take you say one ton

1861

01:13:12,890 --> 01:13:10,140

of of hydrogen and turn it into one ton

1862

01:13:14,750 --> 01:13:12,900

of helium minus a couple pounds uh over

1863

01:13:17,570 --> 01:13:14,760

the course of a billion years and while

1864

01:13:19,550 --> 01:13:17,580

that is a lot of energy it isn't over a

1865

01:13:21,470 --> 01:13:19,560

couple minutes if you got a you know one

1866

01:13:23,689 --> 01:13:21,480

ton Fusion reactor going to Sun's

1867

01:13:25,610 --> 01:13:23,699

conversion range and a one ton gasoline

1868

01:13:28,250 --> 01:13:25,620

powered system one of them is going to

1869

01:13:30,290 --> 01:13:28,260

run a light bulb uh and one of them is

1870

01:13:32,570 --> 01:13:30,300

not it's the fusion when it's not going

1871

01:13:33,530 --> 01:13:32,580

to uh I don't know what's up my head I

1872

01:13:35,810 --> 01:13:33,540

put in some videos where the actual

1873

01:13:38,209 --> 01:13:35,820

conversion rate is but right

1874

01:13:39,709 --> 01:13:38,219

takes a couple tons of Sobo matter at

1875

01:13:42,590 --> 01:13:39,719

the core to produce one watt of power

1876

01:13:43,850 --> 01:13:42,600

it's slow because it burns that's why

1877

01:13:45,590 --> 01:13:43,860

it's going to take 10 billion years to

1878

01:13:47,750 --> 01:13:45,600

run through its Fuel and won't even blow

1879

01:13:49,250 --> 01:13:47,760

most of it up and you know it's a huge

1880

01:13:50,810 --> 01:13:49,260

amount of energy because what matter to

1881

01:13:52,250 --> 01:13:50,820

from one state to another via Fusion

1882

01:13:54,410 --> 01:13:52,260

it's about one percent amount of energy

1883

01:13:55,910 --> 01:13:54,420

conversion but still tiny you know when

1884

01:13:57,709 --> 01:13:55,920

you when you're doing it at a mid to

1885

01:13:59,390 --> 01:13:57,719

minute level what's actually happening

1886

01:14:01,310 --> 01:13:59,400

something like a supernova

1887

01:14:04,070 --> 01:14:01,320

um is that something avoiding a large

1888

01:14:05,870 --> 01:14:04,080

chunk of that matter into energy in a

1889

01:14:08,450 --> 01:14:05,880

couple of seconds the way the fusion

1890

01:14:10,610 --> 01:14:08,460

becomes so much higher normally when two

1891

01:14:12,530 --> 01:14:10,620

protons Bend together they do this

1892

01:14:14,630 --> 01:14:12,540

trillions of times before they stick

1893

01:14:16,490 --> 01:14:14,640

together long enough to form a diproton

1894

01:14:18,530 --> 01:14:16,500

and that's a worthless particle anyway

1895

01:14:21,470 --> 01:14:18,540

so you want deuterium but every so

1896

01:14:23,390 --> 01:14:21,480

afterwards very real the whole process

1897

01:14:25,970 --> 01:14:23,400

is that statistical fluke at that

1898

01:14:28,430 --> 01:14:25,980

temperature it happens insanely rarely

1899

01:14:30,470 --> 01:14:28,440

and it produces a trickle of power but

1900

01:14:32,689 --> 01:14:30,480

out of that much of it it would do it

1901

01:14:34,790 --> 01:14:32,699

over a very long time like to make sure

1902

01:14:37,070 --> 01:14:34,800

I got decent numbers here all Sun gives

1903

01:14:40,910 --> 01:14:37,080

off 4 times 10 to 26 watts and it weighs

1904

01:14:43,189 --> 01:14:40,920

2 times 10 to 30 30 kilograms so that's

1905

01:14:45,410 --> 01:14:43,199

almost a million or you know difference

1906

01:14:47,570 --> 01:14:45,420

of a million half a million right

1907

01:14:50,270 --> 01:14:47,580

um half a million kilograms of that

1908

01:14:52,430 --> 01:14:50,280

stuff is generating one watt half a

1909

01:14:55,189 --> 01:14:52,440

million kilograms 500 tons generating

1910

01:14:56,870 --> 01:14:55,199

one water power that's not very much no

1911

01:14:58,250 --> 01:14:56,880

it's not president please ignore that

1912

01:15:00,470 --> 01:14:58,260

number I'm off by chores of attitude

1913

01:15:02,350 --> 01:15:00,480

five tons of that matters generally one

1914

01:15:06,890 --> 01:15:02,360

water power still not much

1915

01:15:08,330 --> 01:15:06,900

but when you have that much tonnage you

1916

01:15:10,250 --> 01:15:08,340

know then it turns into something but

1917

01:15:11,750 --> 01:15:10,260

but a five ton power generally will only

1918

01:15:14,810 --> 01:15:11,760

putting out one Whopper doing it for a

1919

01:15:17,149 --> 01:15:14,820

billion years is pretty good so this

1920

01:15:19,189 --> 01:15:17,159

just came in from a Gandalf that's his

1921

01:15:22,729 --> 01:15:19,199

real name by the way his parents gave

1922

01:15:23,990 --> 01:15:22,739

him that name Gandalf says I appreciate

1923

01:15:25,970 --> 01:15:24,000

that

1924

01:15:28,189 --> 01:15:25,980

he says the pressure is not high enough

1925

01:15:30,410 --> 01:15:28,199

when he's talking about the you know the

1926

01:15:32,390 --> 01:15:30,420

10 million uh degrees and he's right

1927

01:15:33,649 --> 01:15:32,400

about that and I'll address that in a

1928

01:15:35,570 --> 01:15:33,659

second the pressure is not high enough

1929

01:15:37,610 --> 01:15:35,580

the pressure is much higher in the sun

1930

01:15:39,649 --> 01:15:37,620

we compensate with higher temperature to

1931

01:15:41,630 --> 01:15:39,659

make up for the lower pressure and he is

1932

01:15:44,390 --> 01:15:41,640

see that's how I have a pretty smart

1933

01:15:46,550 --> 01:15:44,400

audience not as smart as yours uh uh

1934

01:15:49,550 --> 01:15:46,560

Isaac oh this is probably one audience

1935

01:15:51,649 --> 01:15:49,560

this is one of your fans that is here

1936

01:15:55,070 --> 01:15:51,659

tonight in that

1937

01:15:57,350 --> 01:15:55,080

um our son it he's correct the amount of

1938

01:16:01,130 --> 01:15:57,360

pressure that it takes to get to the 10

1939

01:16:02,930 --> 01:16:01,140
million degrees is is is is different

1940

01:16:06,709 --> 01:16:02,940
than the amount of pressure that it

1941

01:16:08,330 --> 01:16:06,719
would take and Mass to get to the 150

1942

01:16:10,610 --> 01:16:08,340
million degrees it's two different

1943

01:16:13,310 --> 01:16:10,620
stages there are stars around that

1944

01:16:16,189 --> 01:16:13,320
temperature like we a stall that is

1945

01:16:17,990 --> 01:16:16,199
um twice all Sun size will live about 1

1946

01:16:19,610 --> 01:16:18,000
8 of time all sun does or 110 somewhere

1947

01:16:21,590 --> 01:16:19,620
in that range because it's burning

1948

01:16:22,510 --> 01:16:21,600
faster because it's of course it's just

1949

01:16:25,250 --> 01:16:22,520
so much

1950

01:16:26,990 --> 01:16:25,260
ten thousand and and that would have

1951

01:16:28,430 --> 01:16:27,000

been my original number Olio would have

1952

01:16:30,590 --> 01:16:28,440

been you know low even there I might

1953

01:16:32,750 --> 01:16:30,600

take an entire Megaton to give you

1954

01:16:35,750 --> 01:16:32,760

enough to run a light bulb here of like

1955

01:16:37,610 --> 01:16:35,760

a red dwarf at a very tiny in the M9 but

1956

01:16:39,649 --> 01:16:37,620

the other ones that will list for like a

1957

01:16:41,709 --> 01:16:39,659

million years or less and they've gone

1958

01:16:43,610 --> 01:16:41,719

through so much

1959

01:16:47,149 --> 01:16:43,620

yeah that's kind of what we need to

1960

01:16:48,830 --> 01:16:47,159

emulate for what we want so much mass it

1961

01:16:51,709 --> 01:16:48,840

just burns through that hydrogen just

1962

01:16:53,450 --> 01:16:51,719

crushes the crap out of it and the next

1963

01:16:55,010 --> 01:16:53,460

thing you know it's over

1964

01:16:57,470 --> 01:16:55,020

um and and that's another reason why I

1965

01:17:00,410 --> 01:16:57,480

read dwarfs you know last for a trillion

1966

01:17:02,930 --> 01:17:00,420

or trillions of years very low mass star

1967

01:17:05,390 --> 01:17:02,940

and their their Fusion process is just

1968

01:17:07,610 --> 01:17:05,400

on cruise control it's also nice because

1969

01:17:09,470 --> 01:17:07,620

it will it Cycles everything bubbles

1970

01:17:11,870 --> 01:17:09,480

like a pot so you're not running out of

1971

01:17:14,330 --> 01:17:11,880

hydrogen people say well our Sun's 74

1972

01:17:16,729 --> 01:17:14,340

hydrogen don't quote that number and and

1973

01:17:18,229 --> 01:17:16,739

22 helium over 25 some whatever it is

1974

01:17:19,970 --> 01:17:18,239

it's about one percent things on those

1975

01:17:22,550 --> 01:17:19,980

two so see that we've gone through a

1976

01:17:24,950 --> 01:17:22,560

quarter of all Hydro raising no the sun

1977

01:17:26,870 --> 01:17:24,960

actually already had like 7 70 percent

1978

01:17:28,550 --> 01:17:26,880

something hydrogen began with it's only

1979

01:17:31,130 --> 01:17:28,560

got like two or three percent of change

1980

01:17:33,410 --> 01:17:31,140

over during the time 600 Mega tons per

1981

01:17:34,790 --> 01:17:33,420

second that two volts into helium but

1982

01:17:37,010 --> 01:17:34,800

that's still very tiny compared to how

1983

01:17:38,689 --> 01:17:37,020

much the sun actually is it were only

1984

01:17:41,510 --> 01:17:38,699

born I got about a tenth of its uh

1985

01:17:43,610 --> 01:17:41,520

hydrogen that goes you know uh through

1986

01:17:46,070 --> 01:17:43,620

it will still be mostly hydrogen when it

1987

01:17:48,530 --> 01:17:46,080

goes red dwarf red dwarfs sorry not much

1988

01:17:49,490 --> 01:17:48,540

wolf red giant the very low end of

1989

01:17:51,050 --> 01:17:49,500

vegetables they are actually born

1990

01:17:52,250 --> 01:17:51,060

through all of it in the ends that's

1991

01:17:54,050 --> 01:17:52,260

that's part of what extends their lives

1992

01:17:56,270 --> 01:17:54,060

they get to use all their fuel they just

1993

01:17:58,310 --> 01:17:56,280

use it very slowly whereas those big

1994

01:17:59,689 --> 01:17:58,320

ones it's they actually use a lot of

1995

01:18:02,570 --> 01:17:59,699

those neon two but only because they use

1996

01:18:06,910 --> 01:18:02,580

most at the end they go boom

1997

01:18:11,750 --> 01:18:06,920

right right well isn't that isn't that

1998

01:18:12,530 --> 01:18:11,760

uh isn't that a good reason uh for et by

1999

01:18:15,229 --> 01:18:12,540

the way

2000

01:18:18,530 --> 01:18:15,239

um it's it's winter where Isaac is and

2001

01:18:20,570 --> 01:18:18,540

he's you know he's yeah I'm sorry I've

2002

01:18:21,410 --> 01:18:20,580

been a congested all week Jesse has a

2003

01:18:22,910 --> 01:18:21,420

cold

2004

01:18:25,310 --> 01:18:22,920

um is that

2005

01:18:27,770 --> 01:18:25,320

one of the reasons why E.T would be

2006

01:18:28,810 --> 01:18:27,780

visiting us is because their son is

2007

01:18:32,750 --> 01:18:28,820

toast

2008

01:18:34,550 --> 01:18:32,760

right exploring uh the universe because

2009

01:18:37,250 --> 01:18:34,560

we're gonna have to blow this Popsicle

2010

01:18:39,050 --> 01:18:37,260

stand at some point too as well no no

2011

01:18:41,510 --> 01:18:39,060

you can extend a starless life here they

2012

01:18:45,470 --> 01:18:41,520

want to oh man see that's the thing you

2013

01:18:52,630 --> 01:18:45,480

you smoke too much weed Isaac I I don't

2014

01:18:56,990 --> 01:18:55,010

thinking of the movie uh animal house

2015

01:18:59,149 --> 01:18:57,000

and they're all sitting around smoking

2016

01:19:02,330 --> 01:18:59,159

pot with uh their college professor

2017

01:19:06,470 --> 01:19:02,340

right their philosophy professors and he

2018

01:19:10,970 --> 01:19:06,480

goes you mean the cell on my thumbnail

2019

01:19:12,169 --> 01:19:10,980

can be an entire solar system with a sun

2020

01:19:14,630 --> 01:19:12,179

and an earth

2021

01:19:16,310 --> 01:19:14,640

right that's that's where you are with

2022

01:19:18,229 --> 01:19:16,320

these Concepts man you're smoking the

2023

01:19:19,450 --> 01:19:18,239

weed yeah man we can extend the life of

2024

01:19:22,729 --> 01:19:19,460

our son

2025

01:19:25,370 --> 01:19:22,739

you know to me I grew up on so much the

2026

01:19:27,290 --> 01:19:25,380

science fiction it was such a part of my

2027

01:19:28,910 --> 01:19:27,300

upbringing and so often the questions

2028

01:19:30,530 --> 01:19:28,920

that would come up with those those were

2029

01:19:33,470 --> 01:19:30,540

very real to me as like things that were

2030

01:19:35,030 --> 01:19:33,480

interesting to know you know so I I do

2031

01:19:36,709 --> 01:19:35,040

like to ask those questions how hard is

2032

01:19:39,890 --> 01:19:36,719

it to really build a star war planet or

2033

01:19:40,850 --> 01:19:39,900

to refuel sun it's a big question and we

2034

01:19:42,350 --> 01:19:40,860

know it would be to a future

2035

01:19:44,030 --> 01:19:42,360

civilization it's not very real to us

2036

01:19:45,950 --> 01:19:44,040

right now but if you live in geeky

2037

01:19:47,450 --> 01:19:45,960

enough circles how do you refill your

2038

01:19:48,790 --> 01:19:47,460

sun seems like it should be an important

2039

01:19:51,410 --> 01:19:48,800

question

2040

01:19:54,709 --> 01:19:51,420

stop stop stop stop you can't just blow

2041

01:20:00,169 --> 01:19:54,719

go past this stuff no let's back up the

2042

01:20:03,350 --> 01:20:00,179

car you're saying that you have an idea

2043

01:20:07,550 --> 01:20:03,360

where we could pull up our son to a gas

2044

01:20:09,770 --> 01:20:07,560

pump and inject hydrogen into it is that

2045

01:20:13,689 --> 01:20:09,780

what you're saying uh we have an episode

2046

01:20:18,470 --> 01:20:16,790

in the Sun for a few months back so I

2047

01:20:19,669 --> 01:20:18,480

actually had a bad initial rollout so I

2048

01:20:20,570 --> 01:20:19,679

changed the cover to have a gas pump

2049

01:20:22,010 --> 01:20:20,580

going through because I thought it was

2050

01:20:23,990 --> 01:20:22,020

funny at the time

2051
01:20:26,390 --> 01:20:24,000
um did you really oh I just made that up

2052
01:20:28,130 --> 01:20:26,400
okay I changed it back after I've been

2053
01:20:30,410 --> 01:20:28,140
sitting for a while

2054
01:20:33,229 --> 01:20:30,420
we're smoking the same exotic

2055
01:20:36,709 --> 01:20:33,239
Californian weed apparently okay but but

2056
01:20:39,890 --> 01:20:36,719
how how would this be done because and

2057
01:20:42,590 --> 01:20:39,900
for the audience the ideas are simple uh

2058
01:20:45,590 --> 01:20:42,600
we have uh just imagine this we've got a

2059
01:20:47,750 --> 01:20:45,600
hydrogen core surrounded by helium the

2060
01:20:50,330 --> 01:20:47,760
pressure is causing the fusion and the

2061
01:20:53,149 --> 01:20:50,340
changing of of the hydrogen and

2062
01:20:55,310 --> 01:20:53,159
eventually the helium will overtake the

2063
01:20:57,590 --> 01:20:55,320

hydrogen in the middle then surrounded

2064

01:20:59,630 --> 01:20:57,600

by a hydrogen core with helium in the

2065

01:21:02,090 --> 01:20:59,640

middle that's 150 million degrees period

2066

01:21:04,610 --> 01:21:02,100

when that happens we've got to be gone

2067

01:21:06,770 --> 01:21:04,620

we have to be out of here because the

2068

01:21:09,770 --> 01:21:06,780

sun's going to expand it won't have the

2069

01:21:11,990 --> 01:21:09,780

the pull down to get to the 150 million

2070

01:21:14,270 --> 01:21:12,000

degrees and because we don't have enough

2071

01:21:16,910 --> 01:21:14,280

mass and when that happens the Sun is

2072

01:21:19,310 --> 01:21:16,920

going to expand and probably Reach Out

2073

01:21:21,410 --> 01:21:19,320

And Touch planet Earth at that point so

2074

01:21:24,110 --> 01:21:21,420

we don't want that to happen we want it

2075

01:21:27,290 --> 01:21:24,120

to stay where it is now right we need to

2076

01:21:30,169 --> 01:21:27,300

continue to have hydrogen there right

2077

01:21:32,810 --> 01:21:30,179

right yeah and and the key thing is

2078

01:21:34,610 --> 01:21:32,820

depending on a star's mass is how

2079

01:21:36,709 --> 01:21:34,620

convective it is and to make that

2080

01:21:37,970 --> 01:21:36,719

straightforward If You're Expecting

2081

01:21:39,830 --> 01:21:37,980

things to kind of settle to the middle

2082

01:21:41,209 --> 01:21:39,840

right you need to handle your dents and

2083

01:21:43,610 --> 01:21:41,219

stuff like ions gonna settle the middle

2084

01:21:45,470 --> 01:21:43,620

and when when you're dealing with larger

2085

01:21:46,790 --> 01:21:45,480

systems like that that doesn't really

2086

01:21:48,350 --> 01:21:46,800

tend to be the way it is that's why

2087

01:21:49,669 --> 01:21:48,360

there are things like ion aluminum on

2088

01:21:52,370 --> 01:21:49,679

our surface when they're much heavier

2089

01:21:53,570 --> 01:21:52,380

than normal dirt or water and it's not

2090

01:21:55,970 --> 01:21:53,580

just because they are lighter than

2091

01:21:58,070 --> 01:21:55,980

uranium yes the core is usually denser

2092

01:21:59,510 --> 01:21:58,080

but they do bubble around and stars

2093

01:22:01,490 --> 01:21:59,520

bubble around and our sun is one of the

2094

01:22:03,290 --> 01:22:01,500

ones that does bubble up a lot it's not

2095

01:22:05,630 --> 01:22:03,300

fully convective but over time it would

2096

01:22:07,430 --> 01:22:05,640

be if you were cycling stuff out so if I

2097

01:22:09,950 --> 01:22:07,440

go and scoop a chunk of the up or sun

2098

01:22:11,030 --> 01:22:09,960

off for the moment which isn't really a

2099

01:22:12,830 --> 01:22:11,040

right way to look at because the the

2100

01:22:14,930 --> 01:22:12,840

sun's upward atmosphere is thinner than

2101
01:22:16,610 --> 01:22:14,940
our air uh the part that we can see that

2102
01:22:18,050 --> 01:22:16,620
we call the surface is very very thin

2103
01:22:19,910 --> 01:22:18,060
but let's we scoop something off

2104
01:22:21,649 --> 01:22:19,920
magically for the moment that's going to

2105
01:22:23,090 --> 01:22:21,659
contain about one percent of metals

2106
01:22:24,590 --> 01:22:23,100
including gold and things like that in

2107
01:22:26,630 --> 01:22:24,600
there too it's not just hydrogen helium

2108
01:22:28,490 --> 01:22:26,640
that all the heavier stuff is not just

2109
01:22:30,470 --> 01:22:28,500
in the core the helium comes bubbling up

2110
01:22:31,729 --> 01:22:30,480
so we scooped it up when we pour the

2111
01:22:33,169 --> 01:22:31,739
helium off it and when the other things

2112
01:22:35,450 --> 01:22:33,179
are fit and just put hydrogen back in

2113
01:22:37,070 --> 01:22:35,460

and maybe we suck some Hydro for Jupiter

2114

01:22:40,010 --> 01:22:37,080

for instance Jupiter's got a 35 million

2115

01:22:41,510 --> 01:22:40,020

some EO supply for the sun right uh or

2116

01:22:42,830 --> 01:22:41,520

some other places there's a lot of free

2117

01:22:44,209 --> 01:22:42,840

hydrogen out there there's a lot just

2118

01:22:45,709 --> 01:22:44,219

floating around

2119

01:22:47,390 --> 01:22:45,719

you'd say that helium and you do

2120

01:22:49,010 --> 01:22:47,400

something with it maybe you dump it into

2121

01:22:51,110 --> 01:22:49,020

a black hole to use inside a show will

2122

01:22:52,970 --> 01:22:51,120

look like a hollow Moon maybe you use it

2123

01:22:54,350 --> 01:22:52,980

for artificial Fusion there's lots of

2124

01:22:55,430 --> 01:22:54,360

things you could do with it

2125

01:22:57,110 --> 01:22:55,440

um but

2126

01:22:58,790 --> 01:22:57,120

how do you get it off this very hot

2127

01:23:01,010 --> 01:22:58,800

object and the surprise thing is you use

2128

01:23:02,810 --> 01:23:01,020

the sun Zone power this is a process we

2129

01:23:04,010 --> 01:23:02,820

call Star lifting and there's three ways

2130

01:23:07,130 --> 01:23:04,020

to do it one of them is called the huff

2131

01:23:09,430 --> 01:23:07,140

and puff method because you smoke weed

2132

01:23:11,810 --> 01:23:09,440

right that's not mine

2133

01:23:13,490 --> 01:23:11,820

but that one's that's all at all look

2134

01:23:15,050 --> 01:23:13,500

I'll give you a reference to three pigs

2135

01:23:17,810 --> 01:23:15,060

there but I think you've got everybody

2136

01:23:19,669 --> 01:23:17,820

talking about weed now see

2137

01:23:23,950 --> 01:23:19,679

see look at the comments here they come

2138

01:23:26,870 --> 01:23:23,960

I am a loaded stuff and do not use but

2139

01:23:28,790 --> 01:23:26,880

but I've spoken a couple years back too

2140

01:23:31,310 --> 01:23:28,800

no more tobacco

2141

01:23:33,169 --> 01:23:31,320

um but uh you you can pull the matter

2142

01:23:35,149 --> 01:23:33,179

out because there's such a huge magnetic

2143

01:23:36,890 --> 01:23:35,159

field there and all the metal comes off

2144

01:23:38,990 --> 01:23:36,900

anyway because of solar wind that is

2145

01:23:41,630 --> 01:23:39,000

millions and millions of tons of

2146

01:23:43,189 --> 01:23:41,640

material blowing out the Sun so you

2147

01:23:44,570 --> 01:23:43,199

focus more energy down me with the meal

2148

01:23:46,430 --> 01:23:44,580

whatever it's just to heat up a spot so

2149

01:23:47,750 --> 01:23:46,440

it blows most of the wind off or you do

2150

01:23:49,610 --> 01:23:47,760

so it looks kind of like an accordion

2151
01:23:51,350 --> 01:23:49,620
Bellows thing you can see how visual of

2152
01:23:53,390 --> 01:23:51,360
and I'll stall at the episode or feeling

2153
01:23:55,130 --> 01:23:53,400
inside or walk you through it just blows

2154
01:23:57,050 --> 01:23:55,140
more that matter off and you may

2155
01:23:59,090 --> 01:23:57,060
identity scoop it off as it goes usually

2156
01:24:01,490 --> 01:23:59,100
off the poles by preference and that

2157
01:24:03,770 --> 01:24:01,500
gives you a huge giant Bellows pumping

2158
01:24:07,330 --> 01:24:03,780
the sun off you cycle that material off

2159
01:24:12,410 --> 01:24:11,510
how does the hydrogen travel through the

2160
01:24:14,149 --> 01:24:12,420
Sun

2161
01:24:16,550 --> 01:24:14,159
it would have bubbles up over millions

2162
01:24:19,130 --> 01:24:16,560
of years how does gold get to the

2163
01:24:20,689 --> 01:24:19,140

surface of the Earth right no okay and

2164

01:24:24,110 --> 01:24:20,699

now I understand that but wouldn't it

2165

01:24:26,450 --> 01:24:24,120

have to get through the helium and back

2166

01:24:28,189 --> 01:24:26,460

into the hydrogen core well the helium's

2167

01:24:30,830 --> 01:24:28,199

the core is not actually hydrogen the

2168

01:24:32,750 --> 01:24:30,840

the helium density is highest in the

2169

01:24:34,610 --> 01:24:32,760

core the hydrogen is being thrown with

2170

01:24:35,810 --> 01:24:34,620

helium there you're thinking of stars

2171

01:24:37,790 --> 01:24:35,820

are still getting ready to go supernova

2172

01:24:40,189 --> 01:24:37,800

for having multiple shells our sun

2173

01:24:42,530 --> 01:24:40,199

basically is about the same consistency

2174

01:24:44,450 --> 01:24:42,540

throughout in terms of makeup with a

2175

01:24:46,970 --> 01:24:44,460

little bit higher helium in the core

2176

01:24:49,070 --> 01:24:46,980

just a little bit and the decor is much

2177

01:24:51,290 --> 01:24:49,080

denser but it's still mostly hydrogen

2178

01:24:53,510 --> 01:24:51,300

and it's you know it's about the same

2179

01:24:55,430 --> 01:24:53,520

ratio of helium there as up by the

2180

01:24:57,410 --> 01:24:55,440

surface it is a little bit higher but

2181

01:24:58,729 --> 01:24:57,420

not too much and you keep cycling it out

2182

01:24:59,930 --> 01:24:58,739

it will actually leak out enough that

2183

01:25:02,570 --> 01:24:59,940

you would never have to have the sun go

2184

01:25:03,830 --> 01:25:02,580

red giant

2185

01:25:04,970 --> 01:25:03,840

and you could actually do it when it was

2186

01:25:06,050 --> 01:25:04,980

getting ready to go eventually if you

2187

01:25:08,330 --> 01:25:06,060

really want to because it's easier to

2188

01:25:09,530 --> 01:25:08,340

suck matter off of that Giants but you

2189

01:25:11,689 --> 01:25:09,540

just keep cycling that is like you've

2190

01:25:14,090 --> 01:25:11,699

got Sports of hydrogen and since you can

2191

01:25:15,350 --> 01:25:14,100

build Saturn sized fake planets that

2192

01:25:16,729 --> 01:25:15,360

were made out of just hydrogen with a

2193

01:25:19,490 --> 01:25:16,739

shell around them that's a very good way

2194

01:25:21,410 --> 01:25:19,500

to store your gas tanks giant plants of

2195

01:25:22,910 --> 01:25:21,420

Earth's type variety that are 100 times

2196

01:25:24,649 --> 01:25:22,920

bigger than Earth floating around

2197

01:25:26,570 --> 01:25:24,659

waiting to be turned into uh you know

2198

01:25:28,430 --> 01:25:26,580

fuel tanks down the road

2199

01:25:31,250 --> 01:25:28,440

do you think that

2200

01:25:33,590 --> 01:25:31,260

um uh the amount of energy

2201

01:25:35,330 --> 01:25:33,600

uh that we have we're going to have to

2202

01:25:38,090 --> 01:25:35,340

harness energy from somewhere if we're

2203

01:25:40,310 --> 01:25:38,100

going to go and construct black holes in

2204

01:25:41,810 --> 01:25:40,320

wormholes right it's not going to be an

2205

01:25:44,630 --> 01:25:41,820

energy source

2206

01:25:46,490 --> 01:25:44,640

uh from Earth I don't think so I I'm

2207

01:25:48,590 --> 01:25:46,500

thinking we're gonna have to go external

2208

01:25:51,649 --> 01:25:48,600

would we have to go to Jupiter for that

2209

01:25:54,110 --> 01:25:51,659

would it is our sun

2210

01:25:56,090 --> 01:25:54,120

um energetic enough to construct

2211

01:25:58,250 --> 01:25:56,100

something to travel to another star

2212

01:26:00,290 --> 01:25:58,260

system well there's two billion times

2213

01:26:02,330 --> 01:26:00,300

more sunlight being produced by the Sun

2214

01:26:04,189 --> 01:26:02,340

than the Earth actually gets itself and

2215

01:26:05,750 --> 01:26:04,199

I don't remember exactly what the budget

2216

01:26:07,790 --> 01:26:05,760

looks like plant wise but I think the

2217

01:26:09,649 --> 01:26:07,800

human race is Electric Supply is is on

2218

01:26:12,169 --> 01:26:09,659

order of a thousand to ten thousand

2219

01:26:13,790 --> 01:26:12,179

times smaller than most soloists

2220

01:26:15,410 --> 01:26:13,800

um and that might be very low so

2221

01:26:17,090 --> 01:26:15,420

basically you got at least a trillion

2222

01:26:19,070 --> 01:26:17,100

times more power coming out the sun

2223

01:26:21,050 --> 01:26:19,080

available for us to use than Humanity

2224

01:26:22,850 --> 01:26:21,060

currently uses uh in terms of

2225

01:26:24,890 --> 01:26:22,860

electricity and fuel I'd obviously we

2226

01:26:25,550 --> 01:26:24,900

use it for growing plants

2227

01:26:30,410 --> 01:26:25,560

um

2228

01:26:32,209 --> 01:26:30,420

and you can do something like a solo say

2229

01:26:34,010 --> 01:26:32,219

or a laser sail with instead of letting

2230

01:26:35,689 --> 01:26:34,020

the sun bounce off of a mirror push that

2231

01:26:36,890 --> 01:26:35,699

you say screw just a little bit of

2232

01:26:38,870 --> 01:26:36,900

diversion line which go ahead and hit

2233

01:26:41,629 --> 01:26:38,880

with the laser beam and accelerate it

2234

01:26:43,669 --> 01:26:41,639

very fast or faster anyway and yeah it

2235

01:26:45,050 --> 01:26:43,679

absolutely you could move giant ships I

2236

01:26:46,669 --> 01:26:45,060

mean we talk about moving ones that'll

2237

01:26:49,010 --> 01:26:46,679

that make your aircraft carrier look

2238

01:26:51,350 --> 01:26:49,020

like a little you know rubber duck out

2239

01:26:55,310 --> 01:26:51,360

of the top yeah throw systems using the

2240

01:27:00,110 --> 01:26:55,320

sun's power well when Al cubieri

2241

01:27:02,750 --> 01:27:00,120

um uh you know brought up his idea of uh

2242

01:27:04,850 --> 01:27:02,760

his warp drive which I think he was

2243

01:27:08,030 --> 01:27:04,860

pretty convinced in the beginning that

2244

01:27:10,070 --> 01:27:08,040

the math worked but in the end he kept

2245

01:27:11,510 --> 01:27:10,080

going back and revisiting and revisiting

2246

01:27:13,390 --> 01:27:11,520

and kind of went you know what man you

2247

01:27:16,250 --> 01:27:13,400

know I looked at this again and

2248

01:27:19,910 --> 01:27:16,260

this crap is impossible it would take

2249

01:27:22,669 --> 01:27:19,920

the energy of the entire universe to

2250

01:27:24,410 --> 01:27:22,679

fire this thing up just one time is is

2251
01:27:25,550 --> 01:27:24,420
that the same thing with wormholes are

2252
01:27:28,070 --> 01:27:25,560
we talking about that kind of

2253
01:27:29,149 --> 01:27:28,080
concentration of energy

2254
01:27:31,550 --> 01:27:29,159
um

2255
01:27:32,270 --> 01:27:31,560
it depends I mean it comes down to

2256
01:27:34,310 --> 01:27:32,280
whether or not you actually have

2257
01:27:36,050 --> 01:27:34,320
negative matter if you have negative

2258
01:27:37,129 --> 01:27:36,060
matter and again negative matter is

2259
01:27:40,010 --> 01:27:37,139
something that

2260
01:27:41,930 --> 01:27:40,020
uh that's probably just think of the

2261
01:27:43,910 --> 01:27:41,940
matter was matter that has an absence of

2262
01:27:45,709 --> 01:27:43,920
gravity to reverse gravity you know or

2263
01:27:47,330 --> 01:27:45,719

if you push down a piece of negative

2264

01:27:50,390 --> 01:27:47,340

matter would actually fly towards you

2265

01:27:52,070 --> 01:27:50,400

instead very counterintuitive stuff I am

2266

01:27:53,450 --> 01:27:52,080

well I'm not performing at any Camp

2267

01:27:56,090 --> 01:27:53,460

because it'll be rather be for me in any

2268

01:27:58,070 --> 01:27:56,100

camera but I tend to be pretty opposed

2269

01:27:59,689 --> 01:27:58,080

the idea that stuff exists at all and so

2270

01:28:02,570 --> 01:27:59,699

someone discovers even one particle that

2271

01:28:05,090 --> 01:28:02,580

I tend to assume doesn't exist and it

2272

01:28:07,910 --> 01:28:05,100

requires you require a negative man or

2273

01:28:09,830 --> 01:28:07,920

negative energy uh to do something like

2274

01:28:11,149 --> 01:28:09,840

the warp drive there is a reason to

2275

01:28:12,770 --> 01:28:11,159

think you might be able to do negative

2276

01:28:13,910 --> 01:28:12,780

energy unlimited amounts and some say

2277

01:28:16,250 --> 01:28:13,920

maybe you could do some negative amount

2278

01:28:17,750 --> 01:28:16,260

of two It's Tricky we don't know what

2279

01:28:19,490 --> 01:28:17,760

well cubios would you say is the math

2280

01:28:21,530 --> 01:28:19,500

works if you have these things and the

2281

01:28:24,169 --> 01:28:21,540

same is true for more morals if you have

2282

01:28:26,209 --> 01:28:24,179

negative matter it's very hard to argue

2283

01:28:28,250 --> 01:28:26,219

you can do one more you know so if

2284

01:28:30,169 --> 01:28:28,260

someone finds one particle of negative

2285

01:28:31,370 --> 01:28:30,179

matters model makes it in the lab you

2286

01:28:32,990 --> 01:28:31,380

suddenly have to turn around and say yes

2287

01:28:35,169 --> 01:28:33,000

I think one poles and warp tries are

2288

01:28:38,149 --> 01:28:35,179

both possible

2289

01:28:41,169 --> 01:28:38,159

why is negative matter and when you go

2290

01:28:44,090 --> 01:28:41,179

and and do any Research into wormholes

2291

01:28:45,709 --> 01:28:44,100

whether it's Kip Thorn or even uh you

2292

01:28:47,510 --> 01:28:45,719

know Einstein and going back to the

2293

01:28:50,470 --> 01:28:47,520

1930s

2294

01:28:53,689 --> 01:28:50,480

um a negative matter and negative

2295

01:28:55,669 --> 01:28:53,699

electromagnetic course these these

2296

01:28:58,250 --> 01:28:55,679

comments they've been there for why is

2297

01:29:02,450 --> 01:28:58,260

it so important why is negative matter

2298

01:29:04,729 --> 01:29:02,460

so important uh to to the creation of a

2299

01:29:06,350 --> 01:29:04,739

wormhole well this really comes down to

2300

01:29:08,390 --> 01:29:06,360

the throat and we'll go back to the

2301
01:29:09,530 --> 01:29:08,400
two-dimensional you know level stamp

2302
01:29:12,229 --> 01:29:09,540
version where it looks like an umbilical

2303
01:29:13,790 --> 01:29:12,239
chord between A and B there right um and

2304
01:29:15,890 --> 01:29:13,800
there you think of that as your tunnel

2305
01:29:17,750 --> 01:29:15,900
but you're showing that tunnel up with

2306
01:29:19,370 --> 01:29:17,760
as opposed like beams inside of mine

2307
01:29:20,990 --> 01:29:19,380
you're showing it up with negative

2308
01:29:22,850 --> 01:29:21,000
matter there that's what's keeping this

2309
01:29:25,189 --> 01:29:22,860
thing so that it doesn't Clash a black

2310
01:29:28,189 --> 01:29:25,199
hole so it's inflatable it stays

2311
01:29:30,709 --> 01:29:28,199
inflated yeah the the core level of a

2312
01:29:32,930 --> 01:29:30,719
wormhole of that variety is basically a

2313
01:29:34,850 --> 01:29:32,940

black hole that you stop from collapsing

2314

01:29:37,129 --> 01:29:34,860

into a four Singularity assuming that's

2315

01:29:39,590 --> 01:29:37,139

what black holes even do which I'm also

2316

01:29:42,530 --> 01:29:39,600

on the fence about so think of it as

2317

01:29:43,790 --> 01:29:42,540

this this black horse for me as we're

2318

01:29:45,590 --> 01:29:43,800

playing that and throat and it's about

2319

01:29:47,270 --> 01:29:45,600

to cut it off and chop it off like an

2320

01:29:49,310 --> 01:29:47,280

umbilical cord normally would be but you

2321

01:29:50,810 --> 01:29:49,320

jam a ring made of negative matter in

2322

01:29:52,070 --> 01:29:50,820

there and it can't collapse around that

2323

01:29:54,410 --> 01:29:52,080

and that hole through there was the

2324

01:29:56,050 --> 01:29:54,420

throat of your wormhole uh this is

2325

01:29:58,970 --> 01:29:56,060

three-dimensional not two-dimensional so

2326

01:30:00,229 --> 01:29:58,980

the analogy only goes so far but in you

2327

01:30:02,750 --> 01:30:00,239

know they are it's going to be a shell

2328

01:30:03,649 --> 01:30:02,760

as opposed to a ring and that's where

2329

01:30:04,729 --> 01:30:03,659

you're going to drop in there that's

2330

01:30:09,050 --> 01:30:04,739

what's going to keep this thing from

2331

01:30:10,910 --> 01:30:09,060

collapsing so you can Traverse it and

2332

01:30:12,950 --> 01:30:10,920

this requires a huge amount of this

2333

01:30:14,030 --> 01:30:12,960

material that doesn't exist there are

2334

01:30:16,310 --> 01:30:14,040

some arguments that maybe it only

2335

01:30:18,350 --> 01:30:16,320

requires a few hundred kilograms as

2336

01:30:20,689 --> 01:30:18,360

opposed to several planets worth of the

2337

01:30:24,050 --> 01:30:20,699

material uh that could be debated it's

2338

01:30:27,350 --> 01:30:24,060

on paper my issue is that negative stuff

2339

01:30:29,689 --> 01:30:27,360

really only seems to exist on paper I

2340

01:30:31,490 --> 01:30:29,699

can tell you this is a negative one foot

2341

01:30:33,290 --> 01:30:31,500

distance or it's negative a degree

2342

01:30:35,090 --> 01:30:33,300

temperature that's a made-up construct

2343

01:30:37,070 --> 01:30:35,100

negative energy like we usually talk

2344

01:30:38,450 --> 01:30:37,080

about we've now negative energy that's

2345

01:30:40,669 --> 01:30:38,460

like native temperature in the

2346

01:30:42,950 --> 01:30:40,679

Fahrenheit or Celsius range we set a

2347

01:30:45,050 --> 01:30:42,960

zero and it's below that really there's

2348

01:30:46,550 --> 01:30:45,060

a baseline for all of what the of what

2349

01:30:48,950 --> 01:30:46,560

like I believe that is the vacuum energy

2350

01:30:50,870 --> 01:30:48,960

level that's all artificial zero you

2351

01:30:52,610 --> 01:30:50,880

know uh that's what we're at normally

2352

01:30:53,570 --> 01:30:52,620

and to say that you go below that you

2353

01:30:56,090 --> 01:30:53,580

suddenly you say negative temperature

2354

01:30:57,229 --> 01:30:56,100

isn't really right and that in that same

2355

01:30:59,149 --> 01:30:57,239

way

2356

01:31:01,129 --> 01:30:59,159

um I don't know what a negative foot

2357

01:31:03,169 --> 01:31:01,139

looks like I've never actually seen one

2358

01:31:04,669 --> 01:31:03,179

they don't exist I don't know what a

2359

01:31:05,990 --> 01:31:04,679

negative piece of matter looks like I

2360

01:31:07,910 --> 01:31:06,000

don't know what a negative gallon of

2361

01:31:09,530 --> 01:31:07,920

water looks like I can show you a

2362

01:31:12,169 --> 01:31:09,540

negative gallon on paper it works fine

2363

01:31:13,729 --> 01:31:12,179

but I can't hand you a negative gallon I

2364

01:31:15,290 --> 01:31:13,739

can just hand you an empty gallon jaw

2365

01:31:17,689 --> 01:31:15,300

and say fill it but that's not negative

2366

01:31:21,189 --> 01:31:17,699

gallon that's zero is that is that only

2367

01:31:23,270 --> 01:31:21,199

because we're not in that time scale

2368

01:31:24,530 --> 01:31:23,280

and this is another one's case with

2369

01:31:26,689 --> 01:31:24,540

start skiing a little bit philosophical

2370

01:31:28,669 --> 01:31:26,699

I suppose too right if I have a gallon

2371

01:31:30,950 --> 01:31:28,679

of water I hand it to you I now have a

2372

01:31:32,090 --> 01:31:30,960

negative gallon where I was at you could

2373

01:31:34,669 --> 01:31:32,100

make that argument but I don't know that

2374

01:31:37,669 --> 01:31:34,679

one if I try to drink that you know it's

2375

01:31:40,790 --> 01:31:37,679

uh and time scales wise because a lot of

2376

01:31:43,250 --> 01:31:40,800

these things do shift because space and

2377

01:31:45,770 --> 01:31:43,260

time are not in any way separate you

2378

01:31:48,169 --> 01:31:45,780

know you could you can play with some of

2379

01:31:50,629 --> 01:31:48,179

these things to change the others right

2380

01:31:53,570 --> 01:31:50,639

if I can press a distance I can compress

2381

01:31:55,490 --> 01:31:53,580

the time right yeah yeah you know these

2382

01:31:59,209 --> 01:31:55,500

things do give you some fluctuation so

2383

01:32:02,030 --> 01:31:59,219

would we we couldn't there wouldn't be a

2384

01:32:03,890 --> 01:32:02,040

way to see that it's not in our reality

2385

01:32:05,149 --> 01:32:03,900

call it another dimension whatever you

2386

01:32:08,090 --> 01:32:05,159

want to say but if it's in a different

2387

01:32:10,010 --> 01:32:08,100

time scale then it is just not part of

2388

01:32:12,290 --> 01:32:10,020

our reality no matter how we want to

2389

01:32:14,090 --> 01:32:12,300

think that we could be physical with it

2390

01:32:15,590 --> 01:32:14,100

it had to be part of our reality for us

2391

01:32:17,689 --> 01:32:15,600

to use it though right I guess I got

2392

01:32:19,250 --> 01:32:17,699

like um let's say the other universes

2393

01:32:20,689 --> 01:32:19,260

out there although and there's so many

2394

01:32:22,490 --> 01:32:20,699

different ways you have other divorces

2395

01:32:23,990 --> 01:32:22,500

it could be ones are exactly Echo only

2396

01:32:24,910 --> 01:32:24,000

they're for the way over the Hubble

2397

01:32:26,450 --> 01:32:24,920

horizon

2398

01:32:28,250 --> 01:32:26,460

cosmologicalizing or they could be one

2399

01:32:31,010 --> 01:32:28,260

cell just copy timelines your classic

2400

01:32:33,050 --> 01:32:31,020

Mini Wards what if I had done X instead

2401

01:32:34,850 --> 01:32:33,060

what if I had if Halo had fun and broke

2402

01:32:36,890 --> 01:32:34,860

his neck you know everyone time travel

2403

01:32:38,590 --> 01:32:36,900

around Hitler's is kind of the the main

2404

01:32:42,169 --> 01:32:38,600

sequence

2405

01:32:43,669 --> 01:32:42,179

every possibility exists right right and

2406

01:32:44,990 --> 01:32:43,679

that's that that's that function that is

2407

01:32:47,209 --> 01:32:45,000

the ones where it's like what if the

2408

01:32:48,950 --> 01:32:47,219

universe had simply uh formed Another

2409

01:32:51,950 --> 01:32:48,960

Universe of wand but the speed of light

2410

01:32:53,570 --> 01:32:51,960

was twice what is here or one millimeter

2411

01:32:55,790 --> 01:32:53,580

per second faster or slower than it is

2412

01:32:58,310 --> 01:32:55,800

here or one foot per second or whatever

2413

01:33:00,709 --> 01:32:58,320

it is maybe gravity is one percent

2414

01:33:02,270 --> 01:33:00,719

stronger 100 million times stronger

2415

01:33:04,189 --> 01:33:02,280

these potential Universal Cloud

2416

01:33:05,629 --> 01:33:04,199

potentially exist and whether or not

2417

01:33:08,030 --> 01:33:05,639

they exist or not

2418

01:33:10,310 --> 01:33:08,040

the can you reach them can you detect

2419

01:33:11,810 --> 01:33:10,320

them can you absorb them in any way if

2420

01:33:14,090 --> 01:33:11,820

you can it means you should be able to

2421

01:33:16,490 --> 01:33:14,100

travel to them right if I can send

2422

01:33:18,470 --> 01:33:16,500

information between point a and point B

2423

01:33:20,090 --> 01:33:18,480

then I should be able to send a copy of

2424

01:33:22,070 --> 01:33:20,100

my brain for instance I should be to

2425

01:33:23,870 --> 01:33:22,080

send man or you know if you can send

2426

01:33:25,310 --> 01:33:23,880

information while that is massive you

2427

01:33:26,570 --> 01:33:25,320

should be able to send

2428

01:33:29,570 --> 01:33:26,580

a person

2429

01:33:30,890 --> 01:33:29,580

you know uh so any way that you can

2430

01:33:33,169 --> 01:33:30,900

actually detect another universe's

2431

01:33:35,209 --> 01:33:33,179

existence should give you some way to

2432

01:33:37,550 --> 01:33:35,219

travel to that with the exception of

2433

01:33:38,870 --> 01:33:37,560

conformal cyclic cosmology biped Rose

2434

01:33:40,370 --> 01:33:38,880

which is where you're leaving

2435

01:33:43,070 --> 01:33:40,380

gravitational footprints on a previous

2436

01:33:45,590 --> 01:33:43,080

Universe you know that's lets you travel

2437

01:33:48,229 --> 01:33:45,600

forward in time the long way as Doctor

2438

01:33:50,090 --> 01:33:48,239

Who would say you know right behind for

2439

01:33:51,830 --> 01:33:50,100

people on jillion years from now to

2440

01:33:53,870 --> 01:33:51,840

decode in the subs you know the

2441

01:33:56,149 --> 01:33:53,880

structural Universe where they you know

2442

01:34:00,890 --> 01:33:56,159

post Big Bang exist

2443

01:34:06,890 --> 01:34:00,900

so Nolan just uh posted uh every Bigfoot

2444

01:34:12,110 --> 01:34:10,370

I gotta say I gotta say that's uh

2445

01:34:14,750 --> 01:34:12,120

that's priceless right there that was

2446

01:34:17,330 --> 01:34:14,760

well done what about when when

2447

01:34:21,410 --> 01:34:17,340

um when Matt Visser

2448

01:34:25,189 --> 01:34:21,420

um came out with uh his paper and his

2449

01:34:28,129 --> 01:34:25,199

his theory that uh wormholes uh exist

2450

01:34:31,250 --> 01:34:28,139

naturally uh and from the formation of

2451
01:34:33,950 --> 01:34:31,260
the universe and and they are everywhere

2452
01:34:36,169 --> 01:34:33,960
um I I you know that came out in in the

2453
01:34:37,790 --> 01:34:36,179
mid to late 90s and I remember reading

2454
01:34:40,610 --> 01:34:37,800
that going well that makes a lot of

2455
01:34:43,910 --> 01:34:40,620
sense all right now he has since kind of

2456
01:34:46,550 --> 01:34:43,920
backtrack off of that uh somewhat but at

2457
01:34:50,209 --> 01:34:46,560
the time it was a very exciting uh

2458
01:34:54,649 --> 01:34:50,219
possibility and a possible Discovery and

2459
01:34:57,229 --> 01:34:54,659
then I I was picturing Isaac you know

2460
01:34:59,030 --> 01:34:57,239
how you know the Thomas guide or you

2461
01:35:02,030 --> 01:34:59,040
know travel maps that you would unfold

2462
01:35:05,090 --> 01:35:02,040
you'd unfold a travel map of of

2463
01:35:06,770 --> 01:35:05,100

wormholes connecting galaxies around the

2464

01:35:08,870 --> 01:35:06,780

universe and that's what I was I was

2465

01:35:10,010 --> 01:35:08,880

like that's how et's doing it that's how

2466

01:35:12,530 --> 01:35:10,020

they're doing it right there they take

2467

01:35:14,570 --> 01:35:12,540

out the road map awesome yeah I I love

2468

01:35:16,310 --> 01:35:14,580

to think about how that and that's how

2469

01:35:18,530 --> 01:35:16,320

so many episodes pop up is here's aside

2470

01:35:20,270 --> 01:35:18,540

the end sci-fi what would be the real

2471

01:35:21,649 --> 01:35:20,280

consequence we took that step photo but

2472

01:35:23,629 --> 01:35:21,659

if you won't always get so easy that

2473

01:35:25,610 --> 01:35:23,639

your refrigerator is actually to you

2474

01:35:26,689 --> 01:35:25,620

know you do time they open up the

2475

01:35:28,790 --> 01:35:26,699

refrigerator door click the button

2476

01:35:30,050 --> 01:35:28,800

anyway open yours up with a milk sat on

2477

01:35:32,750 --> 01:35:30,060

the other planet or back in there it's

2478

01:35:35,750 --> 01:35:32,760

like an entrance and then turns onto the

2479

01:35:37,910 --> 01:35:35,760

freeway right you do your dialing up and

2480

01:35:40,370 --> 01:35:37,920

Bam you know is that coming your new

2481

01:35:41,689 --> 01:35:40,380

phone system or is it just like doors of

2482

01:35:44,750 --> 01:35:41,699

Oz was the last thing you played with

2483

01:35:47,090 --> 01:35:44,760

that in his uh courts of chaos second

2484

01:35:49,430 --> 01:35:47,100

half of his book series for Amber as did

2485

01:35:51,709 --> 01:35:49,440

Dan Simmons from hyperia everyone wants

2486

01:35:54,350 --> 01:35:51,719

to go read about those are great

2487

01:35:56,209 --> 01:35:54,360

um but the the you know like suskin

2488

01:35:57,770 --> 01:35:56,219

that's who I was thinking to get Olio uh

2489

01:35:59,330 --> 01:35:57,780

he proposed the idea electrons could

2490

01:36:01,250 --> 01:35:59,340

have holes connecting them oh you're

2491

01:36:02,810 --> 01:36:01,260

talking about Leonard yeah yeah he did

2492

01:36:04,729 --> 01:36:02,820

he didn't I couldn't think of Olio yeah

2493

01:36:08,629 --> 01:36:04,739

you know what when we were doing our

2494

01:36:11,570 --> 01:36:08,639

list of names we left off Lenny I

2495

01:36:12,770 --> 01:36:11,580

apologize Lenny I apologize there are so

2496

01:36:14,390 --> 01:36:12,780

many great things out there and these

2497

01:36:15,830 --> 01:36:14,400

are just the ones who you know there are

2498

01:36:17,149 --> 01:36:15,840

some amazing thinkers out there who are

2499

01:36:18,830 --> 01:36:17,159

just afraid to actually talk in front of

2500

01:36:21,770 --> 01:36:18,840

a class and they never get to be you

2501
01:36:22,850 --> 01:36:21,780
know they never show up on TV I I know

2502
01:36:24,950 --> 01:36:22,860
somebody who's got the same speech

2503
01:36:27,470 --> 01:36:24,960
impediment I have only warsu is

2504
01:36:30,350 --> 01:36:27,480
brilliant and they basically they don't

2505
01:36:32,090 --> 01:36:30,360
teach even small classes because they

2506
01:36:33,709 --> 01:36:32,100
can't stand the get made fun of all the

2507
01:36:35,030 --> 01:36:33,719
feeling they would be for like so you

2508
01:36:38,030 --> 01:36:35,040
know things out there who just aren't

2509
01:36:40,310 --> 01:36:38,040
public appeals wise and I mean there are

2510
01:36:43,250 --> 01:36:40,320
so many great minds out there I I feel I

2511
01:36:45,530 --> 01:36:43,260
feel I feel bad about having that kind

2512
01:36:47,270 --> 01:36:45,540
of mental block you know or that kind of

2513
01:36:48,770 --> 01:36:47,280

fear that kind of phobia because

2514

01:36:51,110 --> 01:36:48,780

honestly I'm just gonna tell you right

2515

01:36:54,950 --> 01:36:51,120

now Isaac nobody gives a crap

2516

01:36:58,689 --> 01:36:54,960

you give a crap and I get that right but

2517

01:37:01,430 --> 01:36:58,699

but we don't we don't we enjoy your mind

2518

01:37:02,750 --> 01:37:01,440

yeah but but whether if something has a

2519

01:37:03,709 --> 01:37:02,760

fear of that themselves you know they

2520

01:37:05,450 --> 01:37:03,719

just don't like to talk in public

2521

01:37:07,370 --> 01:37:05,460

there's the fear of public speaking is

2522

01:37:08,990 --> 01:37:07,380

not what I've ever had I know you know

2523

01:37:10,790 --> 01:37:09,000

I'm probably not you either I don't

2524

01:37:12,649 --> 01:37:10,800

think maybe people become radio

2525

01:37:14,270 --> 01:37:12,659

personalities YouTubers whatever it is

2526

01:37:16,430 --> 01:37:14,280

that they are or even just professors

2527

01:37:18,169 --> 01:37:16,440

really if they are afraid to talk in

2528

01:37:19,550 --> 01:37:18,179

front of the crowd before the fact that

2529

01:37:21,410 --> 01:37:19,560

we don't usually talk in front of crowds

2530

01:37:25,550 --> 01:37:21,420

that often right right right right right

2531

01:37:27,229 --> 01:37:25,560

right no I remember uh uh when you and I

2532

01:37:30,290 --> 01:37:27,239

discovered each other you had just

2533

01:37:32,689 --> 01:37:30,300

started the channel and and when we

2534

01:37:36,169 --> 01:37:32,699

started that communication back then and

2535

01:37:38,270 --> 01:37:36,179

I was I I went through a really I've

2536

01:37:39,530 --> 01:37:38,280

told you this a million times but uh to

2537

01:37:42,770 --> 01:37:39,540

those out there that haven't heard the

2538

01:37:45,590 --> 01:37:42,780

story I went through a really bad Isaac

2539

01:37:48,229 --> 01:37:45,600

Arthur addiction and I had to go through

2540

01:37:50,990 --> 01:37:48,239

a 12-step program and I had meetings

2541

01:37:56,110 --> 01:37:51,000

once a week where I had to go and and

2542

01:38:04,610 --> 01:37:59,510

future science addiction because I was

2543

01:38:06,169 --> 01:38:04,620

and and and I I only heard your speech

2544

01:38:09,770 --> 01:38:06,179

issues

2545

01:38:12,350 --> 01:38:09,780

for maybe 15 minutes in the very

2546

01:38:13,729 --> 01:38:12,360

beginning here and now I know a lot of

2547

01:38:16,070 --> 01:38:13,739

people adapt to it really quickly other

2548

01:38:17,810 --> 01:38:16,080

people and I try you know there are

2549

01:38:20,390 --> 01:38:17,820

people who I know my voice is like nails

2550

01:38:21,350 --> 01:38:20,400

on a chalkboard too and I can't be angry

2551

01:38:23,689 --> 01:38:21,360

at them there are people whose voices

2552

01:38:26,629 --> 01:38:23,699

bug me that shouldn't you know it's what

2553

01:38:28,430 --> 01:38:26,639

bug shows what bug shot you know and uh

2554

01:38:30,410 --> 01:38:28,440

obviously some of them encourage that

2555

01:38:32,390 --> 01:38:30,420

with some nasty or chromosome necessary

2556

01:38:34,189 --> 01:38:32,400

that's just being a joke but if someone

2557

01:38:36,890 --> 01:38:34,199

doesn't like the way you sound like I

2558

01:38:38,570 --> 01:38:36,900

have something I love audiobooks and the

2559

01:38:39,890 --> 01:38:38,580

narrator's tone of voice can make such a

2560

01:38:41,629 --> 01:38:39,900

difference to whether I enjoy and I'm

2561

01:38:43,850 --> 01:38:41,639

not not just Discovery in some areas are

2562

01:38:45,470 --> 01:38:43,860

incredibly boring and that kills it but

2563

01:38:47,510 --> 01:38:45,480

just I don't like the way they talk

2564

01:38:49,910 --> 01:38:47,520

whatever it is that's a petty preference

2565

01:38:53,510 --> 01:38:49,920

but it's a real one it's a real one look

2566

01:38:54,770 --> 01:38:53,520

I I do audio books uh every day and I've

2567

01:38:56,629 --> 01:38:54,780

constantly have them on in the

2568

01:38:58,610 --> 01:38:56,639

background I do an immense amount of re

2569

01:39:01,310 --> 01:38:58,620

I get work done with audiobooks running

2570

01:39:03,470 --> 01:39:01,320

in the background right so but I'm

2571

01:39:06,050 --> 01:39:03,480

telling you right now

2572

01:39:08,209 --> 01:39:06,060

so I I need two minutes

2573

01:39:10,129 --> 01:39:08,219

and if I don't dig the narrator if I

2574

01:39:11,570 --> 01:39:10,139

don't dig what's going on I go to the

2575

01:39:13,310 --> 01:39:11,580

next audiobook

2576

01:39:14,930 --> 01:39:13,320

it tells me try to give it long ago if

2577

01:39:15,890 --> 01:39:14,940

the voice tone is what's telling me as

2578

01:39:17,750 --> 01:39:15,900

opposed to the ones who feel like

2579

01:39:19,129 --> 01:39:17,760

they're just yeah you get some seriously

2580

01:39:21,350 --> 01:39:19,139

because so you want to do audiobooks now

2581

01:39:23,030 --> 01:39:21,360

and it's like this is not a good new you

2582

01:39:24,470 --> 01:39:23,040

know this person's not you know and and

2583

01:39:26,330 --> 01:39:24,480

it's no one sort of gives them as a post

2584

01:39:28,189 --> 01:39:26,340

that takes practice to get that public

2585

01:39:30,410 --> 01:39:28,199

speaking voice or the ability to record

2586

01:39:31,430 --> 01:39:30,420

your script but if if it's one of those

2587

01:39:32,270 --> 01:39:31,440

things where they're not it's kind of

2588

01:39:33,830 --> 01:39:32,280

like when someone sends you a book it

2589

01:39:35,209 --> 01:39:33,840

says can you review this sci-fi book for

2590

01:39:36,950 --> 01:39:35,219

me and I don't do that anymore that's

2591

01:39:39,229 --> 01:39:36,960

because I got backlogs these things

2592

01:39:41,090 --> 01:39:39,239

these days but yeah first I'd say well

2593

01:39:41,870 --> 01:39:41,100

if there's more than one typo on page

2594

01:39:50,090 --> 01:39:41,880

one

2595

01:39:51,590 --> 01:39:50,100

that that's that's why I'm jumping off

2596

01:39:53,290 --> 01:39:51,600

board whether or not the introduction's

2597

01:39:55,970 --> 01:39:53,300

horrible yeah

2598

01:39:58,010 --> 01:39:55,980

and kind of saying foreign if you're

2599

01:39:59,390 --> 01:39:58,020

starting off bad you're like when I'm

2600

01:40:01,250 --> 01:39:59,400

recording scripts I was my little one

2601

01:40:02,810 --> 01:40:01,260

intro line I'll add you on episodes I'll

2602

01:40:04,370 --> 01:40:02,820

do that it's like five or six takes to

2603

01:40:06,110 --> 01:40:04,380

warm up my voice and I always go for the

2604

01:40:08,149 --> 01:40:06,120

best take there most the best day it's

2605

01:40:10,850 --> 01:40:08,159

one take or two if I mess up that's it

2606

01:40:12,890 --> 01:40:10,860

yeah I gotta go to that good intro you

2607

01:40:15,590 --> 01:40:12,900

know yeah I'm gonna take now it takes me

2608

01:40:19,070 --> 01:40:15,600

to get to the the good takes

2609

01:40:22,129 --> 01:40:19,080

it takes me about an hour

2610

01:40:26,270 --> 01:40:22,139

of of getting warmed up and and but but

2611

01:40:27,830 --> 01:40:26,280

one time on my stride boom done you know

2612

01:40:30,770 --> 01:40:27,840

I'll just go straight through it when

2613

01:40:33,050 --> 01:40:30,780

I'm doing TV you know I'll shoot you

2614

01:40:35,810 --> 01:40:33,060

know four five six episodes a day right

2615

01:40:38,570 --> 01:40:35,820

and you've got uh

2616

01:40:40,370 --> 01:40:38,580

you've got production you've got makeup

2617

01:40:42,410 --> 01:40:40,380

you've got wardrobe you've got lights

2618

01:40:45,050 --> 01:40:42,420

you've got audio you've got the director

2619

01:40:47,450 --> 01:40:45,060

you've got the camera people uh set

2620

01:40:52,870 --> 01:40:47,460

decorators you've got this and you know

2621

01:40:58,970 --> 01:40:55,970

there's no retakes so I don't get a

2622

01:41:01,310 --> 01:40:58,980

chance to warm up by the time I get to

2623

01:41:02,810 --> 01:41:01,320

That's it man you can't go to the end of

2624

01:41:05,990 --> 01:41:02,820

the episode and go can we do that again

2625

01:41:07,970 --> 01:41:06,000

what two hours you know so

2626

01:41:11,390 --> 01:41:07,980

um I've got to be on my game and so by

2627

01:41:13,790 --> 01:41:11,400

the time I'm at episode four dude I'm on

2628

01:41:16,370 --> 01:41:13,800

my stride and then I go back and

2629

01:41:20,090 --> 01:41:16,380

whatever episode one was you could tell

2630

01:41:22,270 --> 01:41:20,100

you know I'm still warming up I I don't

2631

01:41:24,950 --> 01:41:22,280

have the stamina for Walter Arrow things

2632

01:41:26,330 --> 01:41:24,960

yeah I can't wait you're gonna be on my

2633

01:41:28,010 --> 01:41:26,340

show I'm gonna bring you out I'm gonna

2634

01:41:30,530 --> 01:41:28,020

bring you out I'm gonna I'm gonna beat

2635

01:41:31,970 --> 01:41:30,540

you up and it's gonna be great I want to

2636

01:41:33,350 --> 01:41:31,980

get back to Matt Visser though for a

2637

01:41:38,750 --> 01:41:33,360

second

2638

01:41:40,370 --> 01:41:38,760

um if if Matt's uh original concept is

2639

01:41:43,490 --> 01:41:40,380

even partially there there's like two

2640

01:41:46,970 --> 01:41:43,500

three four things that that are issues

2641

01:41:49,430 --> 01:41:46,980

first off if that is the case where you

2642

01:41:52,490 --> 01:41:49,440

have a spider web of wormholes

2643

01:41:54,709 --> 01:41:52,500

throughout the the universe that were

2644

01:41:56,570 --> 01:41:54,719

established from the creation of the

2645

01:41:59,090 --> 01:41:56,580

universe right that means it's expanding

2646

01:42:02,590 --> 01:41:59,100

with the universe they're there could

2647

01:42:07,609 --> 01:42:06,410

yes probably uh cosmic strings the tone

2648

01:42:09,169 --> 01:42:07,619

people don't hear as much now but it's

2649

01:42:10,790 --> 01:42:09,179

really popular nowadays remember cosmic

2650

01:42:12,410 --> 01:42:10,800

strings those are the idea that when the

2651
01:42:14,149 --> 01:42:12,420
universe was first expand I got you know

2652
01:42:16,669 --> 01:42:14,159
you got a sheet of aluminum foil

2653
01:42:18,169 --> 01:42:16,679
with using the sheet thing again if you

2654
01:42:19,430 --> 01:42:18,179
cover that up and then lay it out flat

2655
01:42:20,810 --> 01:42:19,440
again you're going to have those little

2656
01:42:22,550 --> 01:42:20,820
lines of other words kind of like

2657
01:42:23,750 --> 01:42:22,560
squiggled up that's a cosmic string

2658
01:42:25,490 --> 01:42:23,760
they're very dense they're you know

2659
01:42:27,169 --> 01:42:25,500
basically one-dimensional but light

2660
01:42:28,310 --> 01:42:27,179
passing by those is absolutely going to

2661
01:42:30,470 --> 01:42:28,320
go off like it's going around a black

2662
01:42:31,609 --> 01:42:30,480
hole or a large planet uh and those

2663
01:42:33,890 --> 01:42:31,619

would be a big sheet you should be able

2664

01:42:35,390 --> 01:42:33,900

to text something like that uh how to

2665

01:42:37,010 --> 01:42:35,400

image when it's something that's you

2666

01:42:39,050 --> 01:42:37,020

know in between Galaxies for instance it

2667

01:42:40,609 --> 01:42:39,060

might not be like a kilometer wide but

2668

01:42:41,930 --> 01:42:40,619

with things like that yes you should be

2669

01:42:44,090 --> 01:42:41,940

able to image something like that yes

2670

01:42:46,010 --> 01:42:44,100

you should be able to detectable holes

2671

01:42:47,750 --> 01:42:46,020

if these things are out there you should

2672

01:42:49,729 --> 01:42:47,760

be able to see them

2673

01:42:51,649 --> 01:42:49,739

um the mouse should absolutely be as

2674

01:42:53,870 --> 01:42:51,659

visible as a black hole ever is yeah

2675

01:42:55,129 --> 01:42:53,880

that's about one horse is especially if

2676

01:42:56,330 --> 01:42:55,139

they do collapsing yourself putting

2677

01:42:58,310 --> 01:42:56,340

metal through them once they're formed

2678

01:42:59,570 --> 01:42:58,320

you need to keep that area very clear so

2679

01:43:00,590 --> 01:42:59,580

you're not sucking matter in which is

2680

01:43:01,790 --> 01:43:00,600

what these things are prone to doing

2681

01:43:03,229 --> 01:43:01,800

right

2682

01:43:05,149 --> 01:43:03,239

um you know you should be able to attack

2683

01:43:07,310 --> 01:43:05,159

them they shouldn't be hidden though

2684

01:43:08,629 --> 01:43:07,320

it's important to remember a wormhole is

2685

01:43:11,030 --> 01:43:08,639

not actually cutting a path through

2686

01:43:13,850 --> 01:43:11,040

normal space between point a and point B

2687

01:43:15,950 --> 01:43:13,860

so like there's not a line there's not a

2688

01:43:17,330 --> 01:43:15,960

highway three Alpha Centauri in here if

2689

01:43:18,649 --> 01:43:17,340

I spotted one point here it's going

2690

01:43:21,229 --> 01:43:18,659

through

2691

01:43:22,910 --> 01:43:21,239

another dimension

2692

01:43:28,250 --> 01:43:22,920

well

2693

01:43:31,010 --> 01:43:28,260

um uh if okay but let's stay Matt Visser

2694

01:43:34,490 --> 01:43:31,020

because it was you that said cosmic

2695

01:43:37,850 --> 01:43:34,500

strings and I believe that that was uh

2696

01:43:39,890 --> 01:43:37,860

visser's way of uh I remember this

2697

01:43:41,570 --> 01:43:39,900

completely man I even remember some of

2698

01:43:43,370 --> 01:43:41,580

the illustrations uh that were

2699

01:43:45,050 --> 01:43:43,380

theorizing when he was that's probably

2700

01:43:46,550 --> 01:43:45,060

why I thought of it too but it was his

2701

01:43:48,709 --> 01:43:46,560

problem is it is but he's back to think

2702

01:43:50,450 --> 01:43:48,719

about that yeah well but but that's the

2703

01:43:52,550 --> 01:43:50,460

way that he wanted us to understand that

2704

01:43:55,729 --> 01:43:52,560

that you know I say spider web but you

2705

01:43:58,149 --> 01:43:55,739

get the idea yeah right so if if we're

2706

01:44:01,970 --> 01:43:58,159

talking about uh negative energy

2707

01:44:03,410 --> 01:44:01,980

inflating right you know keeping it uh

2708

01:44:07,910 --> 01:44:03,420

uh

2709

01:44:11,570 --> 01:44:07,920

um from collapsing it is the negative

2710

01:44:15,890 --> 01:44:11,580

okay so between the negative energy and

2711

01:44:18,470 --> 01:44:15,900

space itself is there a membrane or is

2712

01:44:20,570 --> 01:44:18,480

it the negative energy and space just

2713

01:44:24,129 --> 01:44:20,580

touching up to each other there isn't a

2714

01:44:26,450 --> 01:44:24,139

shell in between anything physical

2715

01:44:28,370 --> 01:44:26,460

uh there should be I mean you should

2716

01:44:30,470 --> 01:44:28,380

have that space right there yeah

2717

01:44:31,910 --> 01:44:30,480

um let's say speaking of Spotlight

2718

01:44:33,350 --> 01:44:31,920

things every time we say that I'm

2719

01:44:35,209 --> 01:44:33,360

thinking of the actual way the Dark

2720

01:44:37,010 --> 01:44:35,219

Matter on Galaxy swarm I like brains and

2721

01:44:38,169 --> 01:44:37,020

walls and clusters but it looks like a

2722

01:44:40,729 --> 01:44:38,179

bunch of neurons

2723

01:44:43,490 --> 01:44:40,739

but I understand what I'm saying if

2724

01:44:46,550 --> 01:44:43,500

negative energy comes up against space

2725

01:44:50,209 --> 01:44:46,560

if it's you know so we've got the shell

2726

01:44:52,010 --> 01:44:50,219

we've got the the negative shell what

2727

01:44:54,050 --> 01:44:52,020

exactly is the allergies format there

2728

01:44:55,970 --> 01:44:54,060

because like positive energy it comes in

2729

01:44:57,770 --> 01:44:55,980

forms what is the form of the negative

2730

01:45:00,770 --> 01:44:57,780

energy here are we talking negative Mass

2731

01:45:03,410 --> 01:45:00,780

right it is regular space same as mass

2732

01:45:07,189 --> 01:45:03,420

does yeah exactly so if that's the case

2733

01:45:09,590 --> 01:45:07,199

could that be imaged can you image a

2734

01:45:12,010 --> 01:45:09,600

negative something negative if we can't

2735

01:45:14,750 --> 01:45:12,020

see I don't know

2736

01:45:17,450 --> 01:45:14,760

let's say I did a big long pipe of

2737

01:45:18,830 --> 01:45:17,460

normal Mass to keep the string analogy a

2738

01:45:21,050 --> 01:45:18,840

big Shaggy entropy long one like

2739

01:45:22,669 --> 01:45:21,060

Galaxy's mass is worth a thing yes we

2740

01:45:24,290 --> 01:45:22,679

can image that same as we can in Dark

2741

01:45:27,109 --> 01:45:24,300

Matter it just bends light so much

2742

01:45:29,450 --> 01:45:27,119

that's positive Mass if it's negative

2743

01:45:30,890 --> 01:45:29,460

mass and it's having the negative Mass

2744

01:45:34,129 --> 01:45:30,900

feature we usually assume of being

2745

01:45:36,290 --> 01:45:34,139

negative gravity or antigrant is called

2746

01:45:38,510 --> 01:45:36,300

anti-gravity then you share that same

2747

01:45:40,189 --> 01:45:38,520

effect only flipped around light should

2748

01:45:42,410 --> 01:45:40,199

bend away from it as opposed to being

2749

01:45:44,510 --> 01:45:42,420

down toward it and you should have that

2750

01:45:47,270 --> 01:45:44,520

same gravitational lensing effect only

2751
01:45:49,550 --> 01:45:47,280
will be reversed and so then you can

2752
01:45:52,129 --> 01:45:49,560
actually be visible in quantity if it's

2753
01:45:53,990 --> 01:45:52,139
diffuse though like does negative matter

2754
01:45:55,310 --> 01:45:54,000
of repel itself from normal matter in

2755
01:45:57,350 --> 01:45:55,320
which case are we all Outside The

2756
01:45:59,209 --> 01:45:57,360
ventricle active void does it repel

2757
01:46:00,410 --> 01:45:59,219
other negative matter so that doesn't

2758
01:46:02,570 --> 01:46:00,420
interact in which case it might be

2759
01:46:04,550 --> 01:46:02,580
spread all over the same as dark matter

2760
01:46:06,709 --> 01:46:04,560
that's it's not documental though that's

2761
01:46:07,970 --> 01:46:06,719
that's how we talk about this we don't

2762
01:46:11,149 --> 01:46:07,980
know what dark matter is but it's not

2763
01:46:16,850 --> 01:46:13,030

oh man

2764

01:46:18,350 --> 01:46:16,860

this is this is the point uh just from

2765

01:46:21,229 --> 01:46:18,360

that right there where I go let's let's

2766

01:46:22,250 --> 01:46:21,239

talk for two more hours let's go right

2767

01:46:25,310 --> 01:46:22,260

there

2768

01:46:27,129 --> 01:46:25,320

um but here is is what I think is uh the

2769

01:46:32,570 --> 01:46:27,139

most important point about all of this

2770

01:46:35,510 --> 01:46:32,580

that if if Kip Thorne is right right if

2771

01:46:37,790 --> 01:46:35,520

uh tippler is right if if Matt Visser is

2772

01:46:40,370 --> 01:46:37,800

right if if John Wheeler is right if

2773

01:46:43,430 --> 01:46:40,380

while is right if Einstein wrote Nathan

2774

01:46:46,609 --> 01:46:43,440

Rosen right if if we put everything

2775

01:46:49,669 --> 01:46:46,619

in Lenny we strength Lenny I'm sorry

2776

01:46:52,310 --> 01:46:49,679

again uh but uh we just did it again

2777

01:46:55,030 --> 01:46:52,320

if they are all correct

2778

01:46:59,390 --> 01:46:55,040

with what is happening today

2779

01:47:03,290 --> 01:46:59,400

Avi Loeb the Department of Defense uh

2780

01:47:05,330 --> 01:47:03,300

uap's objects in the sky defense budgets

2781

01:47:07,490 --> 01:47:05,340

being passed Pilots coming forward

2782

01:47:09,109 --> 01:47:07,500

extraordinary things are being witnessed

2783

01:47:11,750 --> 01:47:09,119

and videotapable

2784

01:47:14,090 --> 01:47:11,760

is it wormholes that answer that

2785

01:47:16,129 --> 01:47:14,100

question about how they could be getting

2786

01:47:18,410 --> 01:47:16,139

here now we'll almost make everything

2787

01:47:19,970 --> 01:47:18,420

more complicated it's you think so I

2788

01:47:22,250 --> 01:47:19,980

want to pause the flame exacerbates

2789

01:47:23,570 --> 01:47:22,260

everything it won't be the kind of woman

2790

01:47:24,709 --> 01:47:23,580

[h__h] we'll think you know they had to

2791

01:47:27,109 --> 01:47:24,719

have found a way to make them way less

2792

01:47:28,550 --> 01:47:27,119

massive otherwise if there was a wound

2793

01:47:30,890 --> 01:47:28,560

horn new enough to us to really make

2794

01:47:32,629 --> 01:47:30,900

travel around the Galaxy easier in a

2795

01:47:35,390 --> 01:47:32,639

sense of you know do it in like years or

2796

01:47:38,629 --> 01:47:35,400

days not you know centuries that would

2797

01:47:42,050 --> 01:47:38,639

mean there was some giant giant Wormhole

2798

01:47:43,609 --> 01:47:42,060

mouth out there massing mini solo masses

2799

01:47:44,750 --> 01:47:43,619

and you would see a black hole that

2800

01:47:46,310 --> 01:47:44,760

massive it wouldn't technically be a

2801

01:47:47,810 --> 01:47:46,320

black hole but you'd still see that it

2802

01:47:50,330 --> 01:47:47,820

would be having the fact we detect

2803

01:47:52,430 --> 01:47:50,340

locally it was in you know a few dozen

2804

01:47:54,950 --> 01:47:52,440

light years are you talking about a mass

2805

01:47:56,450 --> 01:47:54,960

the size of Jupiter no we'll talk about

2806

01:47:59,209 --> 01:47:56,460

something that's bullmastiff than our

2807

01:48:00,410 --> 01:47:59,219

sun I mean this idea was that you might

2808

01:48:01,729 --> 01:48:00,420

be able to do with something as small as

2809

01:48:03,109 --> 01:48:01,739

a Jupiter Mass another thing that later

2810

01:48:05,450 --> 01:48:03,119

got revised by some people down to just

2811

01:48:07,430 --> 01:48:05,460

a few hundred kilograms that's iffy but

2812

01:48:09,950 --> 01:48:07,440

the original one that everyone thought

2813

01:48:11,450 --> 01:48:09,960

would take like 600 solar masses to

2814

01:48:12,850 --> 01:48:11,460

build uh one more

2815

01:48:15,410 --> 01:48:12,860

yeah

2816

01:48:18,830 --> 01:48:15,420

600 Stars crammed together

2817

01:48:21,109 --> 01:48:18,840

the one in interstellar wasn't that big

2818

01:48:25,550 --> 01:48:21,119

oh yeah I thought golgantua was several

2819

01:48:27,229 --> 01:48:25,560

solar masses uh uh the one that that was

2820

01:48:29,290 --> 01:48:27,239

positioned between

2821

01:48:31,910 --> 01:48:29,300

Earth and Saturn

2822

01:48:33,770 --> 01:48:31,920

no matter you're talking about

2823

01:48:35,090 --> 01:48:33,780

remembering the movie well enough to say

2824

01:48:36,770 --> 01:48:35,100

that but I'm sure you would have done

2825

01:48:38,270 --> 01:48:36,780

that because that would have but it

2826

01:48:41,510 --> 01:48:38,280

wasn't that big it was like it was

2827

01:48:43,310 --> 01:48:41,520

smaller than our moon no no that a black

2828

01:48:47,209 --> 01:48:43,320

hole that massive would be no not a

2829

01:48:49,729 --> 01:48:47,219

black hole the Wormhole oh yes yeah

2830

01:48:51,350 --> 01:48:49,739

Isaac

2831

01:48:53,149 --> 01:48:51,360

but these memorized on these things is

2832

01:48:55,850 --> 01:48:53,159

essentially the Wormhole mouth I just

2833

01:48:58,370 --> 01:48:55,860

corrected Isaac Arthur

2834

01:49:02,629 --> 01:48:58,380

I'm going to hell that's that's just

2835

01:49:05,689 --> 01:49:02,639

heresy man heresy um but but that that

2836

01:49:07,870 --> 01:49:05,699

was another aspect of this uh that I

2837

01:49:11,149 --> 01:49:07,880

found fascinating and also convenient

2838

01:49:12,709 --> 01:49:11,159

that you would we did not know it was

2839

01:49:14,810 --> 01:49:12,719

sitting out there and we couldn't see it

2840

01:49:16,910 --> 01:49:14,820

yeah and that could I mean you could

2841

01:49:18,770 --> 01:49:16,920

actually have a assuming you didn't have

2842

01:49:20,090 --> 01:49:18,780

to have many solar mass as well so that

2843

01:49:22,669 --> 01:49:20,100

everything was orbiting it into the sun

2844

01:49:24,649 --> 01:49:22,679

let's say you got down to something not

2845

01:49:27,530 --> 01:49:24,659

quite Jupiter or Saturn mass but say

2846

01:49:29,090 --> 01:49:27,540

Mars Mass even today we could be missing

2847

01:49:30,649 --> 01:49:29,100

something of Mars mass that was

2848

01:49:32,149 --> 01:49:30,659

condensed up like a black hole will be

2849

01:49:35,030 --> 01:49:32,159

inside our solar system

2850

01:49:36,590 --> 01:49:35,040

if it was say cram inside a nice add

2851
01:49:37,790 --> 01:49:36,600
convenient asteroid or moon in one of

2852
01:49:40,250 --> 01:49:37,800
the other systems that was where the

2853
01:49:43,070 --> 01:49:40,260
gate was at we could miss that you know

2854
01:49:45,410 --> 01:49:43,080
because gravity is hard to really see

2855
01:49:46,970 --> 01:49:45,420
the effect of and usually when we're

2856
01:49:48,470 --> 01:49:46,980
having like some kind of anomaly we just

2857
01:49:51,050 --> 01:49:48,480
say oh well it's noise we must be making

2858
01:49:52,729 --> 01:49:51,060
mistake you know you could easily have

2859
01:49:54,229 --> 01:49:52,739
the mass estimate of Jupiter will be off

2860
01:49:57,649 --> 01:49:54,239
by a little bit because it was a black

2861
01:49:59,270 --> 01:49:57,659
hole that was oh one Moon mass or the

2862
01:50:00,830 --> 01:49:59,280
inside one of its moons that we were

2863
01:50:03,109 --> 01:50:00,840

just assuming was part of the mass of

2864

01:50:05,270 --> 01:50:03,119

Jupiter that's those kind of options

2865

01:50:06,830 --> 01:50:05,280

could get hidden you know if you're an

2866

01:50:08,810 --> 01:50:06,840

alien trying to hide something from us

2867

01:50:10,189 --> 01:50:08,820

it's not that hard especially when

2868

01:50:11,830 --> 01:50:10,199

you're not happy to be right next to

2869

01:50:17,209 --> 01:50:11,840

Earth

2870

01:50:18,649 --> 01:50:17,219

I remember uh uh I'm gonna say five six

2871

01:50:20,510 --> 01:50:18,659

years ago one of the first times you're

2872

01:50:22,810 --> 01:50:20,520

on the show

2873

01:50:25,609 --> 01:50:22,820

um I had asked you

2874

01:50:27,530 --> 01:50:25,619

if uh if you believe that ET was

2875

01:50:30,229 --> 01:50:27,540

visiting our planet and that was after

2876
01:50:33,169 --> 01:50:30,239
listening to the Fermi Paradox for three

2877
01:50:35,750 --> 01:50:33,179
months uh your version

2878
01:50:37,310 --> 01:50:35,760
um and and all of your brilliant

2879
01:50:39,109 --> 01:50:37,320
presentations and they are they're

2880
01:50:41,930 --> 01:50:39,119
they're they're just brilliant thank you

2881
01:50:46,129 --> 01:50:41,940
and but

2882
01:50:48,830 --> 01:50:46,139
you said nah nah nah nah I said Isaac

2883
01:50:51,050 --> 01:50:48,840
this is all you talk about yeah I know

2884
01:50:54,290 --> 01:50:51,060
but nah yeah

2885
01:50:57,109 --> 01:50:54,300
as as your view changed on that

2886
01:50:59,390 --> 01:50:57,119
it's changed but more of a limited sense

2887
01:51:01,070 --> 01:50:59,400
I think I let myself get more familiar

2888
01:51:03,430 --> 01:51:01,080

with a lot of things like the Navy UFOs

2889

01:51:05,510 --> 01:51:03,440

though only to a certain point because

2890

01:51:07,010 --> 01:51:05,520

the stuff I'm looking at is well the

2891

01:51:09,109 --> 01:51:07,020

angle of what would it be at more of a

2892

01:51:11,689 --> 01:51:09,119

cosmic level if if all science and

2893

01:51:15,050 --> 01:51:11,699

theory is like now right for things like

2894

01:51:17,030 --> 01:51:15,060

that it really boils down to if aliens

2895

01:51:19,129 --> 01:51:17,040

exist anywhere nearby us and you know

2896

01:51:21,470 --> 01:51:19,139

Stellar travel is possible then they

2897

01:51:23,209 --> 01:51:21,480

came in a story if you show me a live

2898

01:51:25,490 --> 01:51:23,219

alien transmission from you inside this

2899

01:51:27,890 --> 01:51:25,500

galaxy I'm going to assume aliens have

2900

01:51:29,390 --> 01:51:27,900

been here so many times it's insane of

2901
01:51:30,890 --> 01:51:29,400
course they would be why wouldn't you

2902
01:51:33,109 --> 01:51:30,900
you're not going to hold your crime

2903
01:51:34,970 --> 01:51:33,119
director for Yarns so if you find life

2904
01:51:37,490 --> 01:51:34,980
inside the Galaxy assume that they came

2905
01:51:38,209 --> 01:51:37,500
and visited at some point you know

2906
01:51:39,890 --> 01:51:38,219
um

2907
01:51:41,870 --> 01:51:39,900
either that is one of those factors in

2908
01:51:43,669 --> 01:51:41,880
play where it's like well you wish they

2909
01:51:46,310 --> 01:51:43,679
did because it turns out all life wipes

2910
01:51:48,169 --> 01:51:46,320
itself out before it gets you know I

2911
01:51:51,109 --> 01:51:48,179
know that's the issue man that's the

2912
01:51:53,810 --> 01:51:51,119
issue we have to survive this is what

2913
01:51:57,169 --> 01:51:53,820

this is the deal for us to even enjoy

2914

01:52:01,189 --> 01:51:57,179

you know Interstellar stuff ourselves we

2915

01:52:03,169 --> 01:52:01,199

do have to survive uh solar flares we

2916

01:52:05,330 --> 01:52:03,179

have to uh survive our own

2917

01:52:08,209 --> 01:52:05,340

self-destruction with nuclear weapons we

2918

01:52:10,609 --> 01:52:08,219

have to survive uh pandemics and plagues

2919

01:52:13,910 --> 01:52:10,619

and we also have to survive in Alien

2920

01:52:17,390 --> 01:52:13,920

Invasion or two right we have to get

2921

01:52:20,750 --> 01:52:17,400

through all of that right and and and

2922

01:52:23,270 --> 01:52:20,760

you would have to presume that all

2923

01:52:26,270 --> 01:52:23,280

extraterrestrial Advanced civilizations

2924

01:52:27,770 --> 01:52:26,280

out there have gone through and will

2925

01:52:29,450 --> 01:52:27,780

continue to go through the exact same

2926

01:52:30,950 --> 01:52:29,460

things we have so many things from

2927

01:52:32,270 --> 01:52:30,960

science fiction that become cliché about

2928

01:52:33,709 --> 01:52:32,280

you know basically try and explain the

2929

01:52:36,229 --> 01:52:33,719

form of paradox that don't make sense

2930

01:52:37,550 --> 01:52:36,239

and I say to me there's two scenarios

2931

01:52:38,629 --> 01:52:37,560

that make sense either they visit a lot

2932

01:52:40,850 --> 01:52:38,639

and we just

2933

01:52:42,290 --> 01:52:40,860

suffer from a like a horrible mind

2934

01:52:44,450 --> 01:52:42,300

glitch of just not wanting to admit that

2935

01:52:45,890 --> 01:52:44,460

they do and I say we by me and I know

2936

01:52:48,950 --> 01:52:45,900

obviously a lot of listeners now are not

2937

01:52:50,570 --> 01:52:48,960

included in that video uh and or they

2938

01:52:51,890 --> 01:52:50,580

all like the way my usual with is the

2939

01:52:53,209 --> 01:52:51,900

idea that they probably don't exist in

2940

01:52:55,070 --> 01:52:53,219

this galaxy on a neighboring Galaxy

2941

01:52:57,590 --> 01:52:55,080

they're very far away if they exist at

2942

01:52:59,810 --> 01:52:57,600

all all the ones in between that do not

2943

01:53:00,950 --> 01:52:59,820

make much sense to me why yeah well they

2944

01:53:02,750 --> 01:53:00,960

wouldn't visit Oh I thought this was

2945

01:53:05,950 --> 01:53:02,760

boring Kansas is boring millions of

2946

01:53:11,050 --> 01:53:07,669

they don't want to interfere with us

2947

01:53:17,030 --> 01:53:14,330

they don't visit Ohio is what they don't

2948

01:53:19,910 --> 01:53:17,040

visit so the

2949

01:53:23,270 --> 01:53:19,920

uh but but but here's the other part

2950

01:53:26,209 --> 01:53:23,280

though and this is where for me aside

2951
01:53:28,129 --> 01:53:26,219
from my own sightings and and that right

2952
01:53:30,770 --> 01:53:28,139
there I don't know what's going on but

2953
01:53:34,930 --> 01:53:30,780
it forces me to go and try to find out

2954
01:53:38,629 --> 01:53:34,940
I've seen crazy stuff real daylight date

2955
01:53:40,970 --> 01:53:38,639
ginormous don't tell me I didn't see it

2956
01:53:42,470 --> 01:53:40,980
I'm not you or uh Isaac but you know

2957
01:53:44,510 --> 01:53:42,480
anybody

2958
01:53:46,370 --> 01:53:44,520
um wow that sounded cool

2959
01:53:47,530 --> 01:53:46,380
it rang

2960
01:53:49,450 --> 01:53:47,540
okay

2961
01:53:51,530 --> 01:53:49,460
[Laughter]

2962
01:53:53,090 --> 01:53:51,540
people say he's like well you know I

2963
01:53:54,109 --> 01:53:53,100

know you see I didn't see who I saw I

2964

01:53:56,030 --> 01:53:54,119

was like I don't know what you saw I

2965

01:53:57,109 --> 01:53:56,040

don't yeah I don't know what I saw but I

2966

01:54:00,950 --> 01:53:57,119

sent you this photo what's this look

2967

01:54:04,129 --> 01:54:00,960

like to you a DOT a white dot and I I

2968

01:54:07,490 --> 01:54:04,139

don't know what that is but then you go

2969

01:54:10,189 --> 01:54:07,500

to somebody like David fravor right or

2970

01:54:15,709 --> 01:54:10,199

Alex Dietrich Ryan Graves you know and

2971

01:54:19,750 --> 01:54:15,719

and and you go to them that where if if

2972

01:54:24,350 --> 01:54:19,760

we just take a professional pilot like

2973

01:54:27,890 --> 01:54:24,360

David fravor and you extrapolate his

2974

01:54:30,350 --> 01:54:27,900

comments in just the basic form right it

2975

01:54:33,229 --> 01:54:30,360

didn't have wings it was white it was

2976
01:54:35,570 --> 01:54:33,239
shaped like a giant Tic Tac and I was

2977
01:54:37,609 --> 01:54:35,580
chasing it and flew around in a circle

2978
01:54:40,729 --> 01:54:37,619
and then it started chasing me and then

2979
01:54:43,850 --> 01:54:40,739
it took off and disappeared it went from

2980
01:54:47,149 --> 01:54:43,860
80 000 feet to sea level in a fraction

2981
01:54:49,910 --> 01:54:47,159
of a second without a song like boom

2982
01:54:51,169 --> 01:54:49,920
without any gravitational effects or

2983
01:54:52,729 --> 01:54:51,179
anything I think there's a very real

2984
01:54:55,070 --> 01:54:52,739
chance that that's exactly what that

2985
01:54:57,290 --> 01:54:55,080
really did do too I

2986
01:54:59,149 --> 01:54:57,300
but to me that's another jump they ought

2987
01:55:01,430 --> 01:54:59,159
to assume that it was any particular

2988
01:55:03,050 --> 01:55:01,440

type of alien it might have been alien

2989

01:55:05,570 --> 01:55:03,060

it would I mean that's a valid

2990

01:55:07,310 --> 01:55:05,580

hypothesis you can't no there's no way

2991

01:55:08,290 --> 01:55:07,320

it was aliens I mean there's no way it

2992

01:55:11,810 --> 01:55:08,300

was done

2993

01:55:13,430 --> 01:55:11,820

I don't know what it was it's a gigantic

2994

01:55:15,709 --> 01:55:13,440

universe that most scientists believe

2995

01:55:18,250 --> 01:55:15,719

probably has life in some way or maybe

2996

01:55:25,250 --> 01:55:23,689

if we go back uh to financial but if we

2997

01:55:28,129 --> 01:55:25,260

go back to the start of you know like

2998

01:55:32,390 --> 01:55:28,139

science and futurism right and and we

2999

01:55:36,350 --> 01:55:32,400

let's let's go back to say 2013 2014. at

3000

01:55:38,450 --> 01:55:36,360

that time we were still counting you

3001
01:55:41,629 --> 01:55:38,460
know we're at say a thousand exoplanets

3002
01:55:45,129 --> 01:55:41,639
at that time or maybe less actually I

3003
01:55:54,050 --> 01:55:50,990
and and uh the the star count in our uh

3004
01:55:57,050 --> 01:55:54,060
Milky Way isn't what it is today we are

3005
01:55:59,689 --> 01:55:57,060
still continuing to map and figure out

3006
01:56:01,490 --> 01:55:59,699
our own Milky Way let alone most common

3007
01:56:02,870 --> 01:56:01,500
types of stars are the dimmest types of

3008
01:56:06,709 --> 01:56:02,880
stars and they're the hottest ones to

3009
01:56:10,370 --> 01:56:06,719
see in case what's the sea and now today

3010
01:56:12,530 --> 01:56:10,380
um uh I was uh uh out to dinner uh with

3011
01:56:15,410 --> 01:56:12,540
Avi Loeb a couple of months ago and

3012
01:56:17,510 --> 01:56:15,420
we're sitting at this table and Avi and

3013
01:56:19,430 --> 01:56:17,520

I and it's a tough thing to do to get in

3014

01:56:21,169 --> 01:56:19,440

an argument with Avi lobe trust me we're

3015

01:56:24,250 --> 01:56:21,179

sitting there and we were talking about

3016

01:56:28,250 --> 01:56:24,260

the amount of planets in the Milky Way

3017

01:56:30,530 --> 01:56:28,260

and and I was saying uh you know uh

3018

01:56:34,129 --> 01:56:30,540

there's probably 500 billion he goes oh

3019

01:56:35,689 --> 01:56:34,139

no no no yeah trillions trillions I said

3020

01:56:38,270 --> 01:56:35,699

well there's probably you know 40

3021

01:56:39,250 --> 01:56:38,280

billion Rocky Earth no no no no no no no

3022

01:56:42,229 --> 01:56:39,260

no no

3023

01:56:44,090 --> 01:56:42,239

250 billion or probably more than

3024

01:56:46,490 --> 01:56:44,100

precise so it depends on how you know

3025

01:56:48,530 --> 01:56:46,500

how close is Earth you know but my point

3026

01:56:51,890 --> 01:56:48,540

right right in the Goldilocks home but

3027

01:56:55,370 --> 01:56:51,900

my point being these are numbers that

3028

01:56:57,709 --> 01:56:55,380

are freaking huge that that weren't

3029

01:56:59,990 --> 01:56:57,719

talked about or contemplated

3030

01:57:02,030 --> 01:57:00,000

when he started science and futurism I

3031

01:57:03,229 --> 01:57:02,040

think contemplates exactly well talked

3032

01:57:05,090 --> 01:57:03,239

about in complicated because they to

3033

01:57:06,950 --> 01:57:05,100

some degree they were when I was a kid

3034

01:57:08,510 --> 01:57:06,960

we only knew there was 100 billion ish

3035

01:57:10,070 --> 01:57:08,520

stars in the galaxy we figured at least

3036

01:57:12,890 --> 01:57:10,080

a billion of them probably had plants

3037

01:57:15,109 --> 01:57:12,900

and surely a good portion of those were

3038

01:57:17,689 --> 01:57:15,119

off like they really did I think it was

3039

01:57:19,910 --> 01:57:17,699

Millions if not billions but it was too

3040

01:57:21,050 --> 01:57:19,920

huge to discuss like when people say how

3041

01:57:23,089 --> 01:57:21,060

many people could the population support

3042

01:57:24,649 --> 01:57:23,099

what does civilization look like it's

3043

01:57:26,930 --> 01:57:24,659

too huge for the brain to Encompass at

3044

01:57:28,850 --> 01:57:26,940

that stage right right and but those

3045

01:57:32,750 --> 01:57:28,860

were all theories we're talking about

3046

01:57:34,070 --> 01:57:32,760

confirmation now right and and that you

3047

01:57:35,450 --> 01:57:34,080

need that generational cycle to be able

3048

01:57:37,189 --> 01:57:35,460

to start actually contemplating this

3049

01:57:38,930 --> 01:57:37,199

stuff it's it's like looking at fiction

3050

01:57:41,330 --> 01:57:38,940

from the early 1930s when it's not

3051

01:57:43,310 --> 01:57:41,340

having how big the universe really is

3052

01:57:45,589 --> 01:57:43,320

yeah you know things like Lovecraft for

3053

01:57:48,350 --> 01:57:45,599

instance and they start saying my God

3054

01:57:49,970 --> 01:57:48,360

this place is huge and it stops being

3055

01:57:52,490 --> 01:57:49,980

numbers numbers don't mean anything

3056

01:57:54,109 --> 01:57:52,500

numbers gigantic numbers that only mean

3057

01:57:56,450 --> 01:57:54,119

something to a scientists right

3058

01:57:59,209 --> 01:57:56,460

actually trying to absorb that complaint

3059

01:58:00,950 --> 01:57:59,219

that and say wow this is what that would

3060

01:58:02,209 --> 01:58:00,960

be implied by that and that's where the

3061

01:58:04,189 --> 01:58:02,219

funny products comes in because it's

3062

01:58:05,990 --> 01:58:04,199

like the Galaxy just the Galaxy is huge

3063

01:58:07,790 --> 01:58:06,000

and but you're fast and I travel you're

3064

01:58:09,350 --> 01:58:07,800

not limited to the Galaxy you don't even

3065

01:58:11,270 --> 01:58:09,360

live into it if that is you'll if you're

3066

01:58:12,410 --> 01:58:11,280

limited to it but you can do the

3067

01:58:14,870 --> 01:58:12,420

intergalactic colonization without

3068

01:58:17,209 --> 01:58:14,880

professional technology but if you got

3069

01:58:19,490 --> 01:58:17,219

it then you have 100 billion galaxies

3070

01:58:21,470 --> 01:58:19,500

too each with 100 billion stars or

3071

01:58:23,990 --> 01:58:21,480

whatever the number turns out to be in

3072

01:58:25,310 --> 01:58:24,000

that zone and that's even assuming you

3073

01:58:26,450 --> 01:58:25,320

don't come from outside the absorber

3074

01:58:28,490 --> 01:58:26,460

Universe which you should be able to do

3075

01:58:31,189 --> 01:58:28,500

at that point since we think it goes on

3076

01:58:33,649 --> 01:58:31,199

past that area or if I'm another

3077

01:58:35,689 --> 01:58:33,659

dimension or another you know Mini World

3078

01:58:37,850 --> 01:58:35,699

scenario these things get huge you say

3079

01:58:39,410 --> 01:58:37,860

how is it that no one's coming to visit

3080

01:58:40,970 --> 01:58:39,420

us and that's the thing I want to say

3081

01:58:43,729 --> 01:58:40,980

about the foyer pass there is no good

3082

01:58:45,649 --> 01:58:43,739

answer yet because I cannot think of any

3083

01:58:47,209 --> 01:58:45,659

sane reason why life would be so

3084

01:58:49,430 --> 01:58:47,219

insanely rare

3085

01:58:50,990 --> 01:58:49,440

that it wouldn't be you know that they

3086

01:58:53,030 --> 01:58:51,000

couldn't see us interact with us in some

3087

01:58:54,770 --> 01:58:53,040

way and at the same time I can't see

3088

01:58:57,109 --> 01:58:54,780

them acting like they seem to do and we

3089

01:58:58,790 --> 01:58:57,119

not you know we just be missing them you

3090

01:59:00,649 --> 01:58:58,800

know and again obviously I don't want to

3091

01:59:02,270 --> 01:59:00,659

say we are missing them I'm in a

3092

01:59:04,129 --> 01:59:02,280

minority at the moments of folks saying

3093

01:59:05,990 --> 01:59:04,139

that but

3094

01:59:09,589 --> 01:59:06,000

um but

3095

01:59:14,030 --> 01:59:09,599

um I would I would think

3096

01:59:16,070 --> 01:59:14,040

um that if you just merely played the

3097

01:59:18,250 --> 01:59:16,080

numbers and we're just in a numbers game

3098

01:59:21,169 --> 01:59:18,260

just in a numbers game

3099

01:59:24,350 --> 01:59:21,179

with what we are doing today like you

3100

01:59:27,649 --> 01:59:24,360

and I discussing this astronomers radio

3101

01:59:31,129 --> 01:59:27,659

telescopes uh the James Webb all we are

3102

01:59:32,810 --> 01:59:31,139

doing like focused on is searching for

3103

01:59:35,810 --> 01:59:32,820

life and searching for planets right

3104

01:59:38,750 --> 01:59:35,820

that's what we're doing well they are

3105

01:59:40,970 --> 01:59:38,760

doing the exact same thing and if

3106

01:59:43,729 --> 01:59:40,980

they're worth anything

3107

01:59:47,450 --> 01:59:43,739

they know that this big beautiful blue

3108

01:59:49,189 --> 01:59:47,460

gem teeming with life exist yeah yeah

3109

01:59:51,530 --> 01:59:49,199

not because you're setting radio waves

3110

01:59:52,910 --> 01:59:51,540

out the planet was visible you'd say

3111

01:59:54,770 --> 01:59:52,920

well they only just reached out to us

3112

01:59:57,050 --> 01:59:54,780

now you know wait till people send a

3113

01:59:58,490 --> 01:59:57,060

signal out you can see I mean you could

3114

01:59:59,990 --> 01:59:58,500

detect that there was Intelligence on

3115

02:00:02,450 --> 02:00:00,000

this planet from let's say a satellite

3116

02:00:03,830 --> 02:00:02,460

centuries or centuries ago but you could

3117

02:00:06,109 --> 02:00:03,840

detect that there was life here from the

3118

02:00:09,109 --> 02:00:06,119

atmosphere of what two billion years ago

3119

02:00:10,609 --> 02:00:09,119

for the oxygen sure yeah and that's when

3120

02:00:11,570 --> 02:00:10,619

they saw us they want to wipe us out

3121

02:00:13,250 --> 02:00:11,580

that you know anyone's around there

3122

02:00:15,470 --> 02:00:13,260

could have done it already no we had to

3123

02:00:18,229 --> 02:00:15,480

do it you're right though we had a

3124

02:00:20,209 --> 02:00:18,239

detectable biosphere for two two billion

3125

02:00:21,709 --> 02:00:20,219

years and you can't hide you know

3126
02:00:23,149 --> 02:00:21,719
because you have to hide backwards well

3127
02:00:24,410 --> 02:00:23,159
okay I'm sorry we did do an episode

3128
02:00:26,629 --> 02:00:24,420
where we looked the idea that you might

3129
02:00:28,910 --> 02:00:26,639
go back and hide your civilization back

3130
02:00:31,490 --> 02:00:28,920
in time but that shouldn't work out very

3131
02:00:32,990 --> 02:00:31,500
well following Temple of paradoxes

3132
02:00:34,370 --> 02:00:33,000
you're stuck with the fact that everyone

3133
02:00:36,169 --> 02:00:34,380
could see your planet billions of years

3134
02:00:39,109 --> 02:00:36,179
before you existed to do cloaking

3135
02:00:42,589 --> 02:00:39,119
technology and one of the one of my uh

3136
02:00:45,410 --> 02:00:42,599
uh answers to the Fermi Paradox is that

3137
02:00:47,750 --> 02:00:45,420
uh this is a very serious one I'm sure

3138
02:00:51,890 --> 02:00:47,760

that you've touched upon this but this

3139

02:00:55,250 --> 02:00:51,900

is this is one of my uh resolutions uh

3140

02:00:56,990 --> 02:00:55,260

to it is you know what you get to a

3141

02:01:00,169 --> 02:00:57,000

certain point

3142

02:01:02,390 --> 02:01:00,179

where in your age

3143

02:01:03,530 --> 02:01:02,400

you Isaac you're going to get to a

3144

02:01:05,689 --> 02:01:03,540

certain point where you're going to go

3145

02:01:08,750 --> 02:01:05,699

you know what screw everybody

3146

02:01:10,550 --> 02:01:08,760

I just want to go live alone right I'm

3147

02:01:11,770 --> 02:01:10,560

gonna go live on a mountain with no

3148

02:01:15,290 --> 02:01:11,780

telephone

3149

02:01:18,470 --> 02:01:15,300

and I don't want any contact

3150

02:01:21,229 --> 02:01:18,480

and that same you know that same idea

3151

02:01:22,910 --> 02:01:21,239

that same mindset could be with an

3152

02:01:24,950 --> 02:01:22,920

advanced civilization where they're like

3153

02:01:27,950 --> 02:01:24,960

you know what nah man

3154

02:01:32,089 --> 02:01:27,960

we want nobody to know about our

3155

02:01:34,970 --> 02:01:32,099

beautiful planet period we're okay

3156

02:01:36,229 --> 02:01:34,980

it could be individually tilted that way

3157

02:01:38,149 --> 02:01:36,239

you could have a bias in that direction

3158

02:01:39,950 --> 02:01:38,159

like the only civilizations that last

3159

02:01:41,390 --> 02:01:39,960

very long are the ones that are content

3160

02:01:44,750 --> 02:01:41,400

to go sit on a mountain for a million

3161

02:01:46,609 --> 02:01:44,760

years around too much the loud aliens

3162

02:01:48,169 --> 02:01:46,619

versus quiet aliens one of the three

3163

02:01:50,330 --> 02:01:48,179

factors they are they had to expand

3164

02:01:51,770 --> 02:01:50,340

quick they got to be you know loudly

3165

02:01:53,089 --> 02:01:51,780

affecting things and they always they

3166

02:01:55,250 --> 02:01:53,099

have to leave a footprint

3167

02:01:56,870 --> 02:01:55,260

they have to change the space they go

3168

02:01:59,270 --> 02:01:56,880

through they don't do that they're not

3169

02:02:01,490 --> 02:01:59,280

allowed alien we wouldn't see them yeah

3170

02:02:03,050 --> 02:02:01,500

yeah you know how much that's it's big

3171

02:02:04,430 --> 02:02:03,060

change too okay call Chef level

3172

02:02:05,629 --> 02:02:04,440

engineering to really be able to do that

3173

02:02:07,070 --> 02:02:05,639

because we don't see if they've done

3174

02:02:09,470 --> 02:02:07,080

something really tiny on the Stars right

3175

02:02:10,910 --> 02:02:09,480

now but it's hard to predict how that

3176

02:02:12,290 --> 02:02:10,920

would go it's like I've had phases where

3177

02:02:14,629 --> 02:02:12,300

I didn't want to talk though we can't

3178

02:02:16,790 --> 02:02:14,639

see what civilization will stay the same

3179

02:02:19,070 --> 02:02:16,800

over millions of years I've had my homo

3180

02:02:20,450 --> 02:02:19,080

phases I at the moment I'm loving being

3181

02:02:22,550 --> 02:02:20,460

married and having just adopted three

3182

02:02:25,310 --> 02:02:22,560

kids it's great it's I never sleep

3183

02:02:27,169 --> 02:02:25,320

anymore but you know I'm sure that I

3184

02:02:28,629 --> 02:02:27,179

will enjoy having a home and facing at

3185

02:02:31,250 --> 02:02:28,639

some points we'll call that a vacation

3186

02:02:33,709 --> 02:02:31,260

now I was talking to Isaac earlier today

3187

02:02:35,629 --> 02:02:33,719

and I'm listening to the action going on

3188

02:02:39,470 --> 02:02:35,639

in the background I'm like man what the

3189

02:02:42,350 --> 02:02:39,480

heck what's going on over there

3190

02:02:44,030 --> 02:02:42,360

um did you see and if you haven't but

3191

02:02:45,790 --> 02:02:44,040

you're a science fiction guy have you

3192

02:02:48,290 --> 02:02:45,800

seen valerian

3193

02:02:50,030 --> 02:02:48,300

in the city of a thousands is that the

3194

02:02:51,770 --> 02:02:50,040

one I'm thinking of

3195

02:02:53,390 --> 02:02:51,780

I actually can't if I've seen it or the

3196

02:02:54,770 --> 02:02:53,400

spoiler voice sometimes I'll just watch

3197

02:02:57,709 --> 02:02:54,780

like how it should have ended versions

3198

02:02:59,870 --> 02:02:57,719

okay forget that okay that's you need to

3199

02:03:01,850 --> 02:02:59,880

go and watch it and watch it three or

3200

02:03:04,550 --> 02:03:01,860

four it's a fantastic Luke pesan doesn't

3201

02:03:06,890 --> 02:03:04,560

play it's it's a great film but here's

3202

02:03:10,430 --> 02:03:06,900

one of the concepts behind it and the

3203

02:03:14,149 --> 02:03:10,440

opening scene uh set to uh David uh

3204

02:03:16,430 --> 02:03:14,159

Bowie's Space Oddity uh with uh with all

3205

02:03:18,589 --> 02:03:16,440

of the um that's it just watch the

3206

02:03:22,490 --> 02:03:18,599

beginning too as well anyway so it's

3207

02:03:25,570 --> 02:03:22,500

based around this planet called moo

3208

02:03:28,850 --> 02:03:25,580

mu that was blown up and destroyed

3209

02:03:30,770 --> 02:03:28,860

because of an Intergalactic war that was

3210

02:03:32,450 --> 02:03:30,780

going on outside of it nothing to do

3211

02:03:35,570 --> 02:03:32,460

with the planet

3212

02:03:37,970 --> 02:03:35,580

okay the planet was just a bunch of

3213

02:03:40,250 --> 02:03:37,980

advanced uh

3214

02:03:43,189 --> 02:03:40,260

uh uh beings

3215

02:03:44,629 --> 02:03:43,199

that were just living on at Harmony with

3216

02:03:47,570 --> 02:03:44,639

the with nature

3217

02:03:50,930 --> 02:03:47,580

very Advanced very smart you know but

3218

02:03:54,950 --> 02:03:50,940

they they didn't interact right they

3219

02:03:56,689 --> 02:03:54,960

were just behaving and then this battle

3220

02:03:59,930 --> 02:03:56,699

goes on outside of the planet and the

3221

02:04:02,570 --> 02:03:59,940

planet gets blown up and that's that's

3222

02:04:03,669 --> 02:04:02,580

another they probably just wanted to be

3223

02:04:06,649 --> 02:04:03,679

left alone

3224

02:04:08,930 --> 02:04:06,659

and and I could I could I could actually

3225

02:04:11,089 --> 02:04:08,940

see that that yeah really easy too but

3226

02:04:13,189 --> 02:04:11,099

the problem is what comes up is if you

3227

02:04:14,990 --> 02:04:13,199

if you clock away to the top of Darwin's

3228

02:04:18,169 --> 02:04:15,000

messy little corpse pile that we call

3229

02:04:21,709 --> 02:04:18,179

you know the food chain you usually got

3230

02:04:23,810 --> 02:04:21,719

there by not being too passive or not

3231

02:04:26,390 --> 02:04:23,820

being too uh you know uh you're

3232

02:04:27,770 --> 02:04:26,400

proactive and the thing is you know

3233

02:04:29,089 --> 02:04:27,780

someone's gonna come by and you say I

3234

02:04:30,290 --> 02:04:29,099

would like to be left alone and say so

3235

02:04:33,050 --> 02:04:30,300

does the mouse the mouse wants to be

3236

02:04:35,149 --> 02:04:33,060

left alone too you cannot approach you

3237

02:04:36,649 --> 02:04:35,159

know you cannot get there and say I'm

3238

02:04:38,570 --> 02:04:36,659

sure every civilization out there in the

3239

02:04:41,030 --> 02:04:38,580

galaxy is going to leave me be

3240

02:04:42,709 --> 02:04:41,040

because

3241

02:04:44,689 --> 02:04:42,719

why would you have any expectation that

3242

02:04:46,250 --> 02:04:44,699

they would I mean they don't I don't

3243

02:04:48,410 --> 02:04:46,260

think that things could get you know you

3244

02:04:50,270 --> 02:04:48,420

have to be really you don't have to be

3245

02:04:52,129 --> 02:04:50,280

you probably are inclined towards

3246

02:04:53,930 --> 02:04:52,139

somewhat diplomatic approaches to life

3247

02:04:55,490 --> 02:04:53,940

the universe and everything when you've

3248

02:04:57,109 --> 02:04:55,500

actually climbed up through nuclear

3249

02:04:57,950 --> 02:04:57,119

technology because otherwise you

3250

02:04:59,870 --> 02:04:57,960

probably would not have finished

3251

02:05:01,609 --> 02:04:59,880

climbing you'd be you know scattered

3252

02:05:03,050 --> 02:05:01,619

around your planet as a time of gashes

3253

02:05:04,070 --> 02:05:03,060

but at the same time that doesn't

3254

02:05:05,990 --> 02:05:04,080

necessarily mean that you're terribly

3255

02:05:07,729 --> 02:05:06,000

nice and if there's some Ward out there

3256

02:05:08,990 --> 02:05:07,739

that's just saying hey we we love you

3257

02:05:10,970 --> 02:05:09,000

with space hours we want to give you

3258

02:05:12,410 --> 02:05:10,980

hugs come join us friends and someone

3259

02:05:14,510 --> 02:05:12,420

says yeah that's great you know what

3260

02:05:15,950 --> 02:05:14,520

we'd also like to do we'd like to have

3261

02:05:19,390 --> 02:05:15,960

that concept there would you give it to

3262

02:05:23,870 --> 02:05:21,709

friendship I mean these giant guns that

3263

02:05:26,290 --> 02:05:23,880

we'd like to Lad there too

3264

02:05:29,209 --> 02:05:26,300

space cannibals right

3265

02:05:31,970 --> 02:05:29,219

you know come on in have dinner with us

3266

02:05:33,890 --> 02:05:31,980

we're going to fatten you up you know

3267

02:05:35,149 --> 02:05:33,900

it's about protecting you we want to put

3268

02:05:37,189 --> 02:05:35,159

some defenses away because we got

3269

02:05:39,589 --> 02:05:37,199

enemies out there that would kill you I

3270

02:05:41,270 --> 02:05:39,599

mean they're just nasty nastier than I

3271

02:05:42,470 --> 02:05:41,280

said we thought about killing you but we

3272

02:05:44,750 --> 02:05:42,480

like to put some space guns around your

3273

02:05:46,609 --> 02:05:44,760

planet to help protect you you know it's

3274

02:05:48,470 --> 02:05:46,619

it's hard for me to imagine that you'd

3275

02:05:49,850 --> 02:05:48,480

actually have civilizations that that

3276

02:05:54,109 --> 02:05:49,860

really thought they could get away with

3277

02:05:56,149 --> 02:05:54,119

doing the entirely peaceful because we

3278

02:05:57,770 --> 02:05:56,159

say all I want to do is left on peace to

3279

02:05:58,850 --> 02:05:57,780

think we say well these giant minds they

3280

02:06:00,709 --> 02:05:58,860

just want to sit there and meditate and

3281

02:06:02,390 --> 02:06:00,719

contemplate with a small thing really

3282

02:06:03,470 --> 02:06:02,400

smart and so they got another thing

3283

02:06:04,790 --> 02:06:03,480

that's most likely you know about their

3284

02:06:06,830 --> 02:06:04,800

meditations there's someone coming by

3285

02:06:08,030 --> 02:06:06,840

and knocking on the door to try to sell

3286

02:06:10,189 --> 02:06:08,040

them something you know or take their

3287

02:06:13,189 --> 02:06:10,199

stuff or just say hello so they're going

3288

02:06:15,589 --> 02:06:13,199

to have to spend some effort making sure

3289

02:06:17,089 --> 02:06:15,599

that they actually get left alone and

3290

02:06:18,470 --> 02:06:17,099

you know say if you want people to stay

3291

02:06:20,330 --> 02:06:18,480

out of your territory for instance say

3292

02:06:21,649 --> 02:06:20,340

well they hide what's the best way to

3293

02:06:23,689 --> 02:06:21,659

keep people off your front lawn but no

3294

02:06:25,070 --> 02:06:23,699

trespassing's on because you just hide

3295

02:06:26,089 --> 02:06:25,080

people are going to come by anyway

3296

02:06:27,290 --> 02:06:26,099

because oh you're there and they're

3297

02:06:28,970 --> 02:06:27,300

gonna say well this is looks you know

3298

02:06:30,470 --> 02:06:28,980

what a beautiful pastor this is the

3299

02:06:32,390 --> 02:06:30,480

grass is so green I like the build here

3300

02:06:34,189 --> 02:06:32,400

so you put aside I'm telling people no

3301

02:06:35,990 --> 02:06:34,199

this is mine already because well some

3302

02:06:37,250 --> 02:06:36,000

people might try to take it anyway it's

3303

02:06:38,450 --> 02:06:37,260

easy on starting a five with every

3304

02:06:40,250 --> 02:06:38,460

person who kills but I think he has an

3305

02:06:42,350 --> 02:06:40,260

occupant and takes it you know that's

3306

02:06:44,030 --> 02:06:42,360

why things mock the territory in nature

3307

02:06:45,589 --> 02:06:44,040

you lose the stealth Advantage but you

3308

02:06:46,790 --> 02:06:45,599

don't have to fight quite so many fights

3309

02:06:49,850 --> 02:06:46,800

that might not point out the way you'd

3310

02:06:52,669 --> 02:06:49,860

like them to yeah um oh the no

3311

02:06:55,669 --> 02:06:52,679

trespassing sign works yeah it doesn't

3312

02:06:57,649 --> 02:06:55,679

work a hundred percent but it is a good

3313

02:06:59,689 --> 02:06:57,659

diversion for sure you got that

3314

02:07:01,790 --> 02:06:59,699

Civilization and the Enterprise shows up

3315

02:07:03,290 --> 02:07:01,800

one day and says well we hide here and

3316

02:07:05,330 --> 02:07:03,300

you know territory wouldn't blow you up

3317

02:07:06,950 --> 02:07:05,340

so let's say that succeeded someone's

3318

02:07:08,390 --> 02:07:06,960

eventually going to go send by a scout

3319

02:07:09,950 --> 02:07:08,400

Fleet to find out what happened you blow

3320

02:07:11,990 --> 02:07:09,960

them up to eventually they're gonna send

3321

02:07:14,050 --> 02:07:12,000

an armada out there to say hey what

3322

02:07:16,430 --> 02:07:14,060

happened to our stuff

3323

02:07:18,470 --> 02:07:16,440

and we'd like to discuss things with you

3324

02:07:20,990 --> 02:07:18,480

about that we'd like to discuss them

3325

02:07:24,530 --> 02:07:21,000

in depth so you know we have a lot of

3326

02:07:26,089 --> 02:07:24,540

guns too you know what I was I wanted to

3327

02:07:28,430 --> 02:07:26,099

talk a little bit about Consciousness

3328

02:07:29,870 --> 02:07:28,440

tonight we're we're already past that

3329

02:07:32,390 --> 02:07:29,880

and we're at the end of the show and

3330

02:07:34,010 --> 02:07:32,400

we've gone gone past everything and but

3331

02:07:36,530 --> 02:07:34,020

I do want to invite you back and and

3332

02:07:38,570 --> 02:07:36,540

discuss Consciousness I actually want to

3333

02:07:41,930 --> 02:07:38,580

leave on on one note since we're talking

3334

02:07:43,910 --> 02:07:41,940

about uh contact right now with ET there

3335

02:07:46,490 --> 02:07:43,920

is

3336

02:07:48,010 --> 02:07:46,500

um and I'm talking about quote in the

3337

02:07:52,790 --> 02:07:48,020

New York Times

3338

02:07:55,070 --> 02:07:52,800

uh comments from uh uh political

3339

02:07:58,629 --> 02:07:55,080

insiders and movers and shakers of of

3340

02:08:02,810 --> 02:07:58,639

the highest caliber there are comments

3341

02:08:06,410 --> 02:08:02,820

that the Senate was briefed

3342

02:08:09,350 --> 02:08:06,420

with sentences like

3343

02:08:11,810 --> 02:08:09,360

we are in possession of craft not made

3344

02:08:14,089 --> 02:08:11,820

on this earth right this has been told

3345

02:08:16,490 --> 02:08:14,099

to the Senate intelligence committee now

3346

02:08:19,729 --> 02:08:16,500

when stuff like that and this has been

3347

02:08:22,729 --> 02:08:19,739

repeated and this is you know these

3348

02:08:26,149 --> 02:08:22,739

sources I'm assuming that the New York

3349

02:08:27,830 --> 02:08:26,159

Times and and others are are confident

3350

02:08:30,910 --> 02:08:27,840

in their sources and are vetting these

3351

02:08:34,370 --> 02:08:30,920

sources but when these comments are made

3352

02:08:35,510 --> 02:08:34,380

uh what what goes through your mind and

3353

02:08:37,850 --> 02:08:35,520

do you think that the Senate

3354

02:08:39,589 --> 02:08:37,860

intelligence committee is sitting there

3355

02:08:41,149 --> 02:08:39,599

you know taking notes going okay so

3356

02:08:43,189 --> 02:08:41,159

we've got craft

3357

02:08:44,810 --> 02:08:43,199

okay we need to go check that out that's

3358

02:08:47,450 --> 02:08:44,820

being backwards engineering Zeta

3359

02:08:48,950 --> 02:08:47,460

reticula he said okay let's uh let's get

3360

02:08:52,010 --> 02:08:48,960

that down too

3361

02:08:54,169 --> 02:08:52,020

um when when this is being bandied about

3362

02:08:57,290 --> 02:08:54,179

Through official media sources and

3363

02:09:00,050 --> 02:08:57,300

quoted and attributed back to the Senate

3364

02:09:03,050 --> 02:09:00,060

do you think that this possibility is a

3365

02:09:04,850 --> 02:09:03,060

real one it is I mean you know they're

3366

02:09:06,410 --> 02:09:04,860

briefing them in on something I don't

3367

02:09:09,410 --> 02:09:06,420

think the military

3368

02:09:12,169 --> 02:09:09,420

has some actual UFO sleep amount I don't

3369

02:09:13,910 --> 02:09:12,179

think they do because it well let me put

3370

02:09:15,709 --> 02:09:13,920

a pause on that it's not that hard to

3371

02:09:18,109 --> 02:09:15,719

reverse engineer technology if you've

3372

02:09:19,129 --> 02:09:18,119

seen of any machine and you you got

3373

02:09:20,990 --> 02:09:19,139

DaVinci he's going to figure out how

3374

02:09:23,030 --> 02:09:21,000

thing works it's so much harder to

3375

02:09:24,589 --> 02:09:23,040

actually make it in the first place and

3376

02:09:25,430 --> 02:09:24,599

yeah smartphone might be something you

3377

02:09:26,870 --> 02:09:25,440

can handle most people they don't have

3378

02:09:29,270 --> 02:09:26,880

to do it but yes you could hand that to

3379

02:09:30,410 --> 02:09:29,280

an NGO from 50 years ago and you take

3380

02:09:32,209 --> 02:09:30,420

the pawn and say oh that's how this

3381

02:09:33,350 --> 02:09:32,219

works it might be a little bit more

3382

02:09:35,570 --> 02:09:33,360

through it than that but they could do

3383

02:09:36,890 --> 02:09:35,580

it if we have this thing there's so much

3384

02:09:38,510 --> 02:09:36,900

technology we should be able to do right

3385

02:09:40,729 --> 02:09:38,520

now starting with the big one which is

3386

02:09:43,370 --> 02:09:40,739

cheap energy and you always want cheap

3387

02:09:45,589 --> 02:09:43,380

energy there's so many economic Booms

3388

02:09:47,810 --> 02:09:45,599

that come from cheap energy

3389

02:09:49,729 --> 02:09:47,820

um especially space file side you know

3390

02:09:50,570 --> 02:09:49,739

that variety is so good

3391

02:09:52,430 --> 02:09:50,580

um

3392

02:09:55,070 --> 02:09:52,440

do we have one of these things I don't

3393

02:09:56,629 --> 02:09:55,080

know we might I never put it past the

3394

02:09:58,310 --> 02:09:56,639

government again I'm a government

3395

02:10:01,430 --> 02:09:58,320

employee myself I work for the Secretary

3396

02:10:03,350 --> 02:10:01,440

of State my wife's a house rep we you

3397

02:10:04,970 --> 02:10:03,360

get to know the sokos and you're Amazed

3398

02:10:06,830 --> 02:10:04,980

by both the level of competence some

3399

02:10:08,390 --> 02:10:06,840

people have at a level of insane

3400

02:10:10,570 --> 02:10:08,400

incompetence people have and the

3401
02:10:13,550 --> 02:10:10,580
mixtures you get and the government

3402
02:10:16,310 --> 02:10:13,560
never ceases to amaze and surprise me

3403
02:10:18,410 --> 02:10:16,320
with the things that they can do both

3404
02:10:20,149 --> 02:10:18,420
competently and Incredibly incompetently

3405
02:10:22,129 --> 02:10:20,159
I don't believe they could ever hit a

3406
02:10:23,270 --> 02:10:22,139
UFO for us I still would not be the

3407
02:10:24,649 --> 02:10:23,280
least bit surprised if you actually had

3408
02:10:26,149 --> 02:10:24,659
generals going in there briefing the

3409
02:10:27,169 --> 02:10:26,159
intelligence could be on that and they

3410
02:10:29,930 --> 02:10:27,179
did not know what the heck they were

3411
02:10:32,629 --> 02:10:29,940
talking about okay have you been in so

3412
02:10:34,189 --> 02:10:32,639
you worked at Wright-Patt yeah did you

3413
02:10:35,510 --> 02:10:34,199

and one of the billions something people

3414

02:10:38,530 --> 02:10:35,520

thought was I had people come by and

3415

02:10:44,530 --> 02:10:41,629

have you been inside Hangar 18 I watched

3416

02:10:47,330 --> 02:10:44,540

Pizza get delivered to it

3417

02:10:49,310 --> 02:10:47,340

I walked into today and I'll add that

3418

02:10:51,229 --> 02:10:49,320

fun story because the building I was

3419

02:10:52,490 --> 02:10:51,239

working in was was having gigantic

3420

02:10:55,669 --> 02:10:52,500

voltage like the kind of looks like you

3421

02:10:57,470 --> 02:10:55,679

need like you know C4 to bust into and

3422

02:10:58,970 --> 02:10:57,480

nobody knew who what was in it it was

3423

02:11:00,229 --> 02:10:58,980

just they it was locked up we were using

3424

02:11:01,850 --> 02:11:00,239

a building because he's so propaganda

3425

02:11:03,530 --> 02:11:01,860

film and it had no windows so it was

3426

02:11:04,970 --> 02:11:03,540

very suspicious looking you know they

3427

02:11:07,250 --> 02:11:04,980

want the film and catch on file we're

3428

02:11:08,990 --> 02:11:07,260

doing Photon counts the very dark areas

3429

02:11:10,070 --> 02:11:09,000

for that and there was this giant vote I

3430

02:11:11,390 --> 02:11:10,080

had no idea was it and we finally got

3431

02:11:12,709 --> 02:11:11,400

the corner come down and find the code

3432

02:11:15,470 --> 02:11:12,719

to open the thing and there was nothing

3433

02:11:17,689 --> 02:11:15,480

in there but one piece of paper

3434

02:11:21,609 --> 02:11:17,699

just giant expensive on one piece of

3435

02:11:26,570 --> 02:11:25,550

uh so it's under it's underneath they

3436

02:11:29,330 --> 02:11:26,580

must have been left while they were busy

3437

02:11:33,010 --> 02:11:29,340

clearly yeah no no no the room the room

3438

02:11:35,149 --> 02:11:33,020

is the mask

3439

02:11:39,830 --> 02:11:35,159

to go down

3440

02:11:42,589 --> 02:11:39,840

Isaac so much man Hey listen uh happy

3441

02:11:45,589 --> 02:11:42,599

holidays you're one of the very best and

3442

02:11:47,149 --> 02:11:45,599

and our conversations uh I I look

3443

02:11:49,430 --> 02:11:47,159

forward to them but they're always so

3444

02:11:51,290 --> 02:11:49,440

great tonight was another one thank you

3445

02:11:52,850 --> 02:11:51,300

so much my friend that's good to be on

3446

02:11:55,669 --> 02:11:52,860

again Jimmy thanks so much for having me

3447

02:11:58,790 --> 02:11:55,679

I the man in Black

3448

02:12:01,550 --> 02:11:58,800

Isaac Arthur thank you so much Isaac and

3449

02:12:03,770 --> 02:12:01,560

go to Isaac arthur.net that's Isaac's

3450

02:12:06,109 --> 02:12:03,780

website everything is there uh YouTube

3451

02:12:08,950 --> 02:12:06,119

Twitter everything you need to know

3452

02:12:12,169 --> 02:12:08,960

about Isaac is right there at Isaac

3453

02:12:14,390 --> 02:12:12,179

arthur.net and uh go and check you do

3454

02:12:16,550 --> 02:12:14,400

new episodes every Thursday right every

3455

02:12:17,990 --> 02:12:16,560

Thursday and this one was uh we're

3456

02:12:19,910 --> 02:12:18,000

having coming out it'll be uh

3457

02:12:21,470 --> 02:12:19,920

Interstellar colonization strategies

3458

02:12:22,490 --> 02:12:21,480

tomorrow and then for those who are

3459

02:12:24,050 --> 02:12:22,500

really in the tiplo we actually have

3460

02:12:26,030 --> 02:12:24,060

that Omega Point episode coming out

3461

02:12:29,149 --> 02:12:26,040

later this month I want to say January

3462

02:12:31,189 --> 02:12:29,159

19th the best Isaac Arthur thank you so

3463

02:12:33,830 --> 02:12:31,199

much Isaac

3464

02:12:37,910 --> 02:12:33,840

happy holidays and with that let's get

3465

02:12:39,229 --> 02:12:37,920

out of here went to overtime man man I

3466

02:12:41,530 --> 02:12:39,239

haven't done that in a while Isaac

3467

02:12:44,750 --> 02:12:41,540

Arthur

3468

02:12:46,609 --> 02:12:44,760

amazing conversation I am your host

3469

02:12:48,530 --> 02:12:46,619

Jimmy Church

3470

02:12:51,229 --> 02:12:48,540

tomorrow night I've got a surprise guest

3471

02:12:53,390 --> 02:12:51,239

that's gonna blow everybody out of the

3472

02:12:56,689 --> 02:12:53,400

water and if you listen really close

3473

02:12:59,569 --> 02:12:56,699

tonight I even said his name

3474

02:13:01,129 --> 02:12:59,579

I did that for a reason Fade to Black is

3475

02:13:03,490 --> 02:13:01,139

produced by him today Palm Renee Denison

3476

02:13:05,830 --> 02:13:03,500

Kevin announcers are there are none

3477

02:13:09,169 --> 02:13:05,840

announces our Jimmy Church webmaster

3478

02:13:12,050 --> 02:13:09,179

drew the geek music Doug Aldridge intro

3479

02:13:13,850 --> 02:13:12,060

space boys spaceboymusic.com painted

3480

02:13:15,589 --> 02:13:13,860

black is produced by kjcr for the game

3481

02:13:17,990 --> 02:13:15,599

changer Network and this podcast is oh

3482

02:13:20,450 --> 02:13:18,000

and then copyrighted 2023 by Fade to

3483

02:13:22,189 --> 02:13:20,460

Black in the game changer Network Inc it

3484

02:13:23,689 --> 02:13:22,199

cannot be rebroadcast downloaded copied

3485

02:13:25,609 --> 02:13:23,699

or used anywhere in the known universe

3486

02:13:26,990 --> 02:13:25,619

without written or Mission from Fade to

3487

02:13:28,550 --> 02:13:27,000

Black to the game changer Network I'm

3488

02:13:32,330 --> 02:13:28,560

your excuse me church until tomorrow

3489

02:13:32,340 --> 02:13:39,490

go back Lee tappy

3490

02:13:39,500 --> 02:13:57,290

[Music]