



FADE to BLACK

host: Jimmy Church : 747-228-2051

1
00:00:00,160 --> 00:00:03,590
for tonight

2
00:00:09,070 --> 00:00:06,070
f2bq you can also email throughout the

3
00:00:14,629 --> 00:00:11,270
jimmychurchradio.com all right kids you

4
00:00:17,430 --> 00:00:14,639
ready tonight professor avi loeb

5
00:00:20,150 --> 00:00:17,440
and before we get to all of that he'll

6
00:00:22,550 --> 00:00:20,160
be joining us at the bottom of the hour

7
00:00:24,710 --> 00:00:22,560
let's get to the breaking news now i

8
00:00:28,150 --> 00:00:24,720
know

9
00:00:30,790 --> 00:00:28,160
a lot of you are tired of this but

10
00:00:32,549 --> 00:00:30,800
it things are getting heated over in the

11
00:00:36,470 --> 00:00:32,559
uk

12
00:00:40,150 --> 00:00:36,480
here's morgan here's morgan

13
00:00:43,190 --> 00:00:40,160

now i uh okay well the news is this

14

00:00:44,869 --> 00:00:43,200

uh yesterday he stormed off the set of

15

00:00:45,670 --> 00:00:44,879

the show that he hosted in the morning

16

00:00:49,510 --> 00:00:45,680

it's called good

17

00:00:52,470 --> 00:00:49,520

morning britain and pouting

18

00:00:53,029 --> 00:00:52,480

crying wanted to take his toys and go

19

00:00:57,270 --> 00:00:53,039

home

20

00:00:59,990 --> 00:00:57,280

like a child comes back

21

00:01:01,430 --> 00:01:00,000

chats a bit more splits and then he

22

00:01:04,630 --> 00:01:01,440

quits

23

00:01:08,149 --> 00:01:04,640

the way

24

00:01:12,270 --> 00:01:08,159

so that's it and all of this over

25

00:01:15,030 --> 00:01:12,280

megan duchess of sussex

26

00:01:19,429 --> 00:01:15,040

unbelievable his final tweet

27

00:01:22,550 --> 00:01:19,439

his final line in his final tweet quote

28

00:01:24,149 --> 00:01:22,560

thanks for all the love and hate

29

00:01:25,749 --> 00:01:24,159

i'm off to spend more time with my

30

00:01:29,350 --> 00:01:25,759

opinions

31

00:01:31,109 --> 00:01:29,360

then quote ah

32

00:01:32,950 --> 00:01:31,119

there you go i don't know i don't know

33

00:01:36,230 --> 00:01:32,960

what to make i i

34

00:01:38,630 --> 00:01:36,240

uh the monarchy

35

00:01:39,270 --> 00:01:38,640

you know the queen of england and i

36

00:01:42,069 --> 00:01:39,280

think

37

00:01:43,749 --> 00:01:42,079

a very established culture it's it's

38

00:01:45,429 --> 00:01:43,759

what the uk is about and and i

39

00:01:48,469 --> 00:01:45,439

understand that

40

00:01:50,550 --> 00:01:48,479

very important uh geopolitically around

41

00:01:53,670 --> 00:01:50,560

the world i understand that too

42

00:01:57,030 --> 00:01:53,680

and most

43

00:02:00,210 --> 00:01:57,040

britons most of the british

44

00:02:01,510 --> 00:02:00,220

uh respect and and

45

00:02:04,310 --> 00:02:01,520

[Music]

46

00:02:05,910 --> 00:02:04,320

um how do i say this it's it's the

47

00:02:09,029 --> 00:02:05,920

monarchy is part of their culture

48

00:02:12,309 --> 00:02:09,039

right and what is going on right now

49

00:02:14,150 --> 00:02:12,319

with uh megan and uh

50

00:02:16,630 --> 00:02:14,160

and and things in the interview with

51
00:02:17,270 --> 00:02:16,640
oprah well this is world news and i and

52
00:02:20,150 --> 00:02:17,280
i get that

53
00:02:20,869 --> 00:02:20,160
it's not really news for me i you know

54
00:02:29,110 --> 00:02:20,879
it

55
00:02:31,509 --> 00:02:29,120
and yeah i

56
00:02:33,190 --> 00:02:31,519
i don't understand why piers decided to

57
00:02:36,470 --> 00:02:33,200
just make this strong stand

58
00:02:38,630 --> 00:02:36,480
i i just don't get it i don't get it and

59
00:02:39,830 --> 00:02:38,640
to quit your job over something like

60
00:02:43,190 --> 00:02:39,840
this is

61
00:02:45,190 --> 00:02:43,200
ah because it was personal yeah

62
00:02:46,949 --> 00:02:45,200
so that's it that's i i don't want to

63
00:02:49,670 --> 00:02:46,959

give my opinion

64

00:02:52,070 --> 00:02:49,680

that's what went down and i'm just

65

00:02:52,790 --> 00:02:52,080

shocked and surprised about it it's like

66

00:02:55,350 --> 00:02:52,800

me

67

00:02:56,949 --> 00:02:55,360

you know quitting fade to black because

68

00:02:59,430 --> 00:02:56,959

i've got a spat

69

00:03:01,350 --> 00:02:59,440

with somebody that has nothing to do

70

00:03:03,750 --> 00:03:01,360

with the show

71

00:03:04,790 --> 00:03:03,760

it's just it's unbelievable to me all

72

00:03:08,790 --> 00:03:04,800

right

73

00:03:12,869 --> 00:03:08,800

yesterday tuesday

74

00:03:17,030 --> 00:03:12,879

elon musk made 25

75

00:03:21,030 --> 00:03:17,040

billion dollars yesterday

76

00:03:24,550 --> 00:03:21,040

that's right 25 billion ducks

77

00:03:28,070 --> 00:03:24,560

just quacked in his pond

78

00:03:29,509 --> 00:03:28,080

all of it from a 20 rally in tesla's

79

00:03:32,789 --> 00:03:29,519

stock

80

00:03:36,229 --> 00:03:32,799

absolutely incredible well china and

81

00:03:39,270 --> 00:03:36,239

brit are china and britain china and

82

00:03:42,470 --> 00:03:39,280

russia want to build a

83

00:03:44,710 --> 00:03:42,480

shared moon base that's right this was

84

00:03:47,589 --> 00:03:44,720

just announced the two countries agreed

85

00:03:50,270 --> 00:03:47,599

to the plans yesterday saying the

86

00:03:52,070 --> 00:03:50,280

international lunar research station the

87

00:03:54,869 --> 00:03:52,080

ilrs

88

00:03:56,070 --> 00:03:54,879

should be open quote open to all

89

00:03:58,630 --> 00:03:56,080

interested countries and

90

00:04:01,190 --> 00:03:58,640

international partners end quote the

91

00:04:03,110 --> 00:04:01,200

memorandum of understanding between the

92

00:04:05,910 --> 00:04:03,120

two countries announced by the china

93

00:04:09,270 --> 00:04:05,920

national space administration the cnsa

94

00:04:10,949 --> 00:04:09,280

described the ilrs as a comprehensive

95

00:04:14,390 --> 00:04:10,959

scientific experiment

96

00:04:17,909 --> 00:04:14,400

base with the capability of long-term

97

00:04:20,710 --> 00:04:17,919

autonomous operation end quote

98

00:04:22,390 --> 00:04:20,720

neither country has ever landed a human

99

00:04:25,350 --> 00:04:22,400

crew on the moon

100

00:04:26,870 --> 00:04:25,360

now that's of note right and they did

101

00:04:28,110 --> 00:04:26,880

not set a target date to begin

102

00:04:32,310 --> 00:04:28,120

construction of the

103

00:04:34,390 --> 00:04:32,320

ilrs however russia remains a leading

104

00:04:36,310 --> 00:04:34,400

space faring country and china has built

105

00:04:37,430 --> 00:04:36,320

impressive space stations in recent

106

00:04:40,790 --> 00:04:37,440

years

107

00:04:45,110 --> 00:04:40,800

but no word if the u.s

108

00:04:47,670 --> 00:04:45,120

is invited for any sleepovers

109

00:04:49,590 --> 00:04:47,680

there you go announced today american

110

00:04:51,030 --> 00:04:49,600

airlines will no longer have to lay off

111

00:04:53,590 --> 00:04:51,040

an estimated 13

112

00:04:56,710 --> 00:04:53,600

000 employees following the passing of

113

00:04:59,990 --> 00:04:56,720

the latest stimulus package by congress

114

00:05:02,550 --> 00:05:00,000

the airline industry will receive 15

115

00:05:03,029 --> 00:05:02,560

billion dollars out of the 1.9 trillion

116

00:05:05,590 --> 00:05:03,039

cova

117

00:05:07,350 --> 00:05:05,600

19 relief bill as well as an extension

118

00:05:09,830 --> 00:05:07,360

on the payroll support

119

00:05:12,070 --> 00:05:09,840

program the provision was expected to

120

00:05:13,990 --> 00:05:12,080

expire on april 1st as part of the

121

00:05:18,790 --> 00:05:14,000

coronavirus aid relief and

122

00:05:20,390 --> 00:05:18,800

economic security act that's great news

123

00:05:22,790 --> 00:05:20,400

let's get this show cracking happy

124

00:05:26,070 --> 00:05:22,800

birthday to today

125

00:05:29,830 --> 00:05:26,080

olivia wilde is 37

126

00:05:33,670 --> 00:05:29,840

starred in tron and starred in house

127

00:05:38,390 --> 00:05:33,680

md chuck norris today

128

00:05:41,510 --> 00:05:38,400

81 years old let's never forget that

129

00:05:44,950 --> 00:05:41,520

chuck fought bruce lee

130

00:05:48,550 --> 00:05:44,960

in way of the dragon that's right 19

131

00:05:52,390 --> 00:05:48,560

what 72 sharon stone

132

00:05:54,150 --> 00:05:52,400

today is 63. jon hamm

133

00:05:56,950 --> 00:05:54,160

i think he's funny and i think he's a

134

00:05:59,590 --> 00:05:56,960

great actor jon hamm today is 50

135

00:06:01,590 --> 00:05:59,600

of course starting mad men starring in

136

00:06:04,710 --> 00:06:01,600

the new upcoming top gun

137

00:06:05,670 --> 00:06:04,720

maverick he was also really good in the

138

00:06:08,790 --> 00:06:05,680

tv series

139

00:06:12,390 --> 00:06:08,800

good almonds boston's

140

00:06:15,909 --> 00:06:12,400

genius guitar player tom schultz

141

00:06:17,110 --> 00:06:15,919

today is 74. pearl jam bassist jeff

142

00:06:20,309 --> 00:06:17,120

ament

143

00:06:23,590 --> 00:06:20,319

today is 58 edie brickell

144

00:06:26,790 --> 00:06:23,600

edie perkell of the new bohemians yeah

145

00:06:29,830 --> 00:06:26,800

you like that band yeah

146

00:06:33,110 --> 00:06:29,840

i know you did today she's 55.

147

00:06:35,110 --> 00:06:33,120

def jams american recording and and so

148

00:06:37,350 --> 00:06:35,120

forth def jam's rick rubin

149

00:06:39,029 --> 00:06:37,360

today is 58 some say he is the greatest

150

00:06:42,070 --> 00:06:39,039

producer of all time

151
00:06:43,670 --> 00:06:42,080
of course the beastie boys johnny cash

152
00:06:45,430 --> 00:06:43,680
did really well with the red hot chili

153
00:06:48,469 --> 00:06:45,440
peppers too as well

154
00:06:49,350 --> 00:06:48,479
and probably a hundred other bands rick

155
00:06:53,589 --> 00:06:49,360
rubin today

156
00:06:58,150 --> 00:06:53,599
is 58. our dead guy's birthday today is

157
00:06:59,990 --> 00:06:58,160
ted mckenna ted mckenna 1950 to 2019

158
00:07:02,469 --> 00:07:00,000
died at the age of 68.

159
00:07:05,350 --> 00:07:02,479
ted was an amazing drummer he played

160
00:07:08,150 --> 00:07:05,360
with the sensational alex harvey band

161
00:07:08,710 --> 00:07:08,160
played with rory gallagher the greg lake

162
00:07:11,510 --> 00:07:08,720
band

163
00:07:12,150 --> 00:07:11,520

and the michael shanker group he also

164

00:07:14,150 --> 00:07:12,160

toured with

165

00:07:15,270 --> 00:07:14,160

ian gillen for a short period back in

166

00:07:18,309 --> 00:07:15,280

1990

167

00:07:19,749 --> 00:07:18,319

ted lectured in applied art at north

168

00:07:24,710 --> 00:07:19,759

glasgow college

169

00:07:25,350 --> 00:07:24,720

from 1996 to 2011. in 2016 he reunited

170

00:07:27,189 --> 00:07:25,360

with

171

00:07:30,390 --> 00:07:27,199

michael shanker for the michael shanker

172

00:07:31,029 --> 00:07:30,400

fest and anniversary lineup of all three

173

00:07:33,990 --> 00:07:31,039

original

174

00:07:35,670 --> 00:07:34,000

msg vocalist gary barton one of my

175

00:07:36,950 --> 00:07:35,680

favorite singers of all time grand bonna

176

00:07:37,350 --> 00:07:36,960

one of the best of all time and of

177

00:07:40,990 --> 00:07:37,360

course

178

00:07:43,990 --> 00:07:41,000

robin mccauley ted died on january 19

179

00:07:48,150 --> 00:07:44,000

2019 at the age of 68 of a

180

00:07:50,790 --> 00:07:48,160

hemorrhage during a routine operation

181

00:07:52,070 --> 00:07:50,800

happy birthday ted mckenna on this day

182

00:07:58,469 --> 00:07:52,080

in history

183

00:08:00,550 --> 00:07:58,479

otd 1876. first

184

00:08:02,550 --> 00:08:00,560

speech is transmitted by telephone when

185

00:08:04,950 --> 00:08:02,560

alexander graham bell

186

00:08:06,230 --> 00:08:04,960

summons his assistant in another room by

187

00:08:11,430 --> 00:08:06,240

saying quote

188

00:08:14,150 --> 00:08:11,440

mr watson come here i want you

189

00:08:15,749 --> 00:08:14,160

yeah bell got his telephone patent just

190

00:08:20,070 --> 00:08:15,759

three days before

191

00:08:23,909 --> 00:08:20,080

fader fact it's a good one

192

00:08:27,670 --> 00:08:23,919

fader fact after being told

193

00:08:31,270 --> 00:08:27,680

a jet car can run on anything that

194

00:08:32,709 --> 00:08:31,280

burns the president of mexico adolfo

195

00:08:35,750 --> 00:08:32,719

mateos

196

00:08:37,269 --> 00:08:35,760

rode in the turbine chrysler running on

197

00:08:41,350 --> 00:08:37,279

tequila

198

00:08:44,470 --> 00:08:41,360

in 1963. and that

199

00:08:47,190 --> 00:08:44,480

is your fader fact tonight very special

200

00:08:49,150 --> 00:08:47,200

guest professor avi loeb joins us we're

201
00:08:51,590 --> 00:08:49,160
going to be talking about his new book

202
00:08:52,470 --> 00:08:51,600
extraterrestrial we've got a lot of

203
00:08:54,470 --> 00:08:52,480
things

204
00:08:56,710 --> 00:08:54,480
that are about to happen at the bottom

205
00:08:59,670 --> 00:08:56,720
of the hour so get ready for all of that

206
00:09:01,509 --> 00:08:59,680
and tomorrow night is another fader

207
00:09:04,790 --> 00:09:01,519
night with open lines

208
00:09:12,250 --> 00:09:04,800
all night long now it's time for me to

209
00:09:15,350 --> 00:09:13,310
[Music]

210
00:09:19,670 --> 00:09:15,360
rivermooncoffee.com

211
00:09:20,150 --> 00:09:19,680
yeah no it's rivermoonwellness.com i

212
00:09:24,110 --> 00:09:20,160
keep

213
00:09:25,750 --> 00:09:24,120

after so many years river mooncoffee.

214

00:09:27,990 --> 00:09:25,760

rivermoonwellness.com i wonder what

215

00:09:31,269 --> 00:09:28,000

happens if you do rivermooncoffee.com

216

00:09:33,509 --> 00:09:31,279

is it a reroute is it a re-route to

217

00:09:34,829 --> 00:09:33,519

river moon wellness well you can just go

218

00:09:36,150 --> 00:09:34,839

click on the links at

219

00:09:38,870 --> 00:09:36,160

jimmychurchradio.com

220

00:09:41,190 --> 00:09:38,880

all right and also visit their amazon

221

00:09:44,150 --> 00:09:41,200

store get that game change at blend

222

00:09:44,870 --> 00:09:44,160

it's really good promo code f2b blend

223

00:09:50,150 --> 00:09:44,880

all right

224

00:09:53,829 --> 00:09:50,160

let me hit this

225

00:09:57,910 --> 00:09:53,839

funny gilligan's island coconuts

226

00:10:00,470 --> 00:09:57,920

that's funny that's funny

227

00:10:03,990 --> 00:10:00,480

well um tonight's a very special night

228

00:10:08,630 --> 00:10:04,000

but before i get to that

229

00:10:12,470 --> 00:10:11,269

all right i'm gonna get to the end and

230

00:10:14,550 --> 00:10:12,480

then

231

00:10:16,150 --> 00:10:14,560

i'm gonna repeat the end i'm gonna do

232

00:10:17,590 --> 00:10:16,160

the end at the beginning i'm gonna

233

00:10:19,829 --> 00:10:17,600

reverse things

234

00:10:21,590 --> 00:10:19,839

because you need to know where my mind

235

00:10:25,110 --> 00:10:21,600

is right now

236

00:10:28,550 --> 00:10:25,120

so professor ivy loeb

237

00:10:32,310 --> 00:10:28,560

and i recorded the interview

238

00:10:34,949 --> 00:10:32,320

today we did it two hours

239

00:10:36,630 --> 00:10:34,959

before show time it was just recorded we

240

00:10:38,550 --> 00:10:36,640

did it as live as we

241

00:10:40,470 --> 00:10:38,560

could leading up to the show but

242

00:10:44,150 --> 00:10:40,480

professor loeb

243

00:10:45,910 --> 00:10:44,160

gets up at 4 00 a.m to teach school

244

00:10:47,670 --> 00:10:45,920

and i just couldn't keep him up late

245

00:10:50,150 --> 00:10:47,680

he's on the east coast

246

00:10:51,110 --> 00:10:50,160

and that's just the way that it is so he

247

00:10:53,670 --> 00:10:51,120

agreed

248

00:10:55,670 --> 00:10:53,680

to push it up at maximum so he could get

249

00:10:58,630 --> 00:10:55,680

a little bit of sleep tonight

250

00:10:59,269 --> 00:10:58,640

and still do the interview fresh like it

251
00:11:02,150 --> 00:10:59,279
was

252
00:11:04,230 --> 00:11:02,160
live and so we recorded it about two

253
00:11:07,509 --> 00:11:04,240
hours ago two and a half hours ago

254
00:11:11,590 --> 00:11:07,519
and um

255
00:11:15,990 --> 00:11:14,710
i got to think i got to think i was

256
00:11:19,430 --> 00:11:16,000
thinking

257
00:11:22,150 --> 00:11:19,440
got to think what have i

258
00:11:24,230 --> 00:11:22,160
learned after doing nearly 13 years of

259
00:11:27,670 --> 00:11:24,240
radio

260
00:11:33,509 --> 00:11:31,430
well the first thing and it may be the

261
00:11:34,870 --> 00:11:33,519
most important there may be only one

262
00:11:38,230 --> 00:11:34,880
thing

263
00:11:41,430 --> 00:11:38,240

and that is speak

264

00:11:46,949 --> 00:11:43,829

that's right speak with conviction and

265

00:11:54,310 --> 00:11:50,790

don't use words or ideas that

266

00:11:59,269 --> 00:11:57,910

no not live in front of a live audience

267

00:12:02,949 --> 00:11:59,279

not on the radio

268

00:12:06,150 --> 00:12:02,959

not in an interview don't do it

269

00:12:07,829 --> 00:12:06,160

speak with conviction and believe in

270

00:12:10,870 --> 00:12:07,839

yourself

271

00:12:13,670 --> 00:12:10,880

never use words or ideas that you think

272

00:12:15,829 --> 00:12:13,680

people just want to hear to prop

273

00:12:19,750 --> 00:12:15,839

yourself up and make you

274

00:12:22,949 --> 00:12:19,760

feel important because you are saying

275

00:12:27,030 --> 00:12:25,030

only say the stuff that you truly

276

00:12:34,550 --> 00:12:27,040

believe

277

00:12:42,389 --> 00:12:39,350

and this comes from so many

278

00:12:47,030 --> 00:12:45,430

and it's a lesson that only comes with

279

00:12:50,389 --> 00:12:47,040

time

280

00:12:53,829 --> 00:12:50,399

can't be force

281

00:12:54,710 --> 00:12:53,839

fed it's not instant doesn't work that

282

00:12:56,150 --> 00:12:54,720

way

283

00:12:58,550 --> 00:12:56,160

you've got to stumble you've got to

284

00:13:01,990 --> 00:12:58,560

figure it out it's got to be

285

00:13:05,509 --> 00:13:02,000

part of you

286

00:13:09,590 --> 00:13:05,519

ideas that are not your own

287

00:13:13,430 --> 00:13:09,600

or not from your true belief system

288

00:13:14,870 --> 00:13:13,440

are wasted wasted

289

00:13:16,550 --> 00:13:14,880

and think about this when you have a

290

00:13:19,350 --> 00:13:16,560

conversation with somebody

291

00:13:21,269 --> 00:13:19,360

before you just repeat or you just want

292

00:13:21,750 --> 00:13:21,279

to say something in a conversation with

293

00:13:23,670 --> 00:13:21,760

someone

294

00:13:26,069 --> 00:13:23,680

where you're just going to say something

295

00:13:28,550 --> 00:13:26,079

to make yourself seem and feel important

296

00:13:29,829 --> 00:13:28,560

those are the wrong words stop yourself

297

00:13:33,509 --> 00:13:29,839

right there pump the brakes

298

00:13:37,590 --> 00:13:33,519

stop the truck stop it

299

00:13:40,230 --> 00:13:37,600

those words are not remembered

300

00:13:41,030 --> 00:13:40,240

by anyone and you think it's so

301
00:13:44,150 --> 00:13:41,040

important

302
00:13:49,269 --> 00:13:44,160

you think you're sounding so good no

303
00:13:53,269 --> 00:13:49,279

it's wasted the person listening to you

304
00:13:56,949 --> 00:13:53,279

whoever it is their brain

305
00:13:57,670 --> 00:13:56,959

picks up on this they know the ideas are

306
00:13:59,910 --> 00:13:57,680

not yours

307
00:14:01,110 --> 00:13:59,920

they know you don't believe this with

308
00:14:04,310 --> 00:14:01,120

conviction

309
00:14:07,670 --> 00:14:04,320

they know the brain picks up on this

310
00:14:11,750 --> 00:14:07,680

it knows when the words are just

311
00:14:17,110 --> 00:14:11,760

filler stolen

312
00:14:21,350 --> 00:14:17,120

repeated meaningless

313
00:14:26,230 --> 00:14:21,360

the brain when it hears it

314

00:14:29,269 --> 00:14:26,240

knows true original thought

315

00:14:33,269 --> 00:14:29,279

true original ideas

316

00:14:35,509 --> 00:14:33,279

and theories brain gets it

317

00:14:39,910 --> 00:14:35,519

and they know when it's coming from

318

00:14:41,829 --> 00:14:39,920

somebody that believes in themselves

319

00:14:43,430 --> 00:14:41,839

now i know what you're saying here jimmy

320

00:14:44,550 --> 00:14:43,440

give me an example what are you talking

321

00:14:46,470 --> 00:14:44,560

about man this is

322

00:14:50,870 --> 00:14:46,480

this is getting way out there man it's

323

00:14:57,030 --> 00:14:54,629

john anthony west god rest his soul john

324

00:15:00,790 --> 00:14:57,040

anthony west

325

00:15:03,590 --> 00:15:00,800

spoke with conviction believed in

326

00:15:07,509 --> 00:15:05,990

you hung on his every word you

327

00:15:12,069 --> 00:15:07,519

remembered

328

00:15:16,949 --> 00:15:12,079

every word your brain understood

329

00:15:21,189 --> 00:15:16,959

that's right jim mars

330

00:15:23,829 --> 00:15:21,199

jim mars was magical with this

331

00:15:25,590 --> 00:15:23,839

he spoke you listened to you remembered

332

00:15:28,790 --> 00:15:25,600

it wasn't blah blah blah

333

00:15:33,910 --> 00:15:31,910

that's what you do you learn from those

334

00:15:37,189 --> 00:15:33,920

that come before

335

00:15:40,870 --> 00:15:37,199

it's really that simple it's that simple

336

00:15:42,710 --> 00:15:40,880

stanton friedman right it's like the big

337

00:15:43,910 --> 00:15:42,720

three right there john anthony west to

338

00:15:47,670 --> 00:15:43,920

mars

339

00:15:52,230 --> 00:15:47,680

satan friedman speaks with conviction

340

00:15:56,069 --> 00:15:52,240

every time every time

341

00:15:59,509 --> 00:15:58,150

and that's what you have to do and that

342

00:16:04,470 --> 00:15:59,519

is what i have

343

00:16:09,030 --> 00:16:04,480

learned you want a real recent example

344

00:16:12,870 --> 00:16:09,040

last night's show chris bledsoe

345

00:16:15,910 --> 00:16:12,880

speaks with conviction believes

346

00:16:19,509 --> 00:16:15,920

in himself original

347

00:16:22,710 --> 00:16:19,519

thought original ideas

348

00:16:26,069 --> 00:16:22,720

from source that is

349

00:16:29,430 --> 00:16:26,079

what i have learned

350

00:16:33,749 --> 00:16:29,440

tonight avi loeb

351

00:16:36,790 --> 00:16:33,759

brings all of this in full force

352

00:16:38,470 --> 00:16:36,800

he's an original remember everything

353

00:16:42,550 --> 00:16:38,480

that i just laid out for you

354

00:16:46,230 --> 00:16:42,560

right now listen to avi loeb

355

00:16:49,509 --> 00:16:46,240

avilove is singular original thought

356

00:16:50,629 --> 00:16:49,519

original ideas original theories and he

357

00:16:53,509 --> 00:16:50,639

believes in them

358

00:16:54,069 --> 00:16:53,519

and he believes in himself he doesn't

359

00:16:57,509 --> 00:16:54,079

care

360

00:16:58,870 --> 00:16:57,519

what others think and it's an incredible

361

00:17:04,150 --> 00:16:58,880

conversation

362

00:17:06,549 --> 00:17:04,160

before showtime tonight

363

00:17:07,590 --> 00:17:06,559

and i sat back and i thought to myself

364

00:17:10,870 --> 00:17:07,600

not only was

365

00:17:14,069 --> 00:17:10,880

that a great conversation and fun i i

366

00:17:18,470 --> 00:17:14,079

learned something but you just feel

367

00:17:20,630 --> 00:17:18,480

your brain knows it is coming

368

00:17:22,230 --> 00:17:20,640

as original thought it's coming from

369

00:17:24,949 --> 00:17:22,240

somebody with conviction

370

00:17:25,909 --> 00:17:24,959

that believes in themself now this

371

00:17:29,669 --> 00:17:25,919

interview

372

00:17:32,789 --> 00:17:29,679

coming up was recorded live

373

00:17:36,070 --> 00:17:32,799

straight through no edits

374

00:17:39,669 --> 00:17:36,080

did it with the commercials in play boom

375

00:17:43,350 --> 00:17:39,679

done in out done hit

376

00:17:46,630 --> 00:17:43,360

bum sat save file on computer

377

00:17:50,070 --> 00:17:46,640

ready to play that's it

378

00:17:51,830 --> 00:17:50,080

one whack two straight hours so this is

379

00:17:53,830 --> 00:17:51,840

what i'm going to be doing tonight

380

00:17:55,430 --> 00:17:53,840

i'm going to stay with you i'm going to

381

00:17:58,150 --> 00:17:55,440

be hanging out

382

00:17:59,510 --> 00:17:58,160

in the youtube chat i'm going to keep

383

00:18:01,430 --> 00:17:59,520

the video going

384

00:18:03,669 --> 00:18:01,440

i'm going to bounce around between

385

00:18:05,750 --> 00:18:03,679

twitter and speaker and

386

00:18:07,029 --> 00:18:05,760

so i'll try to jump over to facebook too

387

00:18:09,830 --> 00:18:07,039

if i have the time

388

00:18:11,190 --> 00:18:09,840

but it's an opportunity for me to hang

389

00:18:13,909 --> 00:18:11,200

out with all of you

390

00:18:15,110 --> 00:18:13,919

as we listen to this interview again and

391

00:18:21,750 --> 00:18:15,120

i cannot wait

392

00:18:26,230 --> 00:18:21,760

another thing that i need to uh

393

00:18:31,590 --> 00:18:26,240

remind everybody of out of the

394

00:18:39,669 --> 00:18:35,909

i think we recorded two

395

00:18:43,110 --> 00:18:39,679

that's it the last recorded

396

00:18:46,390 --> 00:18:43,120

show and i could be wrong it's so rare

397

00:18:51,430 --> 00:18:46,400

the last show that we recorded

398

00:18:53,350 --> 00:18:51,440

was eric von daniken five years ago

399

00:18:55,510 --> 00:18:53,360

that's how important this show was

400

00:18:58,710 --> 00:18:55,520

tonight we had to do it

401
00:19:01,110 --> 00:18:58,720
everything was in place it had to happen

402
00:19:02,710 --> 00:19:01,120
and it's the only way that it could

403
00:19:05,350 --> 00:19:02,720
that's how unique tonight

404
00:19:06,549 --> 00:19:05,360
is so i'm able to go back something i

405
00:19:08,950 --> 00:19:06,559
never do

406
00:19:10,230 --> 00:19:08,960
which is go back and listen to this very

407
00:19:12,470 --> 00:19:10,240
important conversation

408
00:19:14,549 --> 00:19:12,480
one more time and then hang out with all

409
00:19:16,870 --> 00:19:14,559
of you i want your thoughts

410
00:19:18,470 --> 00:19:16,880
i want to know what you guys think

411
00:19:21,510 --> 00:19:18,480
you're about to learn

412
00:19:25,270 --> 00:19:21,520
it's an absolutely incredible night

413
00:19:27,510 --> 00:19:25,280

and uh so with that i am going to

414

00:19:28,710 --> 00:19:27,520

just say let's roll it and uh let's get

415

00:19:32,549 --> 00:19:28,720

this started

416

00:19:35,110 --> 00:19:32,559

i am uh very honored that uh

417

00:19:35,990 --> 00:19:35,120

uh professor loeb not only came in here

418

00:19:39,350 --> 00:19:36,000

but

419

00:19:41,110 --> 00:19:39,360

very candid very honest very open

420

00:19:43,669 --> 00:19:41,120

it's an incredible incredible

421

00:19:45,830 --> 00:19:43,679

conversation this is fade to black i

422

00:19:48,470 --> 00:19:45,840

am your host jimmy church on the game

423

00:19:50,630 --> 00:19:48,480

changer network and kgra

424

00:19:51,990 --> 00:19:50,640

the planet we'll be right back after

425

00:19:55,110 --> 00:19:52,000

this short break

426
00:19:56,310 --> 00:19:55,120
with professor avi loeb literally

427
00:19:58,150 --> 00:19:56,320
recorded

428
00:20:09,890 --> 00:19:58,160
two and a half hours ago it's a two two

429
00:20:25,430 --> 00:20:18,830
[Music]

430
00:20:27,669 --> 00:20:25,440
this is nicole church daughter of you

431
00:20:29,750 --> 00:20:27,679
know who and you're listening to fade to

432
00:20:34,070 --> 00:20:29,760
black on jimmychurchradio.com

433
00:20:36,310 --> 00:20:34,080
and the game changer network

434
00:20:40,470 --> 00:20:36,320
you're listening to jimmy church fade to

435
00:20:45,029 --> 00:20:42,710
fade to black will now pause for alien

436
00:20:51,990 --> 00:20:45,039
identification

437
00:20:56,149 --> 00:20:54,310
introducing the game changer blend from

438
00:20:58,710 --> 00:20:56,159

river moon coffee that delivers a

439

00:20:59,990 --> 00:20:58,720

customized blend made specifically for

440

00:21:03,190 --> 00:21:00,000

the fader knots

441

00:21:06,230 --> 00:21:03,200

if the game is rigged change the game

442

00:21:08,149 --> 00:21:06,240

it's a boulder cup with some bite game

443

00:21:10,390 --> 00:21:08,159

changer is the coffee of choice for

444

00:21:11,510 --> 00:21:10,400

those that prefer an organic dark roast

445

00:21:15,029 --> 00:21:11,520

that is slightly

446

00:21:17,590 --> 00:21:15,039

lighter and milder but it's still dark

447

00:21:18,470 --> 00:21:17,600

with wild notes of pecans and chocolate

448

00:21:21,029 --> 00:21:18,480

with a rich

449

00:21:23,190 --> 00:21:21,039

balanced full-bodied cup that is roasted

450

00:21:24,310 --> 00:21:23,200

to perfection for a great coffee to

451
00:21:27,350 --> 00:21:24,320
start your day

452
00:21:28,230 --> 00:21:27,360
as an after dinner coffee or anywhere in

453
00:21:30,230 --> 00:21:28,240
between

454
00:21:33,190 --> 00:21:30,240
artisan small batch roasted to

455
00:21:35,590 --> 00:21:33,200
perfection usda certified organic all

456
00:21:38,350 --> 00:21:35,600
river moon coffee is freshly roasted

457
00:21:39,990 --> 00:21:38,360
and packaged in the usa just go to

458
00:21:42,149 --> 00:21:40,000
rivermooncoffee.com or click on the

459
00:21:42,870 --> 00:21:42,159
banners over on our site and use the

460
00:21:46,390 --> 00:21:42,880
promo code

461
00:21:50,789 --> 00:21:46,400
f2b blend for 15 off of your

462
00:21:53,909 --> 00:21:50,799
order today rivermooncoffee.com

463
00:21:58,909 --> 00:21:53,919

this is the only way forward this

464

00:22:01,110 --> 00:21:58,919

is made to black make contact

465

00:22:02,870 --> 00:22:01,120

kgraradio.com

466

00:22:05,669 --> 00:22:02,880

this is jimmy church of fade to black

467

00:22:07,110 --> 00:22:05,679

and you can get our podcast for just two

468

00:22:08,630 --> 00:22:07,120

dollars per month

469

00:22:10,830 --> 00:22:08,640

all you have to do is click on the

470

00:22:13,190 --> 00:22:10,840

podcast banner over at

471

00:22:15,830 --> 00:22:13,200

jimmychurchradio.com

472

00:22:17,110 --> 00:22:15,840

hi folks it's trembling times and fear

473

00:22:19,350 --> 00:22:17,120

is pushing emotions

474

00:22:21,110 --> 00:22:19,360

which in turn pushes health the wrong

475

00:22:22,070 --> 00:22:21,120

direction do you ever get an egg because

476
00:22:24,789 --> 00:22:22,080
life is uneasy

477
00:22:26,710 --> 00:22:24,799
try life change tea get the tea.com life

478
00:22:28,070 --> 00:22:26,720
change tea works on your digestive tract

479
00:22:30,230 --> 00:22:28,080
helping to move food through

480
00:22:31,350 --> 00:22:30,240
quicker and comfortably so your health

481
00:22:33,110 --> 00:22:31,360
is spot on

482
00:22:35,190 --> 00:22:33,120
life change tea may not help with world

483
00:22:36,630 --> 00:22:35,200
issues but it will help with your

484
00:22:38,630 --> 00:22:36,640
digestive issues

485
00:22:40,230 --> 00:22:38,640
a glass a day helps keep the intruders

486
00:22:42,870 --> 00:22:40,240
away so

487
00:22:45,110 --> 00:22:42,880
change your life today log on to get the

488
00:22:47,669 --> 00:22:45,120

tea.com that's get the tea

489

00:22:49,750 --> 00:22:47,679

dot com if your health game is off get

490

00:22:51,990 --> 00:22:49,760

on by ordering life change tea

491

00:22:53,830 --> 00:22:52,000

get the tea dot com and while you're on

492

00:22:55,750 --> 00:22:53,840

our site look around at the great

493

00:22:57,669 --> 00:22:55,760

non-gmo organic supplements

494

00:22:58,950 --> 00:22:57,679

and if you're a sales shopper go to our

495

00:23:00,710 --> 00:22:58,960

specials page

496

00:23:02,470 --> 00:23:00,720

and see what's for you i've been

497

00:23:04,549 --> 00:23:02,480

drinking the tea for 12 years and i'm

498

00:23:09,510 --> 00:23:04,559

sure glad for its health benefits

499

00:23:14,549 --> 00:23:12,870

the tea that makes you go vader knots

500

00:23:16,310 --> 00:23:14,559

when you think about the future of our

501
00:23:18,390 --> 00:23:16,320
country and where we're headed do you

502
00:23:21,029 --> 00:23:18,400
wonder about the food supply

503
00:23:22,630 --> 00:23:21,039
i do disruptions in the food supply

504
00:23:24,710 --> 00:23:22,640
chain could be disastrous

505
00:23:26,950 --> 00:23:24,720
and they usually occur with little

506
00:23:29,029 --> 00:23:26,960
warning that's why the smartest thing

507
00:23:30,549 --> 00:23:29,039
you can do today is to stockpile

508
00:23:33,590 --> 00:23:30,559
emergency food

509
00:23:34,230 --> 00:23:33,600
water and other essentials i personally

510
00:23:36,789 --> 00:23:34,240
recommend

511
00:23:39,350 --> 00:23:36,799
my patriot supply they're the nation's

512
00:23:41,590 --> 00:23:39,360
largest emergency preparedness company

513
00:23:42,710 --> 00:23:41,600

serving millions of customers for more

514

00:23:45,110 --> 00:23:42,720

than a decade

515

00:23:46,149 --> 00:23:45,120

in fact they're the only source my

516

00:23:49,190 --> 00:23:46,159

family trusts for

517

00:23:52,310 --> 00:23:49,200

our preparedness plan you should too

518

00:23:54,870 --> 00:23:52,320

right now save 20 off a full four week

519

00:23:58,470 --> 00:23:54,880

supply of delicious meals that provide 2

520

00:24:01,430 --> 00:23:58,480

000 calories a day saving 20 helps too

521

00:24:04,390 --> 00:24:01,440

doesn't it especially now so go to

522

00:24:07,669 --> 00:24:04,400

prepare with jimmy.com and get ready

523

00:24:08,950 --> 00:24:07,679

that's prepare with jimmy.com there's no

524

00:24:12,149 --> 00:24:08,960

time to lose

525

00:24:12,159 --> 00:24:17,269

nine out of ten geneticists agree

526

00:24:24,710 --> 00:24:21,029

fade to black is not

527

00:24:26,750 --> 00:24:24,720

your father's radio show on the game

528

00:24:30,950 --> 00:24:26,760

changer radio network and

529

00:24:32,950 --> 00:24:30,960

kgra the planet

530

00:24:37,590 --> 00:24:32,960

hi this is rob reiner from anvil and

531

00:24:40,470 --> 00:24:37,600

you're listening to jimmychurchradio.com

532

00:24:46,920 --> 00:24:40,480

what's up i'm chris what up this is

533

00:24:56,950 --> 00:24:46,930

jimmy church radio

534

00:25:02,549 --> 00:24:58,870

[Music]

535

00:25:04,630 --> 00:25:02,559

all right welcome back paid to black i

536

00:25:07,830 --> 00:25:04,640

am your host jimmy church

537

00:25:09,590 --> 00:25:07,840

tonight professor avi loeb

538

00:25:11,470 --> 00:25:09,600

joins us we're going to be talking about

539

00:25:13,510 --> 00:25:11,480

his new book

540

00:25:16,149 --> 00:25:13,520

extraterrestrial tomorrow night is

541

00:25:19,830 --> 00:25:16,159

another fader night with open lines

542

00:25:22,070 --> 00:25:19,840

all night long tonight

543

00:25:23,630 --> 00:25:22,080

harvard's professor avi lope joins us

544

00:25:26,710 --> 00:25:23,640

we're going to discuss his new book

545

00:25:28,549 --> 00:25:26,720

extraterrestrial and our visitor from

546

00:25:31,669 --> 00:25:28,559

the stars

547

00:25:34,070 --> 00:25:31,679

the first known interstellar object

548

00:25:35,269 --> 00:25:34,080

detected passing through our solar

549

00:25:38,310 --> 00:25:35,279

system avilobe

550

00:25:40,549 --> 00:25:38,320

is a theoretical physicist who works on

551
00:25:41,269 --> 00:25:40,559
astrophysics and cosmology he is the

552
00:25:44,070 --> 00:25:41,279
frank b

553
00:25:45,909 --> 00:25:44,080
bear jr professor of science at harvard

554
00:25:47,350 --> 00:25:45,919
university and was the longest serving

555
00:25:48,230 --> 00:25:47,360
chair of harvard's department of

556
00:25:51,909 --> 00:25:48,240
astronomy

557
00:25:53,950 --> 00:25:51,919
from 2011 to 2020 founding director of

558
00:25:55,269 --> 00:25:53,960
harvard's black hole initiative since

559
00:25:57,669 --> 00:25:55,279
2016

560
00:25:58,710 --> 00:25:57,679
and director of the institute for theory

561
00:26:01,510 --> 00:25:58,720
and computation

562
00:26:04,310 --> 00:26:01,520
since 2007 within the harvard

563
00:26:06,710 --> 00:26:04,320

smithsonian center for astrophysics

564

00:26:08,230 --> 00:26:06,720

tonight we are going to discuss his new

565

00:26:10,830 --> 00:26:08,240

book extraterrestrial

566

00:26:12,149 --> 00:26:10,840

and the links for the book are over at

567

00:26:13,430 --> 00:26:12,159

jimmychurchradio.com

568

00:26:15,669 --> 00:26:13,440

and i would like to welcome for the

569

00:26:19,029 --> 00:26:15,679

first time to fade to black professor

570

00:26:21,510 --> 00:26:19,039

avi loeb avi good evening how are you

571

00:26:22,230 --> 00:26:21,520

i'm doing well thanks for having me now

572

00:26:24,950 --> 00:26:22,240

um

573

00:26:25,750 --> 00:26:24,960

what you get tonight avi you get the

574

00:26:29,669 --> 00:26:25,760

first time

575

00:26:29,679 --> 00:26:37,990

let's get

576

00:26:41,669 --> 00:26:40,230

starts it starts where it ends it ends

577

00:26:45,430 --> 00:26:41,679

but we're gonna end his friends

578

00:26:49,029 --> 00:26:45,440

there you go you ready i'm ready totally

579

00:26:51,669 --> 00:26:49,039

now um i i actually want to do this

580

00:26:52,470 --> 00:26:51,679

i want to start here because you've been

581

00:26:55,909 --> 00:26:52,480

out

582

00:26:57,750 --> 00:26:55,919

doing a lot of interviews and the same

583

00:26:58,549 --> 00:26:57,760

questions come at you time and time

584

00:26:59,669 --> 00:26:58,559

again

585

00:27:02,149 --> 00:26:59,679

this is going to be a little bit

586

00:27:05,029 --> 00:27:02,159

different in that i know my guest

587

00:27:06,230 --> 00:27:05,039

i know the subject and i've been lurking

588

00:27:08,950 --> 00:27:06,240

in the background

589

00:27:11,029 --> 00:27:08,960

with you for a number of years i i

590

00:27:13,750 --> 00:27:11,039

pretty much know what's going on

591

00:27:14,950 --> 00:27:13,760

the book is amazing i've now read it

592

00:27:17,990 --> 00:27:14,960

three times

593

00:27:21,590 --> 00:27:18,000

but i wanna actually back up

594

00:27:22,310 --> 00:27:21,600

and and and start here you write a

595

00:27:25,830 --> 00:27:22,320

chapter

596

00:27:26,950 --> 00:27:25,840

in the book about you growing up on your

597

00:27:29,430 --> 00:27:26,960

family's farm in

598

00:27:31,110 --> 00:27:29,440

israel and i found that part of the book

599

00:27:34,070 --> 00:27:31,120

very compelling

600

00:27:34,789 --> 00:27:34,080

and what we know know what we know now

601
00:27:38,070 --> 00:27:34,799
about you

602
00:27:40,389 --> 00:27:38,080
is one thing but back then in israel

603
00:27:41,590 --> 00:27:40,399
were you looking to the stars were you

604
00:27:45,830 --> 00:27:41,600
thinking about life

605
00:27:49,190 --> 00:27:45,840
in the universe growing up not at all

606
00:27:50,310 --> 00:27:49,200
i was pretty much connected to nature

607
00:27:52,149 --> 00:27:50,320
because

608
00:27:54,070 --> 00:27:52,159
you know in the farm we had the chicken

609
00:27:55,029 --> 00:27:54,080
i used to collect eggs every afternoon

610
00:27:57,110 --> 00:27:55,039
and

611
00:27:58,710 --> 00:27:57,120
on weekends i would go to the hills of

612
00:28:02,149 --> 00:27:58,720
the village and

613
00:28:05,590 --> 00:28:02,159

mainly read philosophy books and

614

00:28:09,269 --> 00:28:05,600

i i enjoyed the relaxing environment

615

00:28:11,750 --> 00:28:09,279

uh and i enjoyed it much more than

616

00:28:14,389 --> 00:28:11,760

uh the company of people you know and i

617

00:28:16,230 --> 00:28:14,399

was not a social animal and

618

00:28:18,549 --> 00:28:16,240

that pretty much shaped me as a

619

00:28:19,190 --> 00:28:18,559

scientist as well you know i pay special

620

00:28:21,990 --> 00:28:19,200

respect

621

00:28:22,389 --> 00:28:22,000

to nature when it gives us evidence and

622

00:28:38,470 --> 00:28:22,399

i

623

00:28:45,269 --> 00:28:38,480

the

624

00:28:47,830 --> 00:28:45,279

niche and where you cannot drill anymore

625

00:28:50,389 --> 00:28:47,840

and you cannot find anything new and

626

00:28:51,510 --> 00:28:50,399

the broader view allows you to look

627

00:28:53,990 --> 00:28:51,520

sideways and

628

00:28:55,269 --> 00:28:54,000

perhaps identify opportunities when

629

00:28:57,269 --> 00:28:55,279

others do not

630

00:28:59,909 --> 00:28:57,279

and i i take advantage of that you know

631

00:29:03,029 --> 00:28:59,919

i think outside the box very often

632

00:29:06,549 --> 00:29:03,039

the uh the other part about this

633

00:29:09,430 --> 00:29:06,559

is when somebody has an interest

634

00:29:11,669 --> 00:29:09,440

expressed in in life in the universe or

635

00:29:13,110 --> 00:29:11,679

the possibility of extraterrestrials

636

00:29:15,990 --> 00:29:13,120

visiting us

637

00:29:17,110 --> 00:29:16,000

there always seems to be a personal

638

00:29:19,830 --> 00:29:17,120

connection that

639

00:29:21,750 --> 00:29:19,840

has driven them here did you ever see

640

00:29:23,909 --> 00:29:21,760

something strange in the sky that you

641

00:29:27,430 --> 00:29:23,919

couldn't explain

642

00:29:29,350 --> 00:29:27,440

not at all one way to interpret

643

00:29:31,430 --> 00:29:29,360

the reason why i'm looking for

644

00:29:33,750 --> 00:29:31,440

intelligence in in the skies because i

645

00:29:37,350 --> 00:29:33,760

don't often find it here on earth

646

00:29:38,549 --> 00:29:37,360

why do you that's a very interesting

647

00:29:41,830 --> 00:29:38,559

point because

648

00:29:44,710 --> 00:29:41,840

in the world of hard sciences there

649

00:29:45,389 --> 00:29:44,720

are two things that are going on one the

650

00:29:47,590 --> 00:29:45,399

search for

651
00:29:49,350 --> 00:29:47,600
extraterrestrial life and the origins of

652
00:29:51,190 --> 00:29:49,360
the universe and what is going on out

653
00:29:53,590 --> 00:29:51,200
there amongst the stars and

654
00:29:56,470 --> 00:29:53,600
and even more fantastical things like

655
00:29:58,870 --> 00:29:56,480
the multiverse and parallel worlds and

656
00:30:00,070 --> 00:29:58,880
and what quantum physics and theoretical

657
00:30:02,710 --> 00:30:00,080
things are

658
00:30:04,310 --> 00:30:02,720
driving that part of science and then

659
00:30:07,510 --> 00:30:04,320
there's the other part

660
00:30:07,990 --> 00:30:07,520
where physicists and the hard sciences

661
00:30:11,110 --> 00:30:08,000
don't want

662
00:30:12,230 --> 00:30:11,120
to go to the other side and and talk

663
00:30:13,990 --> 00:30:12,240

about these things

664

00:30:16,630 --> 00:30:14,000

there's like a line in the sand they

665

00:30:19,510 --> 00:30:16,640

want us to believe in the fantastical

666

00:30:20,870 --> 00:30:19,520

of the multiverse but yet they don't

667

00:30:23,510 --> 00:30:20,880

want to cross the line

668

00:30:24,630 --> 00:30:23,520

you've chosen to cross that line haven't

669

00:30:26,710 --> 00:30:24,640

you

670

00:30:29,029 --> 00:30:26,720

well i wouldn't call it crossing the

671

00:30:31,190 --> 00:30:29,039

line in fact i would argue that

672

00:30:33,230 --> 00:30:31,200

my the the approach i'm advocating is

673

00:30:36,789 --> 00:30:33,240

more conservative more

674

00:30:38,070 --> 00:30:36,799

evidence-based and more loyal to the

675

00:30:40,549 --> 00:30:38,080

tradition of physics

676
00:30:42,470 --> 00:30:40,559
rather than you know speculating about

677
00:30:44,470 --> 00:30:42,480
ideas that can never be tested

678
00:30:46,389 --> 00:30:44,480
like the multiverse you know there is no

679
00:30:47,830 --> 00:30:46,399
experimental test that would show us

680
00:30:51,510 --> 00:30:47,840
that we live in the multiverse

681
00:30:53,990 --> 00:30:51,520
as of now also there is no direct test

682
00:30:56,149 --> 00:30:54,000
of the idea of extra dimensions or

683
00:30:57,990 --> 00:30:56,159
of string theory that a lot of people in

684
00:30:59,750 --> 00:30:58,000
the mainstream are working on

685
00:31:01,269 --> 00:30:59,760
on the other hand in the case of the

686
00:31:03,190 --> 00:31:01,279
object that we are discussing you know

687
00:31:05,190 --> 00:31:03,200
if another one comes along and it looks

688
00:31:08,070 --> 00:31:05,200

as weird as

689

00:31:10,310 --> 00:31:08,080

this object we could in principle send a

690

00:31:12,630 --> 00:31:10,320

spacecraft that will take a photograph

691

00:31:14,070 --> 00:31:12,640

and you know a picture is worth a

692

00:31:15,909 --> 00:31:14,080

thousand words it can tell us the

693

00:31:17,830 --> 00:31:15,919

difference between an artificial object

694

00:31:20,230 --> 00:31:17,840

produced by another civilization and a

695

00:31:23,110 --> 00:31:20,240

natural object like a rock

696

00:31:23,590 --> 00:31:23,120

in my case a picture is worth 66 000

697

00:31:29,190 --> 00:31:23,600

words

698

00:31:30,070 --> 00:31:29,200

have you uh we're going to move on in

699

00:31:33,669 --> 00:31:30,080

just a second

700

00:31:36,789 --> 00:31:33,679

but personally have you uh

701

00:31:39,190 --> 00:31:36,799

gotten any pressure from your

702

00:31:39,990 --> 00:31:39,200

uh physicist friends and partners out

703

00:31:43,190 --> 00:31:40,000

there

704

00:31:45,269 --> 00:31:43,200

about about this book and and expressing

705

00:31:47,350 --> 00:31:45,279

these types of views

706

00:31:48,710 --> 00:31:47,360

uh yeah i mean that the pressure is

707

00:31:51,669 --> 00:31:48,720

psychological you know

708

00:31:52,230 --> 00:31:51,679

people on social media write negative

709

00:31:55,509 --> 00:31:52,240

things and

710

00:31:55,990 --> 00:31:55,519

attack me personally but uh i would much

711

00:31:58,470 --> 00:31:56,000

rather

712

00:31:59,190 --> 00:31:58,480

have them discuss the anomalies of this

713

00:32:01,830 --> 00:31:59,200

object

714

00:32:02,870 --> 00:32:01,840

the reason that i advocate for a

715

00:32:04,950 --> 00:32:02,880

possible

716

00:32:05,990 --> 00:32:04,960

you know technological origin for this

717

00:32:07,750 --> 00:32:06,000

object was

718

00:32:09,029 --> 00:32:07,760

the fact that it didn't look like an

719

00:32:11,269 --> 00:32:09,039

asteroid or a comet

720

00:32:12,950 --> 00:32:11,279

the way we found rocks you know in the

721

00:32:15,909 --> 00:32:12,960

solar system before and

722

00:32:17,350 --> 00:32:15,919

if they want to you know keep their eyes

723

00:32:19,430 --> 00:32:17,360

on the ball and just address

724

00:32:21,190 --> 00:32:19,440

these issues i would be very happy to

725

00:32:23,190 --> 00:32:21,200

engage in a conversation but instead

726

00:32:27,269 --> 00:32:23,200

they're attacking me they're attacking

727

00:32:29,110 --> 00:32:27,279

the actual idea of considering this as a

728

00:32:31,750 --> 00:32:29,120

possibility which i find

729

00:32:33,909 --> 00:32:31,760

a little bit strange given that i'm just

730

00:32:35,029 --> 00:32:33,919

practicing the way science is often done

731

00:32:36,710 --> 00:32:35,039

you have some

732

00:32:38,310 --> 00:32:36,720

something that doesn't quite line up

733

00:32:39,909 --> 00:32:38,320

with what you expected and

734

00:32:41,590 --> 00:32:39,919

therefore you put possibilities on the

735

00:32:42,310 --> 00:32:41,600

table and there is nothing wrong with

736

00:32:44,549 --> 00:32:42,320

that

737

00:32:45,430 --> 00:32:44,559

as long as it motivates you to get more

738

00:32:48,389 --> 00:32:45,440

evidence

739

00:32:49,509 --> 00:32:48,399

now if they say it's always rocks it's

740

00:32:51,909 --> 00:32:49,519

never aliens

741

00:32:52,549 --> 00:32:51,919

you know that's a prejudice and

742

00:32:54,630 --> 00:32:52,559

obviously

743

00:32:56,230 --> 00:32:54,640

we'll never discover wonderful things if

744

00:32:58,549 --> 00:32:56,240

you're not ready to

745

00:32:59,990 --> 00:32:58,559

to search for them and that's exactly

746

00:33:03,430 --> 00:33:00,000

where we stand right now

747

00:33:06,789 --> 00:33:03,440

now there is uh a bunch of for me

748

00:33:07,509 --> 00:33:06,799

uh and and following uh you over the

749

00:33:10,389 --> 00:33:07,519

years

750

00:33:12,389 --> 00:33:10,399

a lot of strange coincidences uh

751
00:33:16,149 --> 00:33:12,399
happened along the way for you

752
00:33:17,430 --> 00:33:16,159
in my opinion um and one of them i want

753
00:33:19,110 --> 00:33:17,440
to talk about yuri

754
00:33:20,710 --> 00:33:19,120
yuri milner of course and stephen

755
00:33:24,630 --> 00:33:20,720
hawking and breakthrough star

756
00:33:27,990 --> 00:33:24,640
shot if that hadn't had happened

757
00:33:32,549 --> 00:33:28,000
uh uh milner and hawking would you

758
00:33:34,310 --> 00:33:32,559
have taken notice of omua moa

759
00:33:36,070 --> 00:33:34,320
i would have taken notice perhaps i

760
00:33:38,870 --> 00:33:36,080
would not have imagined the kind of

761
00:33:41,750 --> 00:33:38,880
technology that could explain it

762
00:33:43,509 --> 00:33:41,760
so i i confess that my imagination is

763
00:33:44,310 --> 00:33:43,519

limited to what i know and what i've

764

00:33:47,110 --> 00:33:44,320

experienced

765

00:33:49,190 --> 00:33:47,120

and that was always true you know we

766

00:33:51,110 --> 00:33:49,200

started searching for radio signals from

767

00:33:53,590 --> 00:33:51,120

space once we developed the radio

768

00:33:56,470 --> 00:33:53,600

technology for communication on earth

769

00:33:57,909 --> 00:33:56,480

and obviously we can only imagine things

770

00:34:00,070 --> 00:33:57,919

we experienced

771

00:34:01,430 --> 00:34:00,080

so it's true for me but that doesn't

772

00:34:03,509 --> 00:34:01,440

mean that

773

00:34:04,870 --> 00:34:03,519

that it's not that you know that the

774

00:34:07,269 --> 00:34:04,880

ways not

775

00:34:08,629 --> 00:34:07,279

slightly just because i was able to

776

00:34:10,869 --> 00:34:08,639

imagine it

777

00:34:12,470 --> 00:34:10,879

so the point of the matter is reality

778

00:34:15,190 --> 00:34:12,480

really doesn't care

779

00:34:16,629 --> 00:34:15,200

if we ignore it if we recognize it it's

780

00:34:18,950 --> 00:34:16,639

whatever it is

781

00:34:21,109 --> 00:34:18,960

and we are trying to figure it out and

782

00:34:23,109 --> 00:34:21,119

when we have possibilities on the table

783

00:34:24,470 --> 00:34:23,119

the best way to proceed is get more

784

00:34:26,950 --> 00:34:24,480

evidence that will

785

00:34:29,270 --> 00:34:26,960

allow us to decide if the interpretation

786

00:34:31,270 --> 00:34:29,280

is correct and that's all i'm advocating

787

00:34:32,790 --> 00:34:31,280

my the only reason we might not get that

788

00:34:34,790 --> 00:34:32,800

evidence is if

789

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

my colleagues continue to argue we know

790

00:34:37,909 --> 00:34:36,720

the answer without even checking

791

00:34:39,990 --> 00:34:37,919

and you know that's what the

792

00:34:41,109 --> 00:34:40,000

philosophers during the days of galileo

793

00:34:42,790 --> 00:34:41,119

did they said

794

00:34:44,710 --> 00:34:42,800

we know that the sun moves around the

795

00:34:46,069 --> 00:34:44,720

earth when we don't want to look through

796

00:34:49,109 --> 00:34:46,079

a telescope

797

00:34:51,510 --> 00:34:49,119

now and the other strange coincidence um

798

00:34:52,550 --> 00:34:51,520

and you write about this in the book and

799

00:34:55,669 --> 00:34:52,560

and i found it

800

00:34:58,230 --> 00:34:55,679

just amazing you go to

801
00:34:59,349 --> 00:34:58,240
hawaii with your family little vacation

802
00:35:02,710 --> 00:34:59,359
a little tour

803
00:35:05,470 --> 00:35:02,720
the observatories and you uh

804
00:35:06,950 --> 00:35:05,480
give a presentation about uh

805
00:35:09,829 --> 00:35:06,960
extraterrestrials

806
00:35:11,910 --> 00:35:09,839
you do that and then three months later

807
00:35:16,390 --> 00:35:11,920
omua happens

808
00:35:18,710 --> 00:35:16,400
and i don't think that's a coincidence

809
00:35:20,790 --> 00:35:18,720
when you look back at that would he was

810
00:35:23,270 --> 00:35:20,800
that the universe reaching out to you in

811
00:35:26,230 --> 00:35:23,280
a strange way

812
00:35:26,870 --> 00:35:26,240
yeah well i you know i i i don't i i

813
00:35:29,109 --> 00:35:26,880

find it

814

00:35:30,230 --> 00:35:29,119

just you know maybe a coincidence i i'm

815

00:35:33,349 --> 00:35:30,240

not sure i mean

816

00:35:35,829 --> 00:35:33,359

things in life happen and um you know i

817

00:35:38,470 --> 00:35:35,839

don't give it a special um

818

00:35:39,589 --> 00:35:38,480

significance and obviously it allowed me

819

00:35:43,589 --> 00:35:39,599

to

820

00:35:45,589 --> 00:35:43,599

look looks like and

821

00:35:47,990 --> 00:35:45,599

and then attracted my attention when the

822

00:35:51,750 --> 00:35:48,000

report came out about um

823

00:35:52,630 --> 00:35:51,760

um but yeah maybe things happen in life

824

00:35:54,630 --> 00:35:52,640

sometimes

825

00:35:55,829 --> 00:35:54,640

for reasons we don't fully understand

826

00:35:58,950 --> 00:35:55,839

now when

827

00:36:02,310 --> 00:35:58,960

omo amuwa and the reports of it first

828

00:36:04,630 --> 00:36:02,320

came out i uh i reported on this not

829

00:36:06,150 --> 00:36:04,640

only here but over on coast to coast am

830

00:36:07,750 --> 00:36:06,160

and i'm reaching out to millions of

831

00:36:11,109 --> 00:36:07,760

people each night right

832

00:36:13,190 --> 00:36:11,119

and i thought something strange is going

833

00:36:16,390 --> 00:36:13,200

on here there was a

834

00:36:19,349 --> 00:36:16,400

for me the one line in the report

835

00:36:20,390 --> 00:36:19,359

about actually two that caught my

836

00:36:23,430 --> 00:36:20,400

attention

837

00:36:27,430 --> 00:36:23,440

which was for me unexplainable was

838

00:36:30,630 --> 00:36:27,440

it took a turn and then hit the gas

839

00:36:34,150 --> 00:36:30,640

and i just thought to myself something

840

00:36:36,230 --> 00:36:34,160

strange is going on here when you

841

00:36:37,430 --> 00:36:36,240

read the same things and looked at that

842

00:36:40,790 --> 00:36:37,440

research in the data

843

00:36:43,750 --> 00:36:40,800

what went through your head well

844

00:36:45,510 --> 00:36:43,760

uh so the data came in pieces it didn't

845

00:36:47,750 --> 00:36:45,520

come all together and

846

00:36:48,870 --> 00:36:47,760

every time an anomaly was reported it

847

00:36:51,670 --> 00:36:48,880

looked as if

848

00:36:52,790 --> 00:36:51,680

you know it's unusual and at some point

849

00:36:55,190 --> 00:36:52,800

you know there was

850

00:36:56,710 --> 00:36:55,200

this straw that they broke the camel's

851

00:36:58,870 --> 00:36:56,720

back and that's when

852

00:37:01,190 --> 00:36:58,880

uh there was this anomaly about it

853

00:37:04,550 --> 00:37:01,200

getting an extra push away from the sun

854

00:37:06,310 --> 00:37:04,560

that cannot be explained because

855

00:37:07,670 --> 00:37:06,320

there was no gas around it so you

856

00:37:09,589 --> 00:37:07,680

couldn't explain it in terms of the

857

00:37:10,310 --> 00:37:09,599

rocket effect like you do in the case of

858

00:37:13,349 --> 00:37:10,320

comets

859

00:37:15,430 --> 00:37:13,359

it certainly was not a comment uh and so

860

00:37:17,670 --> 00:37:15,440

at that point i started suspecting

861

00:37:19,510 --> 00:37:17,680

okay well it's time to summarize all the

862

00:37:20,150 --> 00:37:19,520

weird properties and there were six of

863

00:37:23,030 --> 00:37:20,160

them

864

00:37:25,109 --> 00:37:23,040

that was in june 2018 about eight months

865

00:37:28,150 --> 00:37:25,119

after the object was discovered

866

00:37:29,670 --> 00:37:28,160

uh so at that point i wrote an essay to

867

00:37:32,150 --> 00:37:29,680

scientific american where i

868

00:37:33,349 --> 00:37:32,160

summarized all the weird properties and

869

00:37:35,109 --> 00:37:33,359

i said well maybe

870

00:37:37,349 --> 00:37:35,119

it implies that it's of artificial

871

00:37:39,430 --> 00:37:37,359

origin and then a few months later i

872

00:37:42,310 --> 00:37:39,440

wrote a scientific paper

873

00:37:44,950 --> 00:37:42,320

you know with equations and and the

874

00:37:47,589 --> 00:37:44,960

numbers that

875

00:37:48,550 --> 00:37:47,599

argued that indeed you know it may be a

876
00:37:51,030 --> 00:37:48,560
light sale

877
00:37:52,790 --> 00:37:51,040
some artificial object and not

878
00:37:54,470 --> 00:37:52,800
necessarily a rock

879
00:37:56,550 --> 00:37:54,480
and you know the paper was accepted for

880
00:37:58,230 --> 00:37:56,560
publication within a few days which is

881
00:38:00,790 --> 00:37:58,240
quite unusual and

882
00:38:03,270 --> 00:38:00,800
then a couple of bloggers wrote about it

883
00:38:05,990 --> 00:38:03,280
and it became viral on

884
00:38:07,510 --> 00:38:06,000
in the media and i didn't even have a

885
00:38:09,270 --> 00:38:07,520
press release about it

886
00:38:10,710 --> 00:38:09,280
and also the same thing happened with my

887
00:38:13,270 --> 00:38:10,720
book once um

888
00:38:14,550 --> 00:38:13,280

uh the new york post put out the story

889

00:38:18,390 --> 00:38:14,560

on january

890

00:38:20,790 --> 00:38:18,400

3rd 2021 uh you know i

891

00:38:22,630 --> 00:38:20,800

every day after that i had the

892

00:38:26,230 --> 00:38:22,640

interviews from 8 a.m till

893

00:38:26,630 --> 00:38:26,240

7 00 p.m uh about 350 of them over the

894

00:38:29,750 --> 00:38:26,640

past

895

00:38:32,870 --> 00:38:29,760

couple of months and i

896

00:38:34,950 --> 00:38:32,880

i viewed it as a a platform as

897

00:38:36,470 --> 00:38:34,960

an opportunity to convey my message

898

00:38:39,270 --> 00:38:36,480

about the current

899

00:38:41,430 --> 00:38:39,280

uh well first of all that the umuamua

900

00:38:43,910 --> 00:38:41,440

might be the first

901
00:38:45,510 --> 00:38:43,920
artifact the you know technological

902
00:38:46,630 --> 00:38:45,520
object that we have seen from another

903
00:38:49,270 --> 00:38:46,640
civilization

904
00:38:51,270 --> 00:38:49,280
but also more importantly about how the

905
00:38:53,030 --> 00:38:51,280
current scientific culture doesn't have

906
00:38:55,829 --> 00:38:53,040
its heart in the right place

907
00:38:57,190 --> 00:38:55,839
given what the public's interest now one

908
00:39:00,950 --> 00:38:57,200
of the things

909
00:39:04,310 --> 00:39:00,960
uh about to me

910
00:39:07,990 --> 00:39:04,320
uh that i think was a letdown is

911
00:39:11,030 --> 00:39:08,000
it we didn't know anything until it was

912
00:39:14,230 --> 00:39:11,040
past us we didn't

913
00:39:17,589 --> 00:39:14,240

have the opportunity to photograph it

914

00:39:19,829 --> 00:39:17,599

image it and and and track it earlier

915

00:39:21,270 --> 00:39:19,839

um what information could we have gotten

916

00:39:24,470 --> 00:39:21,280

if we had jumped on this

917

00:39:27,910 --> 00:39:24,480

uh you know two months earlier

918

00:39:30,150 --> 00:39:27,920

yes exactly so um you know and that's a

919

00:39:32,069 --> 00:39:30,160

lesson for the future because

920

00:39:34,069 --> 00:39:32,079

you know we found it after a few years

921

00:39:35,349 --> 00:39:34,079

of serving the sky with the pan stars

922

00:39:38,390 --> 00:39:35,359

observatory

923

00:39:40,150 --> 00:39:38,400

and we're likely to find more after a

924

00:39:42,390 --> 00:39:40,160

similar amount of time and

925

00:39:44,390 --> 00:39:42,400

in fact there would be the vera rubin

926

00:39:45,030 --> 00:39:44,400

observatory much more sensitive than pan

927

00:39:46,790 --> 00:39:45,040

stars

928

00:39:48,150 --> 00:39:46,800

starting operations in less than three

929

00:39:51,270 --> 00:39:48,160

years and it could

930

00:39:53,430 --> 00:39:51,280

discover a new object like it uh

931

00:39:55,990 --> 00:39:53,440

you know every month and so the lesson

932

00:39:59,109 --> 00:39:56,000

for those future objects that would look

933

00:40:02,550 --> 00:39:59,119

as weird as um was uh

934

00:40:05,430 --> 00:40:02,560

is that we should if we get an alert

935

00:40:07,990 --> 00:40:05,440

a year in advance then we could send a

936

00:40:10,630 --> 00:40:08,000

spacecraft equipped with a camera that

937

00:40:11,109 --> 00:40:10,640

will pass close to them will intercept

938

00:40:14,870 --> 00:40:11,119

their

939

00:40:18,390 --> 00:40:14,880

photograph

940

00:40:20,870 --> 00:40:18,400

and then that would allow us to

941

00:40:23,030 --> 00:40:20,880

tell directly and i don't think anyone

942

00:40:25,109 --> 00:40:23,040

would argue with a photograph

943

00:40:26,309 --> 00:40:25,119

whether it's a natural object or an

944

00:40:28,069 --> 00:40:26,319

artificial object

945

00:40:29,510 --> 00:40:28,079

and if it isn't one of them is

946

00:40:31,430 --> 00:40:29,520

artificial you know it's just like

947

00:40:33,030 --> 00:40:31,440

looking for plastic bottles on the beach

948

00:40:34,309 --> 00:40:33,040

you know most of the time you find rocks

949

00:40:35,349 --> 00:40:34,319

but every now and then you find a

950

00:40:38,069 --> 00:40:35,359

plastic bottle

951
00:40:39,990 --> 00:40:38,079
so if we do find an artificial object

952
00:40:42,470 --> 00:40:40,000
you know the next question is can we

953
00:40:43,990 --> 00:40:42,480
put our hands on it can can we land on

954
00:40:46,390 --> 00:40:44,000
it just the way we are

955
00:40:47,270 --> 00:40:46,400
you know we're landing on asteroids um

956
00:40:49,829 --> 00:40:47,280
and

957
00:40:52,069 --> 00:40:49,839
you know then we may be able to read off

958
00:40:55,910 --> 00:40:52,079
the label that says made on planet

959
00:40:57,430 --> 00:40:55,920
x or maybe we could try to import the

960
00:41:00,150 --> 00:40:57,440
technology that is

961
00:41:01,990 --> 00:41:00,160
on it uh if that technology is far more

962
00:41:04,710 --> 00:41:02,000
advanced than what we have

963
00:41:06,309 --> 00:41:04,720

here on earth it would it would be it's

964

00:41:08,069 --> 00:41:06,319

a learning experience it would allow us

965

00:41:11,270 --> 00:41:08,079

to

966

00:41:12,950 --> 00:41:11,280

you know jump start our technological

967

00:41:14,710 --> 00:41:12,960

advance instead of

968

00:41:16,390 --> 00:41:14,720

waiting a million years to invent it

969

00:41:18,829 --> 00:41:16,400

ourselves now one

970

00:41:19,990 --> 00:41:18,839

uh another thing so fascinating about

971

00:41:22,309 --> 00:41:20,000

omua

972

00:41:23,750 --> 00:41:22,319

is we know about pioneer 10 and 11 and

973

00:41:27,430 --> 00:41:23,760

voyager 1 and 2

974

00:41:30,790 --> 00:41:27,440

and new horizons where years and years

975

00:41:33,430 --> 00:41:30,800

and years are spent with these craft

976
00:41:34,150 --> 00:41:33,440
to exit our solar system and head into

977
00:41:37,510 --> 00:41:34,160
interstellar

978
00:41:40,550 --> 00:41:37,520
space omuamua came and went

979
00:41:41,190 --> 00:41:40,560
quickly how fast can we talk about the

980
00:41:44,790 --> 00:41:41,200
speed

981
00:41:49,349 --> 00:41:44,800
of omua yeah so

982
00:41:52,950 --> 00:41:49,359
the speed reflected actually

983
00:41:56,150 --> 00:41:52,960
the motion of the solar system in in

984
00:41:57,910 --> 00:41:56,160
its environment uh there is the this

985
00:41:59,829 --> 00:41:57,920
frame of reference which is called the

986
00:42:02,069 --> 00:41:59,839
local standard of rest which is the

987
00:42:04,390 --> 00:42:02,079
frame that you get to when you average

988
00:42:06,230 --> 00:42:04,400

over the random motions of all the stars

989

00:42:08,710 --> 00:42:06,240

in the vicinity of the sun

990

00:42:09,910 --> 00:42:08,720

and each star is moving you can think of

991

00:42:12,870 --> 00:42:09,920

this is

992

00:42:14,309 --> 00:42:12,880

as the local parking lot of the milky

993

00:42:17,510 --> 00:42:14,319

way galaxy

994

00:42:18,630 --> 00:42:17,520

and the omoamwa was at rest in the local

995

00:42:20,870 --> 00:42:18,640

standard of rest

996

00:42:23,430 --> 00:42:20,880

it was sort of parked there just like a

997

00:42:25,829 --> 00:42:23,440

beauty on the surface of the ocean

998

00:42:27,990 --> 00:42:25,839

and then the solar system bumped into it

999

00:42:29,750 --> 00:42:28,000

just like a giant ship

1000

00:42:31,510 --> 00:42:29,760

because of its motion relative to the

1001
00:42:35,910 --> 00:42:31,520
local standard of rest

1002
00:42:39,430 --> 00:42:35,920
and only one in 500 stars

1003
00:42:42,309 --> 00:42:39,440
is so much uh at rest as um

1004
00:42:43,750 --> 00:42:42,319
was in that frame so it was very unusual

1005
00:42:45,510 --> 00:42:43,760
it wasn't really moving

1006
00:42:46,790 --> 00:42:45,520
in the local standard of rest and we

1007
00:42:49,030 --> 00:42:46,800
bumped into it

1008
00:42:50,550 --> 00:42:49,040
you know and that raises the question of

1009
00:42:52,870 --> 00:42:50,560
why you know would

1010
00:42:54,069 --> 00:42:52,880
we find the first object to be so

1011
00:42:56,790 --> 00:42:54,079
unusual

1012
00:42:59,030 --> 00:42:56,800
it doesn't move like a typical star does

1013
00:43:02,550 --> 00:42:59,040

relative to the local standard of rest

1014

00:43:05,829 --> 00:43:02,560

one possibility is that you know it's a

1015

00:43:09,589 --> 00:43:05,839

a member of a population of objects that

1016

00:43:12,470 --> 00:43:09,599

is set on a grid you know and

1017

00:43:13,990 --> 00:43:12,480

it's useful for navigation through

1018

00:43:15,829 --> 00:43:14,000

interstellar space if you want to know

1019

00:43:17,030 --> 00:43:15,839

your coordinates you do it relative to

1020

00:43:19,030 --> 00:43:17,040

these objects

1021

00:43:20,069 --> 00:43:19,040

that are placed at rest in the local

1022

00:43:21,990 --> 00:43:20,079

standard for us that

1023

00:43:23,670 --> 00:43:22,000

that's one possibility another

1024

00:43:26,630 --> 00:43:23,680

possibility is that it's

1025

00:43:27,030 --> 00:43:26,640

a member of an array of objects used for

1026

00:43:29,829 --> 00:43:27,040

uh

1027

00:43:31,750 --> 00:43:29,839

communication as relay stations you know

1028

00:43:33,349 --> 00:43:31,760

but we we don't really know

1029

00:43:35,030 --> 00:43:33,359

at this point because we had only one

1030

00:43:37,589 --> 00:43:35,040

encounter like that

1031

00:43:39,109 --> 00:43:37,599

we we need to wait until we find more of

1032

00:43:42,309 --> 00:43:39,119

objects of the same class

1033

00:43:45,190 --> 00:43:42,319

and it just raises questions and

1034

00:43:46,950 --> 00:43:45,200

and possibilities now uh and the speed

1035

00:43:49,910 --> 00:43:46,960

that it traveled through our solar

1036

00:43:52,150 --> 00:43:49,920

system and to leave us so quickly

1037

00:43:53,510 --> 00:43:52,160

what what does that say to you about the

1038

00:43:56,870 --> 00:43:53,520

sheer

1039

00:43:58,950 --> 00:43:56,880

quickness of it all well it's just

1040

00:44:00,790 --> 00:43:58,960

it's just the speed that the sun moves

1041

00:44:01,589 --> 00:44:00,800

relative to the local standard of rest

1042

00:44:03,990 --> 00:44:01,599

because

1043

00:44:05,589 --> 00:44:04,000

this object was at rest just like a

1044

00:44:06,710 --> 00:44:05,599

beauty on the surface of the ocean and

1045

00:44:09,270 --> 00:44:06,720

we bumped into it

1046

00:44:11,349 --> 00:44:09,280

simply because we were moving so it

1047

00:44:13,349 --> 00:44:11,359

itself was not moving

1048

00:44:14,550 --> 00:44:13,359

relative to the local standard of rest

1049

00:44:16,710 --> 00:44:14,560

and then

1050

00:44:18,630 --> 00:44:16,720

uh that's the reason that it was moving

1051
00:44:20,470 --> 00:44:18,640
fast relative to us because the sun is

1052
00:44:22,550 --> 00:44:20,480
moving very fast relative to the local

1053
00:44:25,030 --> 00:44:22,560
standard of rest and you know we just

1054
00:44:28,230 --> 00:44:25,040
bumped into it and we gave it a kick

1055
00:44:31,270 --> 00:44:28,240
uh through our motion now

1056
00:44:34,230 --> 00:44:31,280
uh what about the increase in speed

1057
00:44:34,790 --> 00:44:34,240
that was something that you addressed uh

1058
00:44:37,670 --> 00:44:34,800
uh

1059
00:44:39,589 --> 00:44:37,680
pretty quickly where other astronomers

1060
00:44:41,510 --> 00:44:39,599
were trying to

1061
00:44:43,589 --> 00:44:41,520
label it as a comet that there was

1062
00:44:45,510 --> 00:44:43,599
something else that was pushing it

1063
00:44:46,790 --> 00:44:45,520

uh and that didn't seem to be the case

1064

00:44:50,150 --> 00:44:46,800

of course it was

1065

00:44:51,990 --> 00:44:50,160

identified originally as uh as an a

1066

00:44:53,510 --> 00:44:52,000

i believe right and then it got the c

1067

00:44:56,550 --> 00:44:53,520

classification

1068

00:44:59,349 --> 00:44:56,560

and then finally the the one i

1069

00:45:01,030 --> 00:44:59,359

interstellar classification in the end

1070

00:45:02,150 --> 00:45:01,040

yeah initially people thought it's a

1071

00:45:04,470 --> 00:45:02,160

comet but

1072

00:45:05,430 --> 00:45:04,480

there was no commentary tail around it

1073

00:45:07,190 --> 00:45:05,440

visually

1074

00:45:08,550 --> 00:45:07,200

and then the spitzer space telescope

1075

00:45:11,750 --> 00:45:08,560

searched uh for

1076

00:45:13,030 --> 00:45:11,760

any traces of carbon-based molecules or

1077

00:45:15,589 --> 00:45:13,040

dust around it

1078

00:45:16,950 --> 00:45:15,599

didn't find anything to very deep limits

1079

00:45:19,670 --> 00:45:16,960

you know so

1080

00:45:21,910 --> 00:45:19,680

in order for the push of this object to

1081

00:45:23,589 --> 00:45:21,920

be generated by the rocket effect by

1082

00:45:26,550 --> 00:45:23,599

evaporating gases

1083

00:45:28,710 --> 00:45:26,560

you needed about 10 percent of the mass

1084

00:45:30,150 --> 00:45:28,720

of this object to evaporate and we would

1085

00:45:32,790 --> 00:45:30,160

have seen it easily

1086

00:45:34,309 --> 00:45:32,800

given what we know about comets and we

1087

00:45:36,870 --> 00:45:34,319

haven't seen anything

1088

00:45:38,630 --> 00:45:36,880

so clearly it was not a comet of the

1089

00:45:41,109 --> 00:45:38,640

type that we are used to

1090

00:45:42,870 --> 00:45:41,119

uh you can always imagine something that

1091

00:45:46,069 --> 00:45:42,880

we have never seen before like

1092

00:45:48,870 --> 00:45:46,079

a comet made of pure hydrogen

1093

00:45:50,309 --> 00:45:48,880

someone suggested that and the problem

1094

00:45:52,550 --> 00:45:50,319

with that is

1095

00:45:54,069 --> 00:45:52,560

uh you know obviously i mean hydrogen is

1096

00:45:57,510 --> 00:45:54,079

transparent so you might miss

1097

00:45:59,990 --> 00:45:57,520

the cometary tail but such a hydrogen

1098

00:46:02,069 --> 00:46:00,000

iceberg the size of a football field

1099

00:46:03,589 --> 00:46:02,079

would get evaporated very quickly by

1100

00:46:06,069 --> 00:46:03,599

absorbing starlight

1101
00:46:07,030 --> 00:46:06,079
and wouldn't survive the journey so we

1102
00:46:09,910 --> 00:46:07,040
showed that in a

1103
00:46:10,550 --> 00:46:09,920
paper that we wrote afterwards and so

1104
00:46:12,550 --> 00:46:10,560
you know

1105
00:46:14,309 --> 00:46:12,560
people suggested things that we've never

1106
00:46:16,790 --> 00:46:14,319
seen before but

1107
00:46:17,829 --> 00:46:16,800
each and every one of them had problems

1108
00:46:20,550 --> 00:46:17,839
another one was

1109
00:46:22,950 --> 00:46:20,560
maybe it's a dust bunny a collection of

1110
00:46:25,750 --> 00:46:22,960
dust particles that are loosely bound

1111
00:46:27,190 --> 00:46:25,760
just like you know the dust bunnies you

1112
00:46:29,349 --> 00:46:27,200
find at home

1113
00:46:30,950 --> 00:46:29,359

and the the idea was maybe it's a

1114

00:46:33,430 --> 00:46:30,960

hundred times less dense than

1115

00:46:35,990 --> 00:46:33,440

air so it's very lightweight sort of

1116

00:46:38,309 --> 00:46:36,000

like a fluffy cloud of dust

1117

00:46:39,750 --> 00:46:38,319

that can be easily pushed by reflecting

1118

00:46:41,510 --> 00:46:39,760

sunlight

1119

00:46:43,030 --> 00:46:41,520

but it needs to be a hundred times less

1120

00:46:44,950 --> 00:46:43,040

dense than air

1121

00:46:46,630 --> 00:46:44,960

and then when it gets close to the sun

1122

00:46:47,589 --> 00:46:46,640

it would get heated by hundreds of

1123

00:46:49,750 --> 00:46:47,599

degrees

1124

00:46:51,910 --> 00:46:49,760

and it's just hard for me to see how it

1125

00:46:54,550 --> 00:46:51,920

would maintain its integrity

1126
00:46:55,510 --> 00:46:54,560
uh given that it's heated by hundreds of

1127
00:46:57,270 --> 00:46:55,520
degrees

1128
00:46:59,109 --> 00:46:57,280
and the the fact that it has very low

1129
00:47:02,550 --> 00:46:59,119
material strength

1130
00:47:05,589 --> 00:47:02,560
so um you know all these proposals had

1131
00:47:08,710 --> 00:47:05,599
significant flows the other thing is uh

1132
00:47:11,430 --> 00:47:08,720
this object was most likely

1133
00:47:13,109 --> 00:47:11,440
pancake shaped um based on the

1134
00:47:13,910 --> 00:47:13,119
reflection of sunlight as it was

1135
00:47:15,750 --> 00:47:13,920
tumbling

1136
00:47:17,030 --> 00:47:15,760
so there was another suggestion maybe

1137
00:47:19,990 --> 00:47:17,040
it's just a piece

1138
00:47:21,430 --> 00:47:20,000

a shrapnel a shred of a bigger object

1139

00:47:23,829 --> 00:47:21,440

that was

1140

00:47:25,750 --> 00:47:23,839

disrupted by the tidal force as it

1141

00:47:27,589 --> 00:47:25,760

passed close to a star

1142

00:47:30,150 --> 00:47:27,599

and the problem with that is usually you

1143

00:47:32,069 --> 00:47:30,160

get this shrapnel to be elongated cigar

1144

00:47:33,589 --> 00:47:32,079

shaped and not pancake shape

1145

00:47:36,309 --> 00:47:33,599

so all of the possibilities that were

1146

00:47:38,870 --> 00:47:36,319

put on the table as an alternative to

1147

00:47:39,829 --> 00:47:38,880

a light sail or an artificial origin

1148

00:47:43,270 --> 00:47:39,839

they also

1149

00:47:45,510 --> 00:47:43,280

had the major flows and you know that's

1150

00:47:48,470 --> 00:47:45,520

why i wrote my book and i

1151
00:47:50,870 --> 00:47:48,480
suggest that we consider the artificial

1152
00:47:54,069 --> 00:47:50,880
origin as a viable possibility

1153
00:47:56,309 --> 00:47:54,079
our guest tonight professor avi loeb i

1154
00:47:57,109 --> 00:47:56,319
am your host jimmy church this is fade

1155
00:48:00,549 --> 00:47:57,119
to black

1156
00:48:02,390 --> 00:48:00,559
on the game changer network and kgra

1157
00:48:07,450 --> 00:48:02,400
the planet more with avi after this

1158
00:48:19,990 --> 00:48:07,460
short break stay with us

1159
00:48:22,309 --> 00:48:20,000
[Music]

1160
00:48:24,470 --> 00:48:22,319
this is faded black with jimmy church on

1161
00:48:29,430 --> 00:48:24,480
the game changer radio network

1162
00:48:31,990 --> 00:48:29,440
and kgra the global radio alliance

1163
00:48:33,030 --> 00:48:32,000

this is kgra digital broadcasting

1164

00:48:37,430 --> 00:48:33,040

station

1165

00:48:39,430 --> 00:48:37,440

salt lake city utah van buren arkansas

1166

00:48:41,109 --> 00:48:39,440

hello my name is billy carson and i'm a

1167

00:48:43,270 --> 00:48:41,119

best-selling author and the founder of

1168

00:48:45,270 --> 00:48:43,280

forbidden knowledge dot tv together with

1169

00:48:46,710 --> 00:48:45,280

my team we have built a all new contest

1170

00:48:48,309 --> 00:48:46,720

streaming tv platform

1171

00:48:50,230 --> 00:48:48,319

designed with every family member in

1172

00:48:51,510 --> 00:48:50,240

mind if you have ever wanted to travel

1173

00:48:53,030 --> 00:48:51,520

the world and attend lectures and

1174

00:48:54,069 --> 00:48:53,040

workshops from your favorite speakers

1175

00:48:56,790 --> 00:48:54,079

but weren't able to

1176

00:48:57,430 --> 00:48:56,800

look no further forbidden knowledge dot

1177

00:48:59,109 --> 00:48:57,440

tv

1178

00:49:01,030 --> 00:48:59,119

there are dozens of workshops and

1179

00:49:03,109 --> 00:49:01,040

lectures from speakers you know and love

1180

00:49:05,030 --> 00:49:03,119

we have also included amazing categories

1181

00:49:06,790 --> 00:49:05,040

to assure that your consciousness is

1182

00:49:07,430 --> 00:49:06,800

entertained and elevating on a daily

1183

00:49:09,589 --> 00:49:07,440

basis

1184

00:49:10,710 --> 00:49:09,599

amazing interviews ancient history

1185

00:49:12,790 --> 00:49:10,720

ascension knowledge

1186

00:49:13,910 --> 00:49:12,800

wisdom teachings documentaries

1187

00:49:16,150 --> 00:49:13,920

conspiracies

1188

00:49:18,069 --> 00:49:16,160

mysteries health and fitness conscious

1189

00:49:20,230 --> 00:49:18,079

cooking meditations finance

1190

00:49:22,630 --> 00:49:20,240

yoga and so much more to start your free

1191

00:49:25,270 --> 00:49:22,640

trial on any mobile device or computer

1192

00:49:25,829 --> 00:49:25,280

surf to forbidden knowledge dot tv

1193

00:49:27,829 --> 00:49:25,839

that's

1194

00:49:30,150 --> 00:49:27,839

forbidden knowledge with the number four

1195

00:49:35,430 --> 00:49:30,160

forbidden knowledge dot tv

1196

00:49:41,030 --> 00:49:38,630

listen i know and you know that you've

1197

00:49:43,190 --> 00:49:41,040

always wanted your first crystal skull

1198

00:49:45,190 --> 00:49:43,200

or maybe you're a collector just like me

1199

00:49:47,829 --> 00:49:45,200

but you just don't know where to go

1200

00:49:50,430 --> 00:49:47,839

to find the real thing then i met

1201

00:49:51,829 --> 00:49:50,440

carolyn ford over at einstein the

1202

00:49:54,309 --> 00:49:51,839

crystalskull.com

1203

00:49:56,309 --> 00:49:54,319

carolyn is the guardian of einstein one

1204

00:49:57,750 --> 00:49:56,319

of the most respected ancient crystal

1205

00:49:59,510 --> 00:49:57,760

skulls in the world

1206

00:50:01,349 --> 00:49:59,520

all of her unique skulls have been

1207

00:50:03,430 --> 00:50:01,359

imprinted sitting with einstein

1208

00:50:05,990 --> 00:50:03,440

in his sacred lodge and are carved from

1209

00:50:08,150 --> 00:50:06,000

the finest gemstone and materials

1210

00:50:10,230 --> 00:50:08,160

imprinting is the process of receiving

1211

00:50:13,270 --> 00:50:10,240

the ancient wisdom from the master

1212

00:50:15,670 --> 00:50:13,280

skull or master computer einstein

1213

00:50:17,430 --> 00:50:15,680

the ancient crystal skull to see

1214

00:50:19,430 --> 00:50:17,440

carolyn's current collection of crystal

1215

00:50:22,309 --> 00:50:19,440

skulls just visit her store at

1216

00:50:24,309 --> 00:50:22,319

einstein the crystal skull dot com click

1217

00:50:26,790 --> 00:50:24,319

on the banner over on our site

1218

00:50:28,790 --> 00:50:26,800

don't forget to use the promo code jimmy

1219

00:50:31,270 --> 00:50:28,800

at checkout to receive 10

1220

00:50:31,990 --> 00:50:31,280

off of your order today that's promo

1221

00:50:34,630 --> 00:50:32,000

code

1222

00:50:35,910 --> 00:50:34,640

jimmy finding your first or next crystal

1223

00:50:41,349 --> 00:50:35,920

skull is easy

1224

00:50:43,510 --> 00:50:41,359

just visit einstein the crystalskull.com

1225

00:50:44,390 --> 00:50:43,520

when you take the beans from central

1226
00:50:46,710 --> 00:50:44,400
america

1227
00:50:47,430 --> 00:50:46,720
with dashes of indonesian and african

1228
00:50:49,670 --> 00:50:47,440
mixed in

1229
00:50:51,030 --> 00:50:49,680
and then roasted to the dark side of

1230
00:50:54,230 --> 00:50:51,040
fade to black

1231
00:50:57,190 --> 00:50:54,240
you create the ultimate brew of fringe

1232
00:50:58,870 --> 00:50:57,200
introducing the fade to black blend from

1233
00:51:01,910 --> 00:50:58,880
river moon coffee

1234
00:51:03,990 --> 00:51:01,920
yes river moon's darkest customized

1235
00:51:07,190 --> 00:51:04,000
roast was created for the love

1236
00:51:09,990 --> 00:51:07,200
of fade to black the alchemy of

1237
00:51:13,270 --> 00:51:10,000
masterful roasting and smoking the beans

1238
00:51:16,309 --> 00:51:13,280

is in every sip of this full-bodied dark

1239

00:51:18,870 --> 00:51:16,319

java i need my coffee doc

1240

00:51:19,829 --> 00:51:18,880

deep with distinct bittersweet chocolate

1241

00:51:22,390 --> 00:51:19,839

highlights

1242

00:51:24,390 --> 00:51:22,400

just like the bunker leaning further

1243

00:51:27,030 --> 00:51:24,400

into the darkness of the roast

1244

00:51:27,910 --> 00:51:27,040

is fade to black blend from river moon

1245

00:51:29,630 --> 00:51:27,920

coffee

1246

00:51:31,670 --> 00:51:29,640

just click on the banner at

1247

00:51:32,069 --> 00:51:31,680

jimmychurchradio.com and use the promo

1248

00:51:36,160 --> 00:51:32,079

code

1249

00:51:46,309 --> 00:51:36,170

f2b blend for 15 off of your

1250

00:51:49,430 --> 00:51:48,390

and you're listening to my good friend

1251
00:51:51,750 --> 00:51:49,440
jimmy church

1252
00:51:54,630 --> 00:51:51,760
fade to black on the game changer

1253
00:51:57,030 --> 00:51:54,640
network and the kgra digital broadcast

1254
00:52:00,190 --> 00:51:57,040
station

1255
00:52:01,349 --> 00:52:00,200
this is toby kebbel you're listening to

1256
00:52:04,390 --> 00:52:01,359
jimmychurchradio.com

1257
00:52:05,510 --> 00:52:04,400
don't hurt me jimmy i'm only little hey

1258
00:52:07,349 --> 00:52:05,520
i'm adrian grenier

1259
00:52:11,829 --> 00:52:07,359
and this is ari gold we're the honey

1260
00:52:15,829 --> 00:52:14,230
hey i'm adrian grenier and i'm ari gold

1261
00:52:18,150 --> 00:52:15,839
we're the honey brothers

1262
00:52:19,670 --> 00:52:18,160
and you're listening to jimmy church a

1263
00:52:21,349 --> 00:52:19,680

revolution

1264

00:52:23,349 --> 00:52:21,359

this is jimmy church of fade to black

1265

00:52:25,670 --> 00:52:23,359

and you can become an official fate or

1266

00:52:29,910 --> 00:52:25,680

not by just going to our membership

1267

00:52:31,990 --> 00:52:29,920

section at jimmychurchradio.com

1268

00:52:33,430 --> 00:52:32,000

hello this is serena wright taylor from

1269

00:52:35,349 --> 00:52:33,440

conscious life expo

1270

00:52:36,470 --> 00:52:35,359

and you're listening to fade to black

1271

00:52:38,710 --> 00:52:36,480

with jimmy church

1272

00:52:42,230 --> 00:52:38,720

who holds the lucky pony record for the

1273

00:52:45,670 --> 00:52:42,240

best astrological chart since 1963.

1274

00:52:46,630 --> 00:52:45,680

true story this is micah hanks of the

1275

00:52:48,309 --> 00:52:46,640

ghrelian report

1276
00:52:50,390 --> 00:52:48,319
and you're listening to jimmy church on

1277
00:52:51,910 --> 00:52:50,400
fade to black across the globe on the

1278
00:52:55,410 --> 00:52:51,920
game changer radio network

1279
00:52:58,829 --> 00:52:55,420
and the one and only kgra radio the

1280
00:53:16,069 --> 00:52:58,839
[Music]

1281
00:53:22,549 --> 00:53:19,190
all right welcome back fade to black

1282
00:53:25,270 --> 00:53:22,559
i am your host jimmy church tonight

1283
00:53:26,270 --> 00:53:25,280
professor avi lope and we are discussing

1284
00:53:28,150 --> 00:53:26,280
his new book

1285
00:53:29,270 --> 00:53:28,160
extraterrestrial the first sign of

1286
00:53:31,990 --> 00:53:29,280
intelligent life

1287
00:53:33,910 --> 00:53:32,000
beyond earth the links for the book are

1288
00:53:35,670 --> 00:53:33,920

over at jimmychurchradio.com

1289

00:53:37,990 --> 00:53:35,680

check it out i have now read it three

1290

00:53:41,589 --> 00:53:38,000

times i'm headed to my fourth

1291

00:53:42,549 --> 00:53:41,599

now um uh uh professor loeb before the

1292

00:53:45,190 --> 00:53:42,559

break

1293

00:53:47,430 --> 00:53:45,200

uh as we're discussing the uh the object

1294

00:53:50,549 --> 00:53:47,440

itself o muammua

1295

00:53:54,069 --> 00:53:50,559

um you brought up in your papers

1296

00:53:57,990 --> 00:53:54,079

the possibility of this having

1297

00:54:01,109 --> 00:53:58,000

a light sail construct to it

1298

00:54:02,790 --> 00:54:01,119

um i i mentioned uh

1299

00:54:05,589 --> 00:54:02,800

yuri mill learned stephen hawking

1300

00:54:09,030 --> 00:54:05,599

earlier and their project of course

1301

00:54:11,670 --> 00:54:09,040

um is that what made you think

1302

00:54:14,230 --> 00:54:11,680

uh light sail you know because of the

1303

00:54:16,870 --> 00:54:14,240

other research that you're working on

1304

00:54:17,910 --> 00:54:16,880

well no first of all um i wanted to

1305

00:54:20,790 --> 00:54:17,920

explain the

1306

00:54:22,309 --> 00:54:20,800

um push that was exhibited by this

1307

00:54:24,630 --> 00:54:22,319

object

1308

00:54:26,470 --> 00:54:24,640

the force that was pushing it declined

1309

00:54:29,510 --> 00:54:26,480

inversely with distance squared

1310

00:54:31,829 --> 00:54:29,520

and um and and it couldn't be due to the

1311

00:54:33,589 --> 00:54:31,839

rocket effect from evaporating gases so

1312

00:54:36,150 --> 00:54:33,599

the question is what is doing

1313

00:54:37,990 --> 00:54:36,160

what is doing this effect and the only

1314

00:54:41,510 --> 00:54:38,000

thing that came to mind is

1315

00:54:43,589 --> 00:54:41,520

a reflection of sunlight and

1316

00:54:44,710 --> 00:54:43,599

in fact as it turns out in retrospect

1317

00:54:47,109 --> 00:54:44,720

you know in september

1318

00:54:48,870 --> 00:54:47,119

2020 there was another object that

1319

00:54:51,670 --> 00:54:48,880

exhibited an excess push

1320

00:54:53,829 --> 00:54:51,680

away from the sun by reflecting sunlight

1321

00:54:55,910 --> 00:54:53,839

and there was no cometary tail and

1322

00:54:58,390 --> 00:54:55,920

this object was also discovered by pan

1323

00:55:01,349 --> 00:54:58,400

stars it was given the astronomical name

1324

00:55:02,549 --> 00:55:01,359

2020 so and then the astronomers

1325

00:55:06,190 --> 00:55:02,559

realized that

1326

00:55:07,430 --> 00:55:06,200

oh it's actually a rocket booster from a

1327

00:55:11,030 --> 00:55:07,440

1966

1328

00:55:14,390 --> 00:55:11,040

launch uh uh a mission called

1329

00:55:16,710 --> 00:55:14,400

lunar lander surveyor ii and um

1330

00:55:18,150 --> 00:55:16,720

this rocket booster was produced by us

1331

00:55:20,549 --> 00:55:18,160

and it had very thin

1332

00:55:23,349 --> 00:55:20,559

walls and that's why it exhibited the

1333

00:55:24,789 --> 00:55:23,359

excess push away from the sun

1334

00:55:26,870 --> 00:55:24,799

so we know that we produced this

1335

00:55:29,190 --> 00:55:26,880

artificially and you know that lends

1336

00:55:31,349 --> 00:55:29,200

credibility to the possibility that omua

1337

00:55:34,150 --> 00:55:31,359

mua was also a thin object

1338

00:55:34,789 --> 00:55:34,160

with a large area for its weight and

1339

00:55:36,950 --> 00:55:34,799

that was

1340

00:55:39,349 --> 00:55:36,960

i checked the numbers it turns out that

1341

00:55:41,750 --> 00:55:39,359

the object had to be very thin

1342

00:55:44,069 --> 00:55:41,760

in order for the reflection of sunlight

1343

00:55:46,950 --> 00:55:44,079

to act on it to be effective

1344

00:55:49,430 --> 00:55:46,960

sort of like a sail and that's what led

1345

00:55:51,750 --> 00:55:49,440

me to suggest that it may be a sale and

1346

00:55:54,150 --> 00:55:51,760

we are currently as you said developing

1347

00:55:56,710 --> 00:55:54,160

this technology of flight sales where

1348

00:55:57,510 --> 00:55:56,720

you push a spacecraft by reflecting

1349

00:56:00,549 --> 00:55:57,520

light

1350

00:56:02,549 --> 00:56:00,559

off its sail just like the sail on a

1351

00:56:05,670 --> 00:56:02,559

boat is um

1352

00:56:08,069 --> 00:56:05,680

pushed forward by reflecting the wind

1353

00:56:09,190 --> 00:56:08,079

uh and so that was the origin of my

1354

00:56:10,710 --> 00:56:09,200

suggestion and

1355

00:56:12,390 --> 00:56:10,720

it was based on the fact that there is

1356

00:56:14,950 --> 00:56:12,400

this push on on

1357

00:56:15,510 --> 00:56:14,960

muammua but then of course as you say i

1358

00:56:18,309 --> 00:56:15,520

mean

1359

00:56:21,270 --> 00:56:18,319

my imagination is obviously limited to

1360

00:56:24,309 --> 00:56:21,280

things that i've experienced and

1361

00:56:27,430 --> 00:56:24,319

the involvement in the starshot

1362

00:56:29,430 --> 00:56:27,440

project uh allowed me to imagine this

1363

00:56:32,549 --> 00:56:29,440

possibility as a viable one

1364

00:56:36,230 --> 00:56:32,559

now uh the

1365

00:56:36,549 --> 00:56:36,240

um and i want to speak very directly to

1366

00:56:40,069 --> 00:56:36,559

this

1367

00:56:41,670 --> 00:56:40,079

when you start going into these areas

1368

00:56:43,190 --> 00:56:41,680

you're going to have skeptics you're

1369

00:56:45,589 --> 00:56:43,200

going to have the blowback and you're

1370

00:56:49,109 --> 00:56:45,599

going to have the counter arguments

1371

00:56:51,349 --> 00:56:49,119

um did you decide to challenge

1372

00:56:52,150 --> 00:56:51,359

the counter offers right that were

1373

00:56:54,549 --> 00:56:52,160

coming in

1374

00:56:56,230 --> 00:56:54,559

out there or do you just let it do you

1375

00:56:58,630 --> 00:56:56,240

let it lay

1376

00:57:00,309 --> 00:56:58,640

well i i keep my eyes on the ball and

1377

00:57:02,390 --> 00:57:00,319

less so on the audience you know i don't

1378

00:57:05,030 --> 00:57:02,400

care what's happening on social media

1379

00:57:07,030 --> 00:57:05,040

and how many likes i have on twitter but

1380

00:57:09,030 --> 00:57:07,040

i really care about what people how

1381

00:57:10,549 --> 00:57:09,040

people explain the anomalies that we

1382

00:57:11,510 --> 00:57:10,559

observe because that you know that's the

1383

00:57:13,270 --> 00:57:11,520

name of the game

1384

00:57:14,870 --> 00:57:13,280

that's the ball the ball is the

1385

00:57:16,390 --> 00:57:14,880

anomalies and

1386

00:57:18,390 --> 00:57:16,400

we need to explain them you know we

1387

00:57:20,470 --> 00:57:18,400

cannot just ignore them and

1388

00:57:22,710 --> 00:57:20,480

make it you know based on our prejudice

1389

00:57:23,349 --> 00:57:22,720

make the argument that it must be rocks

1390

00:57:24,950 --> 00:57:23,359

until

1391

00:57:27,270 --> 00:57:24,960

there is extraordinary evidence for

1392

00:57:30,870 --> 00:57:27,280

anything else uh we we need

1393

00:57:33,030 --> 00:57:30,880

to find what this object is and

1394

00:57:34,630 --> 00:57:33,040

you know even if you argue that it's

1395

00:57:37,270 --> 00:57:34,640

natural you know you have to

1396

00:57:37,990 --> 00:57:37,280

explain the properties that it exhibited

1397

00:57:40,309 --> 00:57:38,000

and

1398

00:57:41,349 --> 00:57:40,319

the scientists that attempted to do that

1399

00:57:43,190 --> 00:57:41,359

came up with

1400

00:57:44,870 --> 00:57:43,200

something that we have never seen before

1401

00:57:46,309 --> 00:57:44,880

so i say you know if we are

1402

00:57:48,950 --> 00:57:46,319

discussing something that we have never

1403

00:57:49,430 --> 00:57:48,960

seen before why not an artificial origin

1404

00:57:52,630 --> 00:57:49,440

and

1405

00:57:55,990 --> 00:57:52,640

uh to me it sounds like a very plausible

1406

00:57:56,549 --> 00:57:56,000

hypothesis to consider given that this

1407

00:57:58,789 --> 00:57:56,559

object

1408

00:57:59,750 --> 00:57:58,799

doesn't look like anything we have seen

1409

00:58:01,990 --> 00:57:59,760

uh and

1410

00:58:04,309 --> 00:58:02,000

uh you know i i was a bit naive in doing

1411

00:58:06,630 --> 00:58:04,319

that and you know i follow my childhood

1412

00:58:07,829 --> 00:58:06,640

curiosity in the way i do science i i

1413

00:58:12,630 --> 00:58:07,839

don't

1414

00:58:15,430 --> 00:58:12,640

i'm not trying to impress or

1415

00:58:16,630 --> 00:58:15,440

to be liked by people i just follow the

1416

00:58:18,710 --> 00:58:16,640

evidence and and put

1417

00:58:19,910 --> 00:58:18,720

on the table what seems to be a

1418

00:58:22,069 --> 00:58:19,920

possibility and

1419

00:58:23,109 --> 00:58:22,079

let's you know if it encourages us to

1420

00:58:24,630 --> 00:58:23,119

get more evidence

1421

00:58:26,230 --> 00:58:24,640

or for the better you know that's part

1422

00:58:27,910 --> 00:58:26,240

of the scientific process

1423

00:58:30,549 --> 00:58:27,920

but in this case you know in difference

1424

00:58:33,589 --> 00:58:30,559

from other cases where i suggested

1425

00:58:35,190 --> 00:58:33,599

you know a new physics or some

1426

00:58:36,710 --> 00:58:35,200

something to do with let's say the

1427

00:58:38,390 --> 00:58:36,720

nature of dark matter which we don't

1428

00:58:40,069 --> 00:58:38,400

know what it is and

1429

00:58:41,910 --> 00:58:40,079

and nobody you know nobody complained

1430

00:58:43,349 --> 00:58:41,920

when i suggested that maybe the dark

1431

00:58:45,349 --> 00:58:43,359

matter has some properties that would

1432

00:58:47,270 --> 00:58:45,359

explain this and that anomaly

1433

00:58:48,390 --> 00:58:47,280

that was fine because it's part of the

1434

00:58:51,030 --> 00:58:48,400

scientific process

1435

00:58:52,230 --> 00:58:51,040

here when i suggested this explanation

1436

00:58:55,750 --> 00:58:52,240

people were very

1437

00:58:57,750 --> 00:58:55,760

uh polarized very uh they attacked me

1438

00:58:59,670 --> 00:58:57,760

personally on occasion and

1439

00:59:01,589 --> 00:58:59,680

and but that's really not the game i'm

1440

00:59:03,990 --> 00:59:01,599

playing i'm not playing a game of

1441

00:59:05,589 --> 00:59:04,000

mud wrestling here i'm just talking

1442

00:59:07,670 --> 00:59:05,599

about the anomalies of a momo

1443

00:59:09,030 --> 00:59:07,680

i don't want to reply to personal

1444

00:59:10,789 --> 00:59:09,040

attacks because

1445

00:59:12,309 --> 00:59:10,799

you know if you get into the mud you you

1446

00:59:14,150 --> 00:59:12,319

you get dirty and

1447

00:59:15,510 --> 00:59:14,160

uh we should just address it as a

1448

00:59:18,150 --> 00:59:15,520

scientific question and

1449

00:59:18,789 --> 00:59:18,160

collect more evidence and the only way

1450

00:59:22,069 --> 00:59:18,799

we won't

1451

00:59:23,109 --> 00:59:22,079

learn something new is if we refuse to

1452

00:59:26,309 --> 00:59:23,119

consider

1453

00:59:28,309 --> 00:59:26,319

some possibilities just you know just as

1454

00:59:30,549 --> 00:59:28,319

we know from the history of science you

1455

00:59:32,150 --> 00:59:30,559

know the progress was blocked when

1456

00:59:34,710 --> 00:59:32,160

people had prejudice and and

1457

00:59:36,309 --> 00:59:34,720

had strong convictions and what i find

1458

00:59:38,950 --> 00:59:36,319

really unfortunate is

1459

00:59:40,710 --> 00:59:38,960

that the public is very excited about

1460

00:59:43,030 --> 00:59:40,720

this possibility and my book is doing

1461

00:59:45,829 --> 00:59:43,040

extremely well because of that

1462

00:59:47,670 --> 00:59:45,839

uh whereas and i think the reason is

1463

00:59:50,549 --> 00:59:47,680

that the public is being starved

1464

00:59:52,309 --> 00:59:50,559

on you know the discussion on uh other

1465

00:59:53,109 --> 00:59:52,319

civilizations out there and looking for

1466

00:59:55,589 --> 00:59:53,119

them

1467

00:59:58,069 --> 00:59:55,599

uh and i find it inappropriate on behalf

1468

01:00:00,630 --> 00:59:58,079

of the science community not to make it

1469

01:00:02,470 --> 01:00:00,640

part of the mainstream you know because

1470

01:00:03,990 --> 01:00:02,480

we are investing more than a billion

1471

01:00:06,069 --> 01:00:04,000

dollars in the search for

1472

01:00:07,990 --> 01:00:06,079

gravitational waves for example and that

1473

01:00:08,870 --> 01:00:08,000

won the nobel prize in physics a few

1474

01:00:11,109 --> 01:00:08,880

years ago

1475

01:00:12,390 --> 01:00:11,119

without the investment of 1.1 billion

1476

01:00:14,069 --> 01:00:12,400

dollars by the

1477

01:00:15,990 --> 01:00:14,079

national science foundation we would

1478

01:00:18,309 --> 01:00:16,000

never find this evidence

1479

01:00:19,910 --> 01:00:18,319

and you know just claiming that we need

1480

01:00:21,990 --> 01:00:19,920

extraordinary evidence without

1481

01:00:23,670 --> 01:00:22,000

providing the funds you know right now

1482

01:00:24,230 --> 01:00:23,680

the search for technological signatures

1483

01:00:26,549 --> 01:00:24,240

has

1484

01:00:28,390 --> 01:00:26,559

a thousand times less funding or even

1485

01:00:28,950 --> 01:00:28,400

more than the search for gravitational

1486

01:00:31,109 --> 01:00:28,960

waves

1487

01:00:33,270 --> 01:00:31,119

you know without funding it obviously we

1488

01:00:35,750 --> 01:00:33,280

won't won't find the evidence

1489

01:00:37,030 --> 01:00:35,760

and with ridiculing any time someone

1490

01:00:38,549 --> 01:00:37,040

mentions the possibility of a

1491

01:00:41,030 --> 01:00:38,559

technological signature

1492

01:00:42,150 --> 01:00:41,040

obviously will not get young talent to

1493

01:00:44,230 --> 01:00:42,160

work on this subject

1494

01:00:45,349 --> 01:00:44,240

so it's sort of like stepping on the

1495

01:00:48,470 --> 01:00:45,359

grass

1496

01:00:50,470 --> 01:00:48,480

grow so saying

1497

01:00:52,230 --> 01:00:50,480

it's a self-fulfilling prophecy saying

1498

01:00:53,190 --> 01:00:52,240

we need extraordinary evidence but at

1499

01:00:55,910 --> 01:00:53,200

the same time not

1500

01:00:57,109 --> 01:00:55,920

allowing this evidence to be gathered

1501

01:00:58,950 --> 01:00:57,119

you know that's that's really

1502

01:01:00,789 --> 01:00:58,960

unfortunate and inappropriate for the

1503

01:01:01,910 --> 01:01:00,799

scientific community to do

1504

01:01:03,910 --> 01:01:01,920

the scientific community should

1505

01:01:05,829 --> 01:01:03,920

recognize that this is a question the

1506

01:01:08,470 --> 01:01:05,839

public cares dearly about

1507

01:01:09,589 --> 01:01:08,480

and the public funds science and we have

1508

01:01:11,349 --> 01:01:09,599

the ability

1509

01:01:13,510 --> 01:01:11,359

to address this question right now we

1510

01:01:16,230 --> 01:01:13,520

have the instruments the telescopes

1511

01:01:17,270 --> 01:01:16,240

we just need to allow ourselves to

1512

01:01:19,190 --> 01:01:17,280

explore it

1513

01:01:20,950 --> 01:01:19,200

and why would it be more speculative

1514

01:01:22,549 --> 01:01:20,960

than the search for specific types of

1515

01:01:23,990 --> 01:01:22,559

dark matter for example we don't know

1516

01:01:26,230 --> 01:01:24,000

what the dark matter is

1517

01:01:27,349 --> 01:01:26,240

and we are searching in the dark and we

1518

01:01:29,190 --> 01:01:27,359

waste you know we

1519

01:01:30,950 --> 01:01:29,200

spent hundreds of millions of dollars

1520

01:01:32,710 --> 01:01:30,960

searching for particular types of dark

1521

01:01:34,549 --> 01:01:32,720

matter we haven't found anything

1522

01:01:36,710 --> 01:01:34,559

nobody complains you know that's part of

1523

01:01:38,630 --> 01:01:36,720

the scientific endeavor sometimes you go

1524

01:01:41,430 --> 01:01:38,640

in directions that do not prove you

1525

01:01:42,870 --> 01:01:41,440

fruitful but the dark matter frankly

1526
01:01:43,510 --> 01:01:42,880
that the nature of the dark matter will

1527
01:01:46,549 --> 01:01:43,520
have zero

1528
01:01:47,670 --> 01:01:46,559
impact on our lives and if we find that

1529
01:01:49,510 --> 01:01:47,680
omomua

1530
01:01:51,670 --> 01:01:49,520
was a technological relic that would

1531
01:01:54,789 --> 01:01:51,680
have a huge impact on society

1532
01:01:57,589 --> 01:01:54,799
so we should fund the search for relics

1533
01:01:59,670 --> 01:01:57,599
in space which i call space archaeology

1534
01:02:01,109 --> 01:01:59,680
we should fund it at least at the level

1535
01:02:01,750 --> 01:02:01,119
that we're funding the search for dark

1536
01:02:04,549 --> 01:02:01,760
matter

1537
01:02:05,990 --> 01:02:04,559
or the search for gravitational waves uh

1538
01:02:08,150 --> 01:02:06,000

in my opinion should be funded

1539

01:02:10,150 --> 01:02:08,160

even more given the public's interest

1540

01:02:11,270 --> 01:02:10,160

and by the way it would make science

1541

01:02:13,029 --> 01:02:11,280

exciting

1542

01:02:14,789 --> 01:02:13,039

why should science be boring why should

1543

01:02:16,470 --> 01:02:14,799

we always talk about concepts the public

1544

01:02:19,430 --> 01:02:16,480

doesn't really care about

1545

01:02:20,069 --> 01:02:19,440

you bring up one of the best points ever

1546

01:02:23,670 --> 01:02:20,079

science

1547

01:02:26,470 --> 01:02:23,680

is nothing but a series of corrections

1548

01:02:26,870 --> 01:02:26,480

that's what it is right we move forward

1549

01:02:31,990 --> 01:02:26,880

we're

1550

01:02:34,069 --> 01:02:32,000

and it's a learning experience you know

1551

01:02:34,870 --> 01:02:34,079

that's that's the way kids learn by the

1552

01:02:37,029 --> 01:02:34,880

way they

1553

01:02:38,789 --> 01:02:37,039

they put some skin in the game and

1554

01:02:39,430 --> 01:02:38,799

that's what literally speaking that's

1555

01:02:41,430 --> 01:02:39,440

why they get

1556

01:02:42,710 --> 01:02:41,440

bruised you know they try things that do

1557

01:02:43,990 --> 01:02:42,720

not work out and

1558

01:02:45,750 --> 01:02:44,000

you know that's the way science should

1559

01:02:47,349 --> 01:02:45,760

be done we should it's a learning

1560

01:02:49,029 --> 01:02:47,359

experience we learn about the world we

1561

01:02:50,710 --> 01:02:49,039

don't know in advance everything and we

1562

01:02:53,430 --> 01:02:50,720

make mistakes along the way

1563

01:02:54,069 --> 01:02:53,440

what's the problem it's not about us

1564

01:02:55,829 --> 01:02:54,079

it's about

1565

01:02:57,750 --> 01:02:55,839

nature we are trying to figure out

1566

01:02:59,589 --> 01:02:57,760

nature so let's

1567

01:03:01,270 --> 01:02:59,599

collect as much evidence as possible

1568

01:03:05,430 --> 01:03:01,280

about whether we have neighbors

1569

01:03:06,390 --> 01:03:05,440

in our cosmic street it's a fundamental

1570

01:03:08,870 --> 01:03:06,400

question

1571

01:03:10,870 --> 01:03:08,880

and why would we assume that that

1572

01:03:14,069 --> 01:03:10,880

there are no neighbors

1573

01:03:15,990 --> 01:03:14,079

now speaking of funding and another

1574

01:03:18,870 --> 01:03:16,000

strange coincidence and you can

1575

01:03:20,230 --> 01:03:18,880

you can giggle if you want but i noticed

1576

01:03:23,670 --> 01:03:20,240

this

1577

01:03:25,430 --> 01:03:23,680

in the movie contact which is uh

1578

01:03:26,789 --> 01:03:25,440

fundamentally you know it's carl sagan

1579

01:03:29,829 --> 01:03:26,799

of course but

1580

01:03:31,430 --> 01:03:29,839

um it's a movie about funding and and

1581

01:03:34,309 --> 01:03:31,440

funding getting cut back

1582

01:03:35,510 --> 01:03:34,319

and and how to make contact and and get

1583

01:03:39,589 --> 01:03:35,520

the funding done again

1584

01:03:39,990 --> 01:03:39,599

but it was also about the signals coming

1585

01:03:43,990 --> 01:03:40,000

from

1586

01:03:47,349 --> 01:03:44,000

vega and omo omua as i'm looking at the

1587

01:03:48,230 --> 01:03:47,359

data it apparently came from the

1588

01:03:51,589 --> 01:03:48,240

direction

1589

01:03:53,349 --> 01:03:51,599

of vega and i had to stop and think

1590

01:03:56,630 --> 01:03:53,359

about that for a second

1591

01:04:00,549 --> 01:03:56,640

have you thought about where the

1592

01:04:03,589 --> 01:04:00,559

origins of omumua may have been

1593

01:04:05,829 --> 01:04:03,599

um yeah but the the fact that it was

1594

01:04:06,710 --> 01:04:05,839

at rest in the local standard of res

1595

01:04:09,029 --> 01:04:06,720

means that

1596

01:04:10,950 --> 01:04:09,039

we cannot really associate it with any

1597

01:04:13,349 --> 01:04:10,960

star because stars are moving relative

1598

01:04:14,950 --> 01:04:13,359

to that frame and you would expect

1599

01:04:16,789 --> 01:04:14,960

an object that comes from one of the

1600

01:04:20,069 --> 01:04:16,799

nearby stars to inherit

1601
01:04:23,270 --> 01:04:20,079
its speed and then

1602
01:04:25,990 --> 01:04:23,280
i think there is you know we we simply

1603
01:04:27,589 --> 01:04:26,000
cannot associate this object with any

1604
01:04:30,230 --> 01:04:27,599
particular star

1605
01:04:32,630 --> 01:04:30,240
and the direction of vega is simply the

1606
01:04:35,349 --> 01:04:32,640
direction that the sun is moving

1607
01:04:37,349 --> 01:04:35,359
towards in the local standard forest and

1608
01:04:37,750 --> 01:04:37,359
as i mentioned this object was at rest

1609
01:04:40,470 --> 01:04:37,760
and

1610
01:04:42,390 --> 01:04:40,480
we just bumped into it so we are moving

1611
01:04:43,109 --> 01:04:42,400
in that direction that's why we saw this

1612
01:04:45,829 --> 01:04:43,119
object coming

1613
01:04:46,390 --> 01:04:45,839

towards us from that direction so uh it

1614

01:04:49,829 --> 01:04:46,400

didn't

1615

01:04:53,109 --> 01:04:49,839

originate from vega which is what

1616

01:04:56,390 --> 01:04:53,119

the the the press release on this

1617

01:04:57,270 --> 01:04:56,400

would would have implied that no no it

1618

01:04:59,670 --> 01:04:57,280

didn't and

1619

01:05:01,430 --> 01:04:59,680

the other point to keep in mind is uh

1620

01:05:02,150 --> 01:05:01,440

you know the outskirts of the solar

1621

01:05:04,309 --> 01:05:02,160

system

1622

01:05:05,270 --> 01:05:04,319

uh are defined by the so-called oort

1623

01:05:08,789 --> 01:05:05,280

cloud

1624

01:05:09,910 --> 01:05:08,799

that's a roughly a spherical region

1625

01:05:12,549 --> 01:05:09,920

around the

1626

01:05:14,950 --> 01:05:12,559

the sun that is a hundred thousand times

1627

01:05:17,990 --> 01:05:14,960

bigger than the earth sun separation

1628

01:05:20,069 --> 01:05:18,000

where you have rocks left over from the

1629

01:05:21,990 --> 01:05:20,079

formation process of the solar system

1630

01:05:23,109 --> 01:05:22,000

being scattered and sort of like the

1631

01:05:25,990 --> 01:05:23,119

building blocks the

1632

01:05:26,789 --> 01:05:26,000

the lego pieces of the planets that were

1633

01:05:28,630 --> 01:05:26,799

scattered

1634

01:05:31,510 --> 01:05:28,640

out to that distance a hundred thousand

1635

01:05:34,309 --> 01:05:31,520

times the earth sun separation and

1636

01:05:35,670 --> 01:05:34,319

uh it's roughly halfway to the nearest

1637

01:05:39,349 --> 01:05:35,680

star system

1638

01:05:40,150 --> 01:05:39,359

so if every star has an odd cloud like

1639

01:05:42,870 --> 01:05:40,160

that

1640

01:05:44,789 --> 01:05:42,880

these odd clouds are touching each other

1641

01:05:47,990 --> 01:05:44,799

they are sort of like

1642

01:05:51,270 --> 01:05:48,000

densely packed billiard balls so

1643

01:05:54,470 --> 01:05:51,280

just imagine going in some direction

1644

01:05:56,549 --> 01:05:54,480

in the sky you will pierce through in

1645

01:06:00,069 --> 01:05:56,559

any direction you will pierce through

1646

01:06:00,630 --> 01:06:00,079

lots of these old clouds a large number

1647

01:06:02,309 --> 01:06:00,640

of them

1648

01:06:04,549 --> 01:06:02,319

and you would never be able to figure

1649

01:06:05,589 --> 01:06:04,559

out which one cloud the object you're

1650

01:06:07,510 --> 01:06:05,599

looking at

1651
01:06:09,029 --> 01:06:07,520
came from because it could have come

1652
01:06:11,029 --> 01:06:09,039
from any of those

1653
01:06:12,150 --> 01:06:11,039
and therefore i think it's completely

1654
01:06:15,270 --> 01:06:12,160
hopeless

1655
01:06:18,309 --> 01:06:15,280
to try and associate an interstellar

1656
01:06:21,589 --> 01:06:18,319
object with a particular star

1657
01:06:24,870 --> 01:06:21,599
is the origin in in

1658
01:06:28,150 --> 01:06:24,880
in another aspect of this

1659
01:06:29,589 --> 01:06:28,160
when uh something is approaching with

1660
01:06:32,950 --> 01:06:29,599
this is the first time

1661
01:06:35,990 --> 01:06:32,960
uh uh from interstellar space

1662
01:06:38,150 --> 01:06:36,000
how easy is it to detect because

1663
01:06:39,190 --> 01:06:38,160

it would need to reflect light from the

1664

01:06:41,750 --> 01:06:39,200

sun for us

1665

01:06:43,750 --> 01:06:41,760

to see it optically and that would be

1666

01:06:45,510 --> 01:06:43,760

very difficult you know going out into

1667

01:06:48,309 --> 01:06:45,520

the kuiper belt and beyond

1668

01:06:48,870 --> 01:06:48,319

nothing would reflect how do we detect

1669

01:06:50,950 --> 01:06:48,880

something

1670

01:06:53,029 --> 01:06:50,960

else that would approach us from

1671

01:06:55,430 --> 01:06:53,039

interstellar space

1672

01:06:57,349 --> 01:06:55,440

right so it all depends on the size of

1673

01:06:59,750 --> 01:06:57,359

the telescope you're using as to

1674

01:07:01,109 --> 01:06:59,760

you know it's like a light bucket it

1675

01:07:05,029 --> 01:07:01,119

collects light and

1676
01:07:06,950 --> 01:07:05,039
and the pan stars telescope was able to

1677
01:07:08,950 --> 01:07:06,960
detect an object roughly the size of a

1678
01:07:10,470 --> 01:07:08,960
football field which was the size of a

1679
01:07:13,589 --> 01:07:10,480
muammua

1680
01:07:15,109 --> 01:07:13,599
a few hundred feet uh within the orbit

1681
01:07:17,109 --> 01:07:15,119
of the earth around the sun

1682
01:07:19,190 --> 01:07:17,119
okay so that just to give you a ballpark

1683
01:07:20,390 --> 01:07:19,200
number so the reflection of sunlight

1684
01:07:23,109 --> 01:07:20,400
from an object

1685
01:07:24,870 --> 01:07:23,119
of a few hundred feet is detectable by

1686
01:07:25,750 --> 01:07:24,880
an instrument by a telescope like pan

1687
01:07:29,349 --> 01:07:25,760
stars

1688
01:07:31,510 --> 01:07:29,359

and is i mean the vera rubin observatory

1689

01:07:33,270 --> 01:07:31,520

the next telescope that will come online

1690

01:07:34,630 --> 01:07:33,280

and survey the sky that is much more

1691

01:07:37,910 --> 01:07:34,640

sensitive

1692

01:07:40,309 --> 01:07:37,920

will uh be bigger and

1693

01:07:41,430 --> 01:07:40,319

and could detect things farther away of

1694

01:07:43,270 --> 01:07:41,440

this size

1695

01:07:45,510 --> 01:07:43,280

now there may be many more objects that

1696

01:07:48,870 --> 01:07:45,520

are smaller passing through

1697

01:07:52,390 --> 01:07:48,880

and fewer objects that are bigger but

1698

01:07:54,549 --> 01:07:52,400

they get dimmer inversely with

1699

01:07:56,069 --> 01:07:54,559

distance to the fourth power very

1700

01:07:59,270 --> 01:07:56,079

quickly right so for example

1701

01:08:01,029 --> 01:07:59,280

um now is a million times fainter than

1702

01:08:02,069 --> 01:08:01,039

when it was close to earth we can't

1703

01:08:04,150 --> 01:08:02,079

really see it

1704

01:08:05,670 --> 01:08:04,160

with any telescope right now and there

1705

01:08:07,829 --> 01:08:05,680

is no point in chasing it

1706

01:08:08,950 --> 01:08:07,839

because as i said before you know there

1707

01:08:11,510 --> 01:08:08,960

would be more

1708

01:08:12,470 --> 01:08:11,520

coming our way and we just need to wait

1709

01:08:15,829 --> 01:08:12,480

for them

1710

01:08:16,390 --> 01:08:15,839

uh so you know when i go to the kitchen

1711

01:08:21,749 --> 01:08:16,400

i

1712

01:08:24,309 --> 01:08:21,759

there must be many more ants out there

1713

01:08:25,590 --> 01:08:24,319

and the same is true about the objects

1714

01:08:27,829 --> 01:08:25,600

of the type of

1715

01:08:29,829 --> 01:08:27,839

there must be many more passing through

1716

01:08:32,229 --> 01:08:29,839

and instead of obsessing on

1717

01:08:33,189 --> 01:08:32,239

any particular one of them we should

1718

01:08:36,229 --> 01:08:33,199

search for more

1719

01:08:38,309 --> 01:08:36,239

and find them and then send a camera

1720

01:08:41,349 --> 01:08:38,319

that will give us photographs now

1721

01:08:44,630 --> 01:08:41,359

you had indicated earlier uh omumu

1722

01:08:46,870 --> 01:08:44,640

being uh sort of static and like a buoy

1723

01:08:51,189 --> 01:08:46,880

in the ocean

1724

01:08:54,070 --> 01:08:51,199

right now you just stated chasing it

1725

01:08:56,709 --> 01:08:54,080

is it still static is it the is it the

1726

01:08:57,990 --> 01:08:56,719

the speed of our solar system and it is

1727

01:09:02,550 --> 01:08:58,000

traveling

1728

01:09:05,990 --> 01:09:02,560

that causes the motion of omua

1729

01:09:08,149 --> 01:09:06,000

well we actually gave it a kick right

1730

01:09:10,630 --> 01:09:08,159

when it came close to the sun sort of

1731

01:09:14,149 --> 01:09:10,640

like giving a kick to a buoy

1732

01:09:16,470 --> 01:09:14,159

when a ship runs into it

1733

01:09:18,789 --> 01:09:16,480

we didn't really collide with it but the

1734

01:09:21,269 --> 01:09:18,799

gravitational force of the sun

1735

01:09:23,030 --> 01:09:21,279

deflected it gave it a kick and right

1736

01:09:25,189 --> 01:09:23,040

now it's not in the local standard of

1737

01:09:29,749 --> 01:09:25,199

rest anymore because we kicked it

1738

01:09:33,430 --> 01:09:29,759

uh so it's moving away uh and

1739

01:09:35,349 --> 01:09:33,440

so you know this object is

1740

01:09:38,470 --> 01:09:35,359

running out of the solar system at an

1741

01:09:39,990 --> 01:09:38,480

enhanced speed and

1742

01:09:41,829 --> 01:09:40,000

again it doesn't have a special

1743

01:09:44,870 --> 01:09:41,839

significance

1744

01:09:46,789 --> 01:09:44,880

but there are many more objects that

1745

01:09:49,910 --> 01:09:46,799

should come our way in the future

1746

01:09:50,630 --> 01:09:49,920

now uh how many are undetected i i know

1747

01:09:53,749 --> 01:09:50,640

that's a

1748

01:09:56,149 --> 01:09:53,759

a hypothetical but well

1749

01:09:58,070 --> 01:09:56,159

so with it depends again on the

1750

01:09:59,830 --> 01:09:58,080

telescope with pan stars anything much

1751

01:10:02,630 --> 01:09:59,840

smaller than omomoa

1752

01:10:04,470 --> 01:10:02,640

would not be detectable uh roughly at a

1753

01:10:05,990 --> 01:10:04,480

fraction of the earth sun separation it

1754

01:10:07,910 --> 01:10:06,000

wouldn't be detectable

1755

01:10:09,830 --> 01:10:07,920

there might be a lot of those that are

1756

01:10:12,550 --> 01:10:09,840

smaller you know something like

1757

01:10:14,229 --> 01:10:12,560

um you know the size of a person would

1758

01:10:14,950 --> 01:10:14,239

not be detectable and maybe there are

1759

01:10:16,790 --> 01:10:14,960

lots of

1760

01:10:18,550 --> 01:10:16,800

things like it passing through you know

1761

01:10:20,709 --> 01:10:18,560

a spacecraft as small as that

1762

01:10:22,870 --> 01:10:20,719

or something that is moving very fast

1763

01:10:24,550 --> 01:10:22,880

you know at a fraction of the speed of

1764

01:10:25,669 --> 01:10:24,560

light like the light sails we are

1765

01:10:28,709 --> 01:10:25,679

planning to

1766

01:10:29,270 --> 01:10:28,719

to launch with the starshot initiative

1767

01:10:31,030 --> 01:10:29,280

and

1768

01:10:32,790 --> 01:10:31,040

you know that that will not be

1769

01:10:33,910 --> 01:10:32,800

detectable because it would move too

1770

01:10:35,430 --> 01:10:33,920

fast and and

1771

01:10:37,030 --> 01:10:35,440

currently astronomers would simply

1772

01:10:39,030 --> 01:10:37,040

ignore it so

1773

01:10:40,630 --> 01:10:39,040

you know there might be a lot of stuff

1774

01:10:41,750 --> 01:10:40,640

flying through the solar system that we

1775

01:10:44,070 --> 01:10:41,760

haven't yet

1776

01:10:46,070 --> 01:10:44,080

detected and that's why it's good to

1777

01:10:47,910 --> 01:10:46,080

deploy a lot of cameras

1778

01:10:49,910 --> 01:10:47,920

within the orbit of the earth around the

1779

01:10:51,430 --> 01:10:49,920

sun because maybe we will see things we

1780

01:10:54,390 --> 01:10:51,440

haven't seen before

1781

01:10:55,910 --> 01:10:54,400

now the universe is a big place right we

1782

01:10:58,950 --> 01:10:55,920

we understand this

1783

01:11:02,790 --> 01:10:58,960

but the milky way is also

1784

01:11:05,910 --> 01:11:02,800

very big it is it is huge it's 150

1785

01:11:07,189 --> 01:11:05,920

000 light years across it's not a small

1786

01:11:10,950 --> 01:11:07,199

environment

1787

01:11:13,350 --> 01:11:10,960

but the odds of something finding

1788

01:11:14,229 --> 01:11:13,360

our solar system and cruising by our

1789

01:11:17,030 --> 01:11:14,239

planet

1790

01:11:18,950 --> 01:11:17,040

i think uh is is a huge number i don't i

1791

01:11:22,229 --> 01:11:18,960

don't know how big that number is

1792

01:11:24,070 --> 01:11:22,239

but is what it did was it was it

1793

01:11:26,550 --> 01:11:24,080

finding us was do you think it was

1794

01:11:29,750 --> 01:11:26,560

actually sent here

1795

01:11:32,229 --> 01:11:29,760

so if it's um just space trash you know

1796

01:11:34,070 --> 01:11:32,239

something most of the stars in the milky

1797

01:11:35,110 --> 01:11:34,080

way galaxy formed billions of years

1798

01:11:36,550 --> 01:11:35,120

before the sun

1799

01:11:38,790 --> 01:11:36,560

so if they had a technological

1800

01:11:41,110 --> 01:11:38,800

civilization similar to ours

1801
01:11:42,630 --> 01:11:41,120
you know it may be dead by now and it

1802
01:11:44,870 --> 01:11:42,640
produced the

1803
01:11:47,110 --> 01:11:44,880
probes like voyager 1 voyager 2 and

1804
01:11:49,189 --> 01:11:47,120
others that were sent into space and

1805
01:11:51,189 --> 01:11:49,199
are not operational anymore you know

1806
01:11:52,790 --> 01:11:51,199
imagine voyager a billion years from now

1807
01:11:55,030 --> 01:11:52,800
it will not really work

1808
01:11:57,590 --> 01:11:55,040
um so most of it would be just space

1809
01:12:00,390 --> 01:11:57,600
trash most of the equipment we find and

1810
01:12:01,430 --> 01:12:00,400
that would be my natural expectations so

1811
01:12:04,470 --> 01:12:01,440
in that case

1812
01:12:06,390 --> 01:12:04,480
um you know it would still

1813
01:12:07,990 --> 01:12:06,400

indicate that there was a civilization

1814

01:12:10,709 --> 01:12:08,000

that sent it

1815

01:12:11,189 --> 01:12:10,719

but it wouldn't necessarily spy on us

1816

01:12:13,750 --> 01:12:11,199

and

1817

01:12:15,189 --> 01:12:13,760

or try to gather information but who

1818

01:12:17,430 --> 01:12:15,199

knows you know we need to

1819

01:12:18,550 --> 01:12:17,440

have an open mind and just try to get

1820

01:12:22,630 --> 01:12:18,560

more evidence

1821

01:12:24,630 --> 01:12:22,640

but if it's a random um a population of

1822

01:12:25,110 --> 01:12:24,640

objects on random trajectories you know

1823

01:12:26,950 --> 01:12:25,120

then

1824

01:12:28,390 --> 01:12:26,960

there should be a lot of them right now

1825

01:12:30,229 --> 01:12:28,400

within the solar system

1826

01:12:31,990 --> 01:12:30,239

because we detected one after a few

1827

01:12:32,950 --> 01:12:32,000

years passing within the earth sun

1828

01:12:34,709 --> 01:12:32,960

separation

1829

01:12:35,990 --> 01:12:34,719

there should be of order a quadrillion

1830

01:12:39,669 --> 01:12:36,000

of them inside

1831

01:12:42,870 --> 01:12:39,679

the orc cloud that's 10 to the power 15

1832

01:12:43,590 --> 01:12:42,880

a lot and just like ants in a kitchen

1833

01:12:45,990 --> 01:12:43,600

you know so

1834

01:12:46,709 --> 01:12:46,000

we will find another one in a few years

1835

01:12:49,669 --> 01:12:46,719

and

1836

01:12:50,070 --> 01:12:49,679

so that's why i'm saying uh you know we

1837

01:12:52,070 --> 01:12:50,080

should

1838

01:12:54,470 --> 01:12:52,080

continue to search and find more of the

1839

01:12:57,750 --> 01:12:54,480

same and once we do identify

1840

01:12:59,270 --> 01:12:57,760

objects that look as weird as then we

1841

01:13:02,390 --> 01:12:59,280

can examine you know

1842

01:13:05,750 --> 01:13:02,400

them more carefully unless of course

1843

01:13:07,430 --> 01:13:05,760

the scientific community uh uh

1844

01:13:08,790 --> 01:13:07,440

continues to argue that it's always

1845

01:13:09,590 --> 01:13:08,800

rocks and therefore we shouldn't even

1846

01:13:11,990 --> 01:13:09,600

check

1847

01:13:14,310 --> 01:13:12,000

now how many how many trips through the

1848

01:13:17,350 --> 01:13:14,320

solar system interstellar wise

1849

01:13:18,390 --> 01:13:17,360

is it going to take for for science to

1850

01:13:22,310 --> 01:13:18,400

wake up

1851

01:13:22,950 --> 01:13:22,320

right once okay twice is is it is it

1852

01:13:26,310 --> 01:13:22,960

three

1853

01:13:27,510 --> 01:13:26,320

four five i hope i hope it's only once

1854

01:13:28,950 --> 01:13:27,520

because uh

1855

01:13:30,950 --> 01:13:28,960

you know that would be the intelligent

1856

01:13:33,669 --> 01:13:30,960

thing to do that

1857

01:13:33,990 --> 01:13:33,679

we you know we it's a wake-up call for

1858

01:13:37,910 --> 01:13:34,000

us

1859

01:13:40,550 --> 01:13:37,920

to uh start doing space archaeology

1860

01:13:42,790 --> 01:13:40,560

you know we in the past for 70 years

1861

01:13:44,790 --> 01:13:42,800

we've been searching for radio signals

1862

01:13:46,070 --> 01:13:44,800

uh and that's just like trying to have a

1863

01:13:48,070 --> 01:13:46,080

phone conversation with

1864

01:13:49,830 --> 01:13:48,080

with another civilization and it

1865

01:13:50,950 --> 01:13:49,840

requires that the counterpart would be

1866

01:13:52,790 --> 01:13:50,960

alive

1867

01:13:54,630 --> 01:13:52,800

uh we cannot have a phone conversation

1868

01:13:55,350 --> 01:13:54,640

with the mayans the mayan culture is

1869

01:13:57,669 --> 01:13:55,360

dead and

1870

01:13:58,630 --> 01:13:57,679

not around anymore and but we can learn

1871

01:14:00,630 --> 01:13:58,640

about them from

1872

01:14:02,470 --> 01:14:00,640

archaeological digs you know we can find

1873

01:14:04,310 --> 01:14:02,480

the relics they're left behind

1874

01:14:05,669 --> 01:14:04,320

and in much the same way we can look for

1875

01:14:08,229 --> 01:14:05,679

relics in space

1876

01:14:08,870 --> 01:14:08,239

i call that space archaeology and i do

1877

01:14:11,110 --> 01:14:08,880

think that

1878

01:14:12,070 --> 01:14:11,120

just like archaeology on earth is a

1879

01:14:14,470 --> 01:14:12,080

mainstream

1880

01:14:16,790 --> 01:14:14,480

activity in why every campus university

1881

01:14:18,149 --> 01:14:16,800

campus has some archaeologists

1882

01:14:20,070 --> 01:14:18,159

the same should be true for space

1883

01:14:20,709 --> 01:14:20,080

archaeology in the future there should

1884

01:14:23,830 --> 01:14:20,719

be

1885

01:14:26,870 --> 01:14:23,840

experts in looking for

1886

01:14:30,229 --> 01:14:26,880

you know debris or relics

1887

01:14:33,430 --> 01:14:30,239

of other civilizations in space uh

1888

01:14:35,669 --> 01:14:33,440

in every university in the future now

1889

01:14:37,350 --> 01:14:35,679

let's let's let's examine something for

1890

01:14:40,070 --> 01:14:37,360

a second in 1995

1891

01:14:41,830 --> 01:14:40,080

talking about the way all of this is

1892

01:14:44,149 --> 01:14:41,840

starting to come to the surface when it

1893

01:14:47,830 --> 01:14:44,159

comes to science and astronomy

1894

01:14:51,830 --> 01:14:47,840

1995 one exoplanet

1895

01:14:54,790 --> 01:14:51,840

right a few years later we had five

1896

01:14:55,270 --> 01:14:54,800

today in 2021 we've got what five

1897

01:14:57,750 --> 01:14:55,280

thousand

1898

01:14:59,430 --> 01:14:57,760

waiting to be cataloged right that's

1899

01:15:02,550 --> 01:14:59,440

where we are today

1900

01:15:05,510 --> 01:15:02,560

and the general conversation is

1901

01:15:06,470 --> 01:15:05,520

every star you see in the sky has got a

1902

01:15:10,390 --> 01:15:06,480

planet

1903

01:15:13,830 --> 01:15:10,400

and now these numbers are getting into

1904

01:15:14,950 --> 01:15:13,840

the tens of billions just in our milky

1905

01:15:17,830 --> 01:15:14,960

way

1906

01:15:19,510 --> 01:15:17,840

what does this do for for science and

1907

01:15:21,110 --> 01:15:19,520

funding and looking to the future i

1908

01:15:22,390 --> 01:15:21,120

think it's the best day to be an

1909

01:15:24,310 --> 01:15:22,400

astronomer

1910

01:15:26,870 --> 01:15:24,320

just go ahead and go to work tonight

1911

01:15:28,790 --> 01:15:26,880

you're going to discover a planet right

1912

01:15:30,390 --> 01:15:28,800

well there are two important lessons

1913

01:15:31,590 --> 01:15:30,400

from what happened in the field of

1914

01:15:35,030 --> 01:15:31,600

exoplanets

1915

01:15:37,189 --> 01:15:35,040

the first lesson is in 1952 there was an

1916

01:15:40,709 --> 01:15:37,199

astronomer named otto struve

1917

01:15:43,350 --> 01:15:40,719

who said imagine a planet like jupiter

1918

01:15:45,590 --> 01:15:43,360

being very close to a star like the sun

1919

01:15:47,110 --> 01:15:45,600

in that case it will tag the star back

1920

01:15:49,510 --> 01:15:47,120

and forth

1921

01:15:51,430 --> 01:15:49,520

in a way that we can measure because

1922

01:15:54,149 --> 01:15:51,440

it's so close to the star

1923

01:15:55,990 --> 01:15:54,159

and also it will have a higher chance of

1924

01:15:58,070 --> 01:15:56,000

coming in front of the star and blocking

1925

01:15:59,910 --> 01:15:58,080

a little bit of the starlight so we can

1926

01:16:03,030 --> 01:15:59,920

detect that as well

1927

01:16:04,870 --> 01:16:03,040

and for four decades uh

1928

01:16:07,030 --> 01:16:04,880

astronomers on time allocation

1929

01:16:10,070 --> 01:16:07,040

committees on major telescopes

1930

01:16:13,030 --> 01:16:10,080

refused to allow time

1931

01:16:15,270 --> 01:16:13,040

on telescopes to search for such systems

1932

01:16:16,950 --> 01:16:15,280

because they argued we know why jupiter

1933

01:16:18,709 --> 01:16:16,960

is so far from the sun you wouldn't

1934

01:16:21,430 --> 01:16:18,719

expect any other star to have a

1935

01:16:24,630 --> 01:16:21,440

jupiter-like planet so close to it

1936

01:16:26,390 --> 01:16:24,640

uh and only in 1995 the first such

1937

01:16:28,709 --> 01:16:26,400

system was discovered

1938

01:16:31,030 --> 01:16:28,719

so you might say and and then of course

1939

01:16:32,790 --> 01:16:31,040

the nobel prize was awarded for it a few

1940

01:16:35,830 --> 01:16:32,800

years ago in physics

1941

01:16:38,149 --> 01:16:35,840

uh and and that opened up a whole new

1942

01:16:40,310 --> 01:16:38,159

field of exoplanet searches

1943

01:16:42,709 --> 01:16:40,320

uh you might say okay well eventually

1944

01:16:44,709 --> 01:16:42,719

scientists arrived at this discovery it

1945

01:16:45,510 --> 01:16:44,719

took four decades but eventually it

1946

01:16:47,750 --> 01:16:45,520

happened

1947

01:16:49,590 --> 01:16:47,760

well first of all what about the wasted

1948

01:16:51,430 --> 01:16:49,600

time you know in those four decades we

1949

01:16:53,669 --> 01:16:51,440

could have made a lot of progress

1950

01:16:54,950 --> 01:16:53,679

and second this is a baby that was

1951

01:16:56,630 --> 01:16:54,960

barely born

1952

01:16:59,270 --> 01:16:56,640

what about all these babies that were

1953

01:17:01,910 --> 01:16:59,280

never born the unborn babies

1954

01:17:04,070 --> 01:17:01,920

so that's lesson number one that it's

1955

01:17:04,950 --> 01:17:04,080

really you know science is not efficient

1956

01:17:08,950 --> 01:17:04,960

the way that

1957

01:17:12,470 --> 01:17:08,960

the mainstream uh you know approach to

1958

01:17:15,669 --> 01:17:12,480

innovative ideas is handled right now um

1959

01:17:18,310 --> 01:17:15,679

and then the second point is that

1960

01:17:20,070 --> 01:17:18,320

you know this uh the one thing we

1961

01:17:22,950 --> 01:17:20,080

learned from the kepler satellite

1962

01:17:26,149 --> 01:17:22,960

um data is that not only that there are

1963

01:17:28,830 --> 01:17:26,159

so many planets out there but

1964

01:17:29,920 --> 01:17:28,840

the chance of having an earth-sized

1965

01:17:31,030 --> 01:17:29,930

planet uh

1966

01:17:33,990 --> 01:17:31,040

[Music]

1967

01:17:35,830 --> 01:17:34,000

the separation the earth is from the sun

1968

01:17:38,310 --> 01:17:35,840

around the sun like star

1969

01:17:39,910 --> 01:17:38,320

is quite substantial it's about 50 plus

1970

01:17:42,229 --> 01:17:39,920

or minus 20 percent

1971

01:17:44,310 --> 01:17:42,239

and you know like half of the sun like

1972

01:17:46,070 --> 01:17:44,320

stars have a planet like the earth and

1973

01:17:47,830 --> 01:17:46,080

that means that not only we are not at

1974

01:17:50,149 --> 01:17:47,840

the center of the universe but

1975

01:17:51,430 --> 01:17:50,159

what we find in our backyard in earth

1976

01:17:53,430 --> 01:17:51,440

sun system

1977

01:17:55,189 --> 01:17:53,440

you know that is very common there are

1978

01:17:56,870 --> 01:17:55,199

billions of those systems in the milky

1979

01:17:59,830 --> 01:17:56,880

way galaxy alone and

1980

01:18:02,149 --> 01:17:59,840

that to me again reiterates the point of

1981

01:18:04,310 --> 01:18:02,159

modesty we should be modest

1982

01:18:05,910 --> 01:18:04,320

because we are not privileged what we

1983

01:18:08,470 --> 01:18:05,920

find in our backyard

1984

01:18:10,390 --> 01:18:08,480

is common is typical so why would we

1985

01:18:12,310 --> 01:18:10,400

assume that we are special and unique

1986

01:18:13,669 --> 01:18:12,320

why would we say that finding evidence

1987

01:18:16,149 --> 01:18:13,679

for others is

1988

01:18:17,669 --> 01:18:16,159

an extraordinary claim it's not an

1989

01:18:19,910 --> 01:18:17,679

extraordinary claim it's we are

1990

01:18:21,030 --> 01:18:19,920

we might be as common as ants are on a

1991

01:18:23,110 --> 01:18:21,040

sidewalk you know

1992

01:18:24,790 --> 01:18:23,120

there were many like us before and we

1993

01:18:30,149 --> 01:18:24,800

should just search for them

1994

01:18:33,510 --> 01:18:30,159

now uh how how amazing is it for you

1995

01:18:34,149 --> 01:18:33,520

um as an astronomer and and doing what

1996

01:18:37,590 --> 01:18:34,159

you do

1997

01:18:40,790 --> 01:18:37,600

to see the numbers multiply

1998

01:18:41,830 --> 01:18:40,800

like they are it seems like now it's

1999

01:18:45,189 --> 01:18:41,840

daily

2000

01:18:47,590 --> 01:18:45,199

it's right it's it's not it's not

2001

01:18:48,950 --> 01:18:47,600

if there are other planets out there

2002

01:18:52,950 --> 01:18:48,960

right now we are talking

2003

01:18:54,950 --> 01:18:52,960

in the billions rocky earth-like planets

2004

01:18:56,390 --> 01:18:54,960

uh the amount of galaxies in the

2005

01:19:00,149 --> 01:18:56,400

universe

2006

01:19:00,870 --> 01:19:00,159

five years ago that conversation was 250

2007

01:19:03,990 --> 01:19:00,880

billion

2008

01:19:06,830 --> 01:19:04,000

now the conversation is a trillion

2009

01:19:08,070 --> 01:19:06,840

right it is constantly increasing every

2010

01:19:11,110 --> 01:19:08,080

day

2011

01:19:11,590 --> 01:19:11,120

yeah well it comes back to the point

2012

01:19:14,790 --> 01:19:11,600

that

2013

01:19:17,270 --> 01:19:14,800

we are not privileged we are not special

2014

01:19:18,790 --> 01:19:17,280

there are many copies of systems that we

2015

01:19:20,470 --> 01:19:18,800

see around us

2016

01:19:22,390 --> 01:19:20,480

and you know that comes back to the

2017

01:19:24,790 --> 01:19:22,400

copernican principle that

2018

01:19:26,790 --> 01:19:24,800

we should never assume that we are at

2019

01:19:28,630 --> 01:19:26,800

the center of things that we are unique

2020

01:19:29,669 --> 01:19:28,640

and special that we are privileged in

2021

01:19:32,229 --> 01:19:29,679

any way

2022

01:19:33,270 --> 01:19:32,239

and it comes back to me as a message

2023

01:19:36,870 --> 01:19:33,280

saying

2024

01:19:39,590 --> 01:19:36,880

let's search for things like us because

2025

01:19:41,270 --> 01:19:39,600

we are not special you know it's just

2026

01:19:44,229 --> 01:19:41,280

like the roman

2027

01:19:44,790 --> 01:19:44,239

caesars used to have a person next to

2028

01:19:48,390 --> 01:19:44,800

them

2029

01:19:51,350 --> 01:19:48,400

mortal

2030

01:19:52,070 --> 01:19:51,360

don't be arrogant because those emperors

2031

01:19:54,229 --> 01:19:52,080

used to

2032

01:19:56,550 --> 01:19:54,239

you know be very arrogant after winning

2033

01:19:58,470 --> 01:19:56,560

a war and they needed someone next to

2034

01:20:01,750 --> 01:19:58,480

them to tell them stay modest

2035

01:20:03,510 --> 01:20:01,760

you are mortal and to me what the the

2036

01:20:06,470 --> 01:20:03,520

the message we get from the sky

2037

01:20:07,830 --> 01:20:06,480

is very similar it says don't feel

2038

01:20:10,390 --> 01:20:07,840

privileged

2039

01:20:12,229 --> 01:20:10,400

you are not unusual you are common and

2040

01:20:13,030 --> 01:20:12,239

we keep getting that message again and

2041

01:20:16,070 --> 01:20:13,040

again you know

2042

01:20:17,189 --> 01:20:16,080

it started with the message galileo got

2043

01:20:18,790 --> 01:20:17,199

through his telescopes

2044

01:20:20,709 --> 01:20:18,800

the earth is not at the center of the

2045

01:20:21,430 --> 01:20:20,719

universe the earth moves around the sun

2046

01:20:23,830 --> 01:20:21,440

okay

2047

01:20:25,669 --> 01:20:23,840

it took a while we accepted that but

2048

01:20:27,510 --> 01:20:25,679

still you know the mainstream of the

2049

01:20:29,590 --> 01:20:27,520

astronomy community is willing maybe to

2050

01:20:31,830 --> 01:20:29,600

entertain the possibility of microbes

2051
01:20:32,950 --> 01:20:31,840
and searching for microbes but why not

2052
01:20:36,310 --> 01:20:32,960
search for things like

2053
01:20:38,629 --> 01:20:36,320
us technological signatures in space

2054
01:20:39,750 --> 01:20:38,639
and by the way it's really difficult to

2055
01:20:41,910 --> 01:20:39,760
find subtle

2056
01:20:43,030 --> 01:20:41,920
effects of microbes on the atmospheres

2057
01:20:45,590 --> 01:20:43,040
of other planets

2058
01:20:47,590 --> 01:20:45,600
it's easier to find for example

2059
01:20:49,750 --> 01:20:47,600
industrial pollution in the atmospheres

2060
01:20:53,350 --> 01:20:49,760
of other planets because that would be

2061
01:20:55,189 --> 01:20:53,360
a clear evidence that there is

2062
01:20:56,470 --> 01:20:55,199
something unnatural out there something

2063
01:20:59,590 --> 01:20:56,480

artificial so

2064

01:21:01,990 --> 01:20:59,600

my point is why what do we lose

2065

01:21:03,270 --> 01:21:02,000

by conducting a search on one of the

2066

01:21:05,990 --> 01:21:03,280

most fundamental questions that will

2067

01:21:08,950 --> 01:21:06,000

have the biggest impact on society

2068

01:21:10,070 --> 01:21:08,960

and that the public supports how how is

2069

01:21:12,070 --> 01:21:10,080

it possible that we are

2070

01:21:13,110 --> 01:21:12,080

at this situation where the scientific

2071

01:21:15,350 --> 01:21:13,120

community resists

2072

01:21:17,110 --> 01:21:15,360

that and ridicules any discussion on

2073

01:21:18,950 --> 01:21:17,120

that let's take a break

2074

01:21:20,629 --> 01:21:18,960

right here we need to get that in this

2075

01:21:21,910 --> 01:21:20,639

is fade to black i'm your host jimmy

2076

01:21:24,390 --> 01:21:21,920

church our guest tonight

2077

01:21:25,390 --> 01:21:24,400

professor avilo we're talking about his

2078

01:21:27,590 --> 01:21:25,400

new book

2079

01:21:45,990 --> 01:21:27,600

extraterrestrial more with avi after

2080

01:21:52,229 --> 01:21:49,110

way out here we listen to jimmy church

2081

01:21:54,070 --> 01:21:52,239

you're listening to fade to black

2082

01:21:56,149 --> 01:21:54,080

always on the edge of the hottest

2083

01:22:14,070 --> 01:21:56,159

alternative talk jimmy church

2084

01:22:18,149 --> 01:22:16,149

do you want to be an official fate or

2085

01:22:20,229 --> 01:22:18,159

not of course you do

2086

01:22:22,830 --> 01:22:20,239

this is jimmy church of fade to black

2087

01:22:25,270 --> 01:22:22,840

just go to our membership section at

2088

01:22:27,189 --> 01:22:25,280

2089

01:22:29,030 --> 01:22:27,199

fader knots when you think about the

2090

01:22:30,950 --> 01:22:29,040

future of our country and where we're

2091

01:22:31,830 --> 01:22:30,960

headed do you wonder about the food

2092

01:22:36,070 --> 01:22:31,840

supply

2093

01:22:38,149 --> 01:22:36,080

chain could be disastrous

2094

01:22:40,390 --> 01:22:38,159

and they usually occur with little

2095

01:22:41,510 --> 01:22:40,400

warning that's why the smartest thing

2096

01:22:44,629 --> 01:22:41,520

you can do today

2097

01:22:47,030 --> 01:22:44,639

is to stockpile emergency food water

2098

01:22:47,669 --> 01:22:47,040

and other essentials i personally

2099

01:22:50,229 --> 01:22:47,679

recommend

2100

01:22:52,070 --> 01:22:50,239

my patriot supply they're the nation's

2101
01:22:54,629 --> 01:22:52,080
largest emergency preparedness

2102
01:22:56,149 --> 01:22:54,639
company serving millions of customers

2103
01:22:58,550 --> 01:22:56,159
for more than a decade

2104
01:22:59,590 --> 01:22:58,560
in fact they're the only source my

2105
01:23:02,629 --> 01:22:59,600
family trusts for

2106
01:23:05,750 --> 01:23:02,639
our preparedness plan you should too

2107
01:23:08,310 --> 01:23:05,760
right now save 20 off a full four week

2108
01:23:11,910 --> 01:23:08,320
supply of delicious meals that provide 2

2109
01:23:14,870 --> 01:23:11,920
000 calories a day saving 20 helps too

2110
01:23:16,709 --> 01:23:14,880
doesn't it especially now so go to

2111
01:23:19,590 --> 01:23:16,719
prepare with jimmy.com

2112
01:23:20,629 --> 01:23:19,600
and get ready that's prepare with jimmy

2113
01:23:25,669 --> 01:23:20,639

dot com

2114

01:23:32,149 --> 01:23:29,709

so you love talk radio then you'll love

2115

01:23:33,030 --> 01:23:32,159

talkstreamlive.com talk stream live is

2116

01:23:35,830 --> 01:23:33,040

always on

2117

01:23:37,910 --> 01:23:35,840

24 7 with the best streaming talk shows

2118

01:23:38,709 --> 01:23:37,920

find your favorite talkers and discover

2119

01:23:41,669 --> 01:23:38,719

some new ones

2120

01:23:43,750 --> 01:23:41,679

it's free readily available online or on

2121

01:23:45,830 --> 01:23:43,760

mobile with any smartphone or tablet

2122

01:23:48,550 --> 01:23:45,840

finding your favorite talk shows all in

2123

01:23:51,350 --> 01:23:48,560

one place has gotten a whole lot easier

2124

01:23:53,590 --> 01:23:51,360

just go to talkstreamlive.com be sure to

2125

01:23:56,950 --> 01:23:53,600

download the free apps from google play

2126

01:24:00,229 --> 01:23:56,960

or the itunes app store

2127

01:24:02,140 --> 01:24:00,239

you listen to us and we listen to you

2128

01:24:06,510 --> 01:24:02,150

and so does the c.i.a

2129

01:24:10,229 --> 01:24:06,520

[Music]

2130

01:24:17,030 --> 01:24:12,229

you are listening to fate to black with

2131

01:24:19,590 --> 01:24:17,040

jimmy church on the game changer network

2132

01:24:20,629 --> 01:24:19,600

hi i'm reece evans you're listening to

2133

01:24:23,830 --> 01:24:20,639

jimmy church

2134

01:24:25,110 --> 01:24:23,840

this is revolution the revolution will

2135

01:24:28,830 --> 01:24:25,120

not be televised

2136

01:24:33,270 --> 01:24:28,840

the revolution is on radio

2137

01:25:14,950 --> 01:25:12,950

[Music]

2138

01:25:17,189 --> 01:25:14,960

welcome back fade to black i am your

2139

01:25:19,149 --> 01:25:17,199

host jimmy church tonight professor avi

2140

01:25:20,390 --> 01:25:19,159

lope we're talking about his book

2141

01:25:21,709 --> 01:25:20,400

extraterrestrial

2142

01:25:23,110 --> 01:25:21,719

the links are over at

2143

01:25:24,709 --> 01:25:23,120

jimmychurchradio.com we've got

2144

01:25:27,270 --> 01:25:24,719

everything up in twitter

2145

01:25:28,870 --> 01:25:27,280

a great conversation tonight and right

2146

01:25:30,790 --> 01:25:28,880

before the break avi

2147

01:25:32,149 --> 01:25:30,800

we were talking about the public

2148

01:25:34,709 --> 01:25:32,159

acceptance

2149

01:25:35,750 --> 01:25:34,719

and and there's a little bit going on

2150

01:25:38,709 --> 01:25:35,760

now too

2151
01:25:40,790 --> 01:25:38,719
with mass media and the way that these

2152
01:25:44,629 --> 01:25:40,800
subjects are being reported

2153
01:25:47,830 --> 01:25:44,639
it's never been this free form

2154
01:25:50,550 --> 01:25:47,840
uh with mass media before there's always

2155
01:25:52,629 --> 01:25:50,560
been a lot of ridicule tinfoil hats and

2156
01:25:54,310 --> 01:25:52,639
the conspiracy circles and and

2157
01:25:57,110 --> 01:25:54,320
everything else that comes

2158
01:25:57,910 --> 01:25:57,120
with these subjects today it's not funny

2159
01:26:00,629 --> 01:25:57,920
haha

2160
01:26:01,189 --> 01:26:00,639
anymore and the response that you have

2161
01:26:04,470 --> 01:26:01,199
gotten

2162
01:26:06,870 --> 01:26:04,480
and the support uh from not only

2163
01:26:09,350 --> 01:26:06,880

our community but the rest of the world

2164

01:26:12,390 --> 01:26:09,360

says that we need this information

2165

01:26:14,310 --> 01:26:12,400

and the mass media is giving it to them

2166

01:26:15,669 --> 01:26:14,320

whether it's with fast radio bursts so

2167

01:26:18,790 --> 01:26:15,679

exoplanets and

2168

01:26:19,350 --> 01:26:18,800

and searches and of course uh what's

2169

01:26:21,270 --> 01:26:19,360

going on

2170

01:26:22,790 --> 01:26:21,280

right now with mars and the search for

2171

01:26:25,030 --> 01:26:22,800

life this is

2172

01:26:26,470 --> 01:26:25,040

one of the things that the public wants

2173

01:26:29,990 --> 01:26:26,480

answers to

2174

01:26:30,790 --> 01:26:30,000

isn't it definitely uh just yesterday

2175

01:26:33,910 --> 01:26:30,800

there was a

2176
01:26:38,070 --> 01:26:33,920
youtube video that was posted by vice

2177
01:26:39,910 --> 01:26:38,080
news uh 14 minutes long

2178
01:26:41,510 --> 01:26:39,920
based on an interview with me that took

2179
01:26:44,070 --> 01:26:41,520
place a few weeks ago and

2180
01:26:44,870 --> 01:26:44,080
it within a day it got a quarter of a

2181
01:26:46,950 --> 01:26:44,880
million

2182
01:26:48,070 --> 01:26:46,960
views you know that's amazing that's

2183
01:26:51,350 --> 01:26:48,080
like more than

2184
01:26:53,990 --> 01:26:51,360
a popular song that the

2185
01:26:54,950 --> 01:26:54,000
you know by by popular artist gets in

2186
01:26:56,550 --> 01:26:54,960
one day

2187
01:26:58,310 --> 01:26:56,560
it just shows you how interested the

2188
01:27:01,669 --> 01:26:58,320

public is and

2189

01:27:03,270 --> 01:27:01,679

it was 14 minutes long uh now my book

2190

01:27:06,950 --> 01:27:03,280

also became a bestseller in

2191

01:27:11,189 --> 01:27:06,960

many countries and uh you know i got

2192

01:27:15,510 --> 01:27:14,550

messages from filmmakers and producers

2193

01:27:17,510 --> 01:27:15,520

that

2194

01:27:19,430 --> 01:27:17,520

showed interest in the book and it's

2195

01:27:23,590 --> 01:27:19,440

going out to 26

2196

01:27:27,110 --> 01:27:23,600

editions in 23 languages worldwide and

2197

01:27:30,070 --> 01:27:27,120

i get emails every day i got an email

2198

01:27:31,350 --> 01:27:30,080

a few days ago from malawi in africa

2199

01:27:33,750 --> 01:27:31,360

from a woman that said

2200

01:27:35,910 --> 01:27:33,760

your book is great and uh you know i

2201
01:27:38,790 --> 01:27:35,920
might want to become an astronomer

2202
01:27:39,430 --> 01:27:38,800
and i said to her i said uh you know

2203
01:27:41,270 --> 01:27:39,440
when i

2204
01:27:43,590 --> 01:27:41,280
thought about writing the book i told my

2205
01:27:46,149 --> 01:27:43,600
publisher that my main motivation

2206
01:27:46,950 --> 01:27:46,159
is to convince someone somewhere in the

2207
01:27:49,110 --> 01:27:46,960
world

2208
01:27:51,189 --> 01:27:49,120
to become a scientist and if one person

2209
01:27:54,070 --> 01:27:51,199
does it as a result of reading my book

2210
01:27:54,950 --> 01:27:54,080
i would be satisfied so i asked her are

2211
01:27:58,149 --> 01:27:54,960
you the one

2212
01:28:01,110 --> 01:27:58,159
scientist after reading my book

2213
01:28:03,590 --> 01:28:01,120

and she said maybe and then i got an

2214

01:28:05,669 --> 01:28:03,600

email from

2215

01:28:06,950 --> 01:28:05,679

an undergraduate student in colombia

2216

01:28:09,669 --> 01:28:06,960

saying your book

2217

01:28:11,750 --> 01:28:09,679

changed my life and then i got an email

2218

01:28:13,669 --> 01:28:11,760

from a lawyer in palo alto

2219

01:28:15,669 --> 01:28:13,679

saying keep doing what you're doing it's

2220

01:28:17,830 --> 01:28:15,679

amazing uh you know and i

2221

01:28:19,830 --> 01:28:17,840

i get these emails every day and that

2222

01:28:22,310 --> 01:28:19,840

keeps me going so to speak

2223

01:28:23,510 --> 01:28:22,320

because you know that that was one of

2224

01:28:26,390 --> 01:28:23,520

the important

2225

01:28:28,229 --> 01:28:26,400

uh messages i wanted to convey that

2226

01:28:30,709 --> 01:28:28,239

science can be exciting

2227

01:28:31,750 --> 01:28:30,719

and can be relevant to the public now if

2228

01:28:35,110 --> 01:28:31,760

you get that same

2229

01:28:35,669 --> 01:28:35,120

email uh from brian greene you know let

2230

01:28:39,430 --> 01:28:35,679

me know

2231

01:28:42,629 --> 01:28:39,440

right where no yeah exactly

2232

01:28:44,149 --> 01:28:42,639

and and you know with uh the i i like to

2233

01:28:46,070 --> 01:28:44,159

call them you know the rock star

2234

01:28:48,470 --> 01:28:46,080

physicist out there

2235

01:28:49,430 --> 01:28:48,480

um and they are they've they've got a

2236

01:28:52,709 --> 01:28:49,440

tremendous

2237

01:28:53,189 --> 01:28:52,719

amount of influence and and people hang

2238

01:28:56,629 --> 01:28:53,199

on their

2239

01:28:59,910 --> 01:28:56,639

every word we need to uh

2240

01:29:02,470 --> 01:28:59,920

get them uh uh

2241

01:29:03,110 --> 01:29:02,480

on board how do we do how do we do that

2242

01:29:07,830 --> 01:29:03,120

how do we

2243

01:29:10,950 --> 01:29:07,840

change uh that side of academia

2244

01:29:14,149 --> 01:29:10,960

well rather than engage in uh uh

2245

01:29:14,550 --> 01:29:14,159

you know lengthy discussions that will

2246

01:29:17,830 --> 01:29:14,560

not

2247

01:29:19,910 --> 01:29:17,840

uh end anywhere other you know away from

2248

01:29:21,030 --> 01:29:19,920

their prejudice the simplest way to do

2249

01:29:22,870 --> 01:29:21,040

that is

2250

01:29:24,229 --> 01:29:22,880

getting more evidence you know if we if

2251

01:29:27,270 --> 01:29:24,239

we have a photograph

2252

01:29:28,310 --> 01:29:27,280

of an object like and it doesn't look

2253

01:29:30,870 --> 01:29:28,320

like a rock

2254

01:29:31,510 --> 01:29:30,880

they cannot say anything about it right

2255

01:29:33,189 --> 01:29:31,520

so

2256

01:29:34,950 --> 01:29:33,199

i think what we need is to collect more

2257

01:29:36,790 --> 01:29:34,960

evidence now that of course

2258

01:29:37,990 --> 01:29:36,800

their approach would argue it's always a

2259

01:29:40,790 --> 01:29:38,000

rock we don't need to get

2260

01:29:42,149 --> 01:29:40,800

the evidence uh which is their prejudice

2261

01:29:44,790 --> 01:29:42,159

but somehow you know

2262

01:29:46,550 --> 01:29:44,800

if enough people try to collect the

2263

01:29:47,830 --> 01:29:46,560

evidence just like in the case of hot

2264

01:29:50,790 --> 01:29:47,840

jupiters you know that

2265

01:29:53,030 --> 01:29:50,800

eventually someone observed the system

2266

01:29:54,629 --> 01:29:53,040

that has a jupiter close into a star

2267

01:29:56,149 --> 01:29:54,639

irrespective of what people in the

2268

01:29:57,830 --> 01:29:56,159

mainstream community were saying that

2269

01:29:59,350 --> 01:29:57,840

such a system should not exist

2270

01:30:01,189 --> 01:29:59,360

right and where are all these people

2271

01:30:03,110 --> 01:30:01,199

that argue that it shouldn't exist

2272

01:30:04,950 --> 01:30:03,120

they disappeared suddenly suddenly

2273

01:30:06,070 --> 01:30:04,960

nobody you know everyone was silent

2274

01:30:08,709 --> 01:30:06,080

didn't nobody said

2275

01:30:10,390 --> 01:30:08,719

oh i was wrong nobody would say that you

2276

01:30:13,750 --> 01:30:10,400

know i can give you an exam another

2277

01:30:16,709 --> 01:30:13,760

example in 2013 i gave a lecture at the

2278

01:30:19,030 --> 01:30:16,719

winter school about and the lecture was

2279

01:30:22,550 --> 01:30:19,040

about gravitational waves um

2280

01:30:24,149 --> 01:30:22,560

and then another lecturer that was 20

2281

01:30:25,830 --> 01:30:24,159

years younger than i am so it has

2282

01:30:29,110 --> 01:30:25,840

nothing to do with age

2283

01:30:30,870 --> 01:30:29,120

he stood up and said how dare you waste

2284

01:30:32,470 --> 01:30:30,880

the time of these students

2285

01:30:34,229 --> 01:30:32,480

on a subject that will never be

2286

01:30:37,030 --> 01:30:34,239

important for them

2287

01:30:38,629 --> 01:30:37,040

during their career and you know just a

2288

01:30:41,750 --> 01:30:38,639

couple of years later

2289

01:30:44,070 --> 01:30:41,760

the ligo experiment discovered the first

2290

01:30:45,669 --> 01:30:44,080

gravitational wave signal and that

2291

01:30:47,270 --> 01:30:45,679

opened up a whole new frontier of

2292

01:30:48,950 --> 01:30:47,280

gravitational wave astrophysics the one

2293

01:30:51,910 --> 01:30:48,960

that i was talking about

2294

01:30:52,790 --> 01:30:51,920

and the the same students that were in

2295

01:30:55,910 --> 01:30:52,800

the audience

2296

01:30:58,629 --> 01:30:55,920

were still doing their phd so

2297

01:30:59,510 --> 01:30:58,639

uh that person who said made that

2298

01:31:01,510 --> 01:30:59,520

comment to me

2299

01:31:03,510 --> 01:31:01,520

he sort of disappeared he never you know

2300

01:31:03,990 --> 01:31:03,520

he never said oh i was wrong he sort of

2301
01:31:07,189 --> 01:31:04,000
said

2302
01:31:09,430 --> 01:31:07,199
you know you never hear from him uh so

2303
01:31:10,310 --> 01:31:09,440
the point is once you have conclusive

2304
01:31:12,149 --> 01:31:10,320
evidence

2305
01:31:14,229 --> 01:31:12,159
suddenly all these people that the

2306
01:31:15,669 --> 01:31:14,239
naysayers will disappear

2307
01:31:17,669 --> 01:31:15,679
they will never admit that they were

2308
01:31:19,590 --> 01:31:17,679
wrong they will never say oh

2309
01:31:20,950 --> 01:31:19,600
it's too bad we should not have

2310
01:31:24,790 --> 01:31:20,960
suppressed

2311
01:31:26,709 --> 01:31:24,800
this particular brand of innovation

2312
01:31:28,709 --> 01:31:26,719
you will never find any trace for the

2313
01:31:30,310 --> 01:31:28,719

fact that that they resisted it and

2314

01:31:31,910 --> 01:31:30,320

tried to bully it and try

2315

01:31:33,510 --> 01:31:31,920

you know they would suddenly say oh yeah

2316

01:31:37,350 --> 01:31:33,520

of course why not

2317

01:31:38,390 --> 01:31:37,360

well and that's one of the most valuable

2318

01:31:41,830 --> 01:31:38,400

points

2319

01:31:44,950 --> 01:31:41,840

about science that frustrates me because

2320

01:31:46,310 --> 01:31:44,960

we can go back to you know it's lead by

2321

01:31:49,590 --> 01:31:46,320

example

2322

01:31:53,270 --> 01:31:49,600

albert einstein static universe

2323

01:31:54,709 --> 01:31:53,280

that is what he believed he hangs out

2324

01:31:56,790 --> 01:31:54,719

with edwin hubble

2325

01:31:58,390 --> 01:31:56,800

looks through the telescope edwin says

2326

01:32:00,550 --> 01:31:58,400

hey there's some motion

2327

01:32:02,629 --> 01:32:00,560

right there's some things going on here

2328

01:32:06,550 --> 01:32:02,639

i think you need to check it out

2329

01:32:09,910 --> 01:32:06,560

and einstein went back and said hey

2330

01:32:13,110 --> 01:32:09,920

you know i was wrong the universe

2331

01:32:15,910 --> 01:32:13,120

isn't static the solar system is moving

2332

01:32:17,510 --> 01:32:15,920

there is movement going on up there i

2333

01:32:20,709 --> 01:32:17,520

need to go back and take a look

2334

01:32:22,390 --> 01:32:20,719

and he changed his equations and we

2335

01:32:24,629 --> 01:32:22,400

accepted that

2336

01:32:25,430 --> 01:32:24,639

isn't that a lesson that anybody should

2337

01:32:28,550 --> 01:32:25,440

uh go

2338

01:32:30,870 --> 01:32:28,560

and take a look at today yeah so

2339

01:32:31,750 --> 01:32:30,880

um you know physics is a learning

2340

01:32:33,910 --> 01:32:31,760

experience

2341

01:32:35,910 --> 01:32:33,920

we can be wrong you know making mistakes

2342

01:32:37,910 --> 01:32:35,920

is part of the process

2343

01:32:39,669 --> 01:32:37,920

and as long as you accept it and don't

2344

01:32:40,070 --> 01:32:39,679

take it personally you know it's not

2345

01:32:46,790 --> 01:32:40,080

about

2346

01:32:48,390 --> 01:32:46,800

and right now what happens in academia

2347

01:32:49,990 --> 01:32:48,400

unfortunately is that the

2348

01:32:51,669 --> 01:32:50,000

you know people are motivated they're

2349

01:32:53,350 --> 01:32:51,679

getting rewarded for showing that

2350

01:32:54,870 --> 01:32:53,360

they're smart rather than for finding

2351

01:32:57,669 --> 01:32:54,880

the truth you know and

2352

01:32:59,350 --> 01:32:57,679

as a result they escape into corners

2353

01:32:59,830 --> 01:32:59,360

where they never get tested you know

2354

01:33:03,910 --> 01:32:59,840

they

2355

01:33:05,590 --> 01:33:03,920

intellectual gymnastics and

2356

01:33:07,430 --> 01:33:05,600

you know fancy mathematics and

2357

01:33:09,270 --> 01:33:07,440

demonstrate that they're smart and

2358

01:33:11,910 --> 01:33:09,280

but it doesn't serve any good purpose

2359

01:33:14,070 --> 01:33:11,920

because you know okay they get honors

2360

01:33:14,629 --> 01:33:14,080

awards they belong to honor societies

2361

01:33:16,550 --> 01:33:14,639

but

2362

01:33:18,550 --> 01:33:16,560

they don't necessarily describe nature

2363

01:33:20,229 --> 01:33:18,560

by saying that string theory is right or

2364

01:33:22,870 --> 01:33:20,239

by saying that

2365

01:33:23,510 --> 01:33:22,880

extra dimensions are potentially out

2366

01:33:29,270 --> 01:33:23,520

there

2367

01:33:31,430 --> 01:33:29,280

and who cares that a bunch of physicists

2368

01:33:34,709 --> 01:33:31,440

decides and agrees

2369

01:33:36,629 --> 01:33:34,719

to pursue that as you know a sandbox to

2370

01:33:38,950 --> 01:33:36,639

demonstrate that they are smart

2371

01:33:40,550 --> 01:33:38,960

it's not really relevant what matters is

2372

01:33:42,070 --> 01:33:40,560

you have to put skin in the game you

2373

01:33:44,229 --> 01:33:42,080

have to make predictions

2374

01:33:46,709 --> 01:33:44,239

that are testable that could be proven

2375

01:33:49,350 --> 01:33:46,719

wrong but if they are proven right

2376

01:33:49,990 --> 01:33:49,360

it demonstrates that you are right and

2377

01:33:52,550 --> 01:33:50,000

that's the way

2378

01:33:55,430 --> 01:33:52,560

physics progressed along the years and

2379

01:33:57,430 --> 01:33:55,440

unfortunately now this culture is quite

2380

01:33:59,110 --> 01:33:57,440

dominant you know the culture of not

2381

01:34:01,430 --> 01:33:59,120

testing your ideas

2382

01:34:02,790 --> 01:34:01,440

of just showing that you are smart of

2383

01:34:06,070 --> 01:34:02,800

hanging around with

2384

01:34:09,270 --> 01:34:06,080

like-minded people groupthink uh

2385

01:34:11,750 --> 01:34:09,280

and and ridiculing innovation ridiculing

2386

01:34:13,910 --> 01:34:11,760

thinking outside the box you know and

2387

01:34:16,149 --> 01:34:13,920

it's really unfortunate because academia

2388

01:34:19,030 --> 01:34:16,159

should be the place where innovation

2389

01:34:19,590 --> 01:34:19,040

blossoms you know instead what you find

2390

01:34:25,110 --> 01:34:19,600

is

2391

01:34:25,830 --> 01:34:25,120

you know it's for-profit recognizes the

2392

01:34:29,590 --> 01:34:25,840

value

2393

01:34:31,750 --> 01:34:29,600

taking risks

2394

01:34:34,629 --> 01:34:31,760

and sometimes failing because every now

2395

01:34:37,189 --> 01:34:34,639

and then you discover something new that

2396

01:34:39,270 --> 01:34:37,199

carries a huge revenue that more than

2397

01:34:42,870 --> 01:34:39,280

compensates for the mistakes

2398

01:34:45,270 --> 01:34:42,880

and if the private sector you know apple

2399

01:34:46,870 --> 01:34:45,280

spacex google and so forth have these

2400

01:34:50,070 --> 01:34:46,880

groups of people that

2401

01:34:51,109 --> 01:34:50,080

you know take risks i think you know

2402

01:34:54,149 --> 01:34:51,119

it's a

2403

01:34:55,350 --> 01:34:54,159

red light for academia not to be better

2404

01:34:57,590 --> 01:34:55,360

than that and

2405

01:34:59,430 --> 01:34:57,600

we we are not better than that academia

2406

01:34:59,990 --> 01:34:59,440

is not innovating more than the private

2407

01:35:02,310 --> 01:35:00,000

sector right

2408

01:35:03,510 --> 01:35:02,320

now and it's quite unfortunate it should

2409

01:35:06,870 --> 01:35:03,520

be the other way around

2410

01:35:10,950 --> 01:35:06,880

it's you you said the key word there um

2411

01:35:14,070 --> 01:35:10,960

uh key words thinking outside the box

2412

01:35:17,270 --> 01:35:14,080

that's what moves things forward

2413

01:35:20,229 --> 01:35:17,280

asking questions pondering

2414

01:35:21,270 --> 01:35:20,239

right wondering and trying to figure

2415

01:35:24,310 --> 01:35:21,280

things out

2416

01:35:25,430 --> 01:35:24,320

not staying inside the box in a safe

2417

01:35:28,470 --> 01:35:25,440

zone

2418

01:35:31,590 --> 01:35:28,480

right and let me give you an example

2419

01:35:31,990 --> 01:35:31,600

uh that i mentioned in my book you know

2420

01:35:42,390 --> 01:35:32,000

i

2421

01:35:44,390 --> 01:35:42,400

space

2422

01:35:45,590 --> 01:35:44,400

in the room you know that the ceiling

2423

01:35:47,910 --> 01:35:45,600

was slanted and

2424

01:35:49,270 --> 01:35:47,920

i couldn't really stand up in the shower

2425

01:35:51,990 --> 01:35:49,280

and uh

2426

01:35:54,070 --> 01:35:52,000

i really didn't like that and at some

2427

01:35:56,149 --> 01:35:54,080

point i decided to take a double room

2428

01:35:57,669 --> 01:35:56,159

so that they have more space and when i

2429

01:36:00,070 --> 01:35:57,679

got to the receptionist

2430

01:36:01,750 --> 01:36:00,080

she asked me where is your wife and i

2431

01:36:05,350 --> 01:36:01,760

said that she's not with me

2432

01:36:09,270 --> 01:36:05,360

and then she said okay i'll give you uh

2433

01:36:12,950 --> 01:36:11,669

uh i'll give you a single room uh and i

2434

01:36:14,870 --> 01:36:12,960

said no i'm actually

2435

01:36:16,709 --> 01:36:14,880

interested in having more space and she

2436

01:36:17,109 --> 01:36:16,719

said oh i understand she thought that i

2437

01:36:18,950 --> 01:36:17,119

have

2438

01:36:20,709 --> 01:36:18,960

i'm having an affair or something that i

2439

01:36:21,350 --> 01:36:20,719

need the extra i said no i'm coming from

2440

01:36:24,310 --> 01:36:21,360

the us

2441

01:36:25,830 --> 01:36:24,320

and i'm used to having more space and

2442

01:36:29,750 --> 01:36:25,840

then it's at that point i

2443

01:36:33,590 --> 01:36:29,760

i decided to ask uh my hosts

2444

01:36:36,070 --> 01:36:33,600

as to why is there so little space

2445

01:36:38,950 --> 01:36:36,080

in the hotel rooms uh and they told me

2446

01:36:40,870 --> 01:36:38,960

well we have a rule in this town that

2447

01:36:42,390 --> 01:36:40,880

no building should be taller than the

2448

01:36:44,390 --> 01:36:42,400

church

2449

01:36:46,310 --> 01:36:44,400

and so i thought about it for a second

2450

01:36:49,030 --> 01:36:46,320

and then i said okay why don't you make

2451

01:36:51,270 --> 01:36:49,040

the church taller

2452

01:36:52,310 --> 01:36:51,280

and they said we haven't thought about

2453

01:36:56,950 --> 01:36:52,320

that

2454

01:36:59,109 --> 01:36:56,960

it came to me immediately

2455

01:37:00,390 --> 01:36:59,119

and for centuries they never

2456

01:37:02,229 --> 01:37:00,400

contemplated

2457

01:37:04,310 --> 01:37:02,239

making the church taller so that they

2458

01:37:07,430 --> 01:37:04,320

would have more room

2459

01:37:09,270 --> 01:37:07,440

seems simple to me right

2460

01:37:11,030 --> 01:37:09,280

yeah i mean these ideas come to me

2461

01:37:13,270 --> 01:37:11,040

without much effort and

2462

01:37:14,390 --> 01:37:13,280

i'm really surprised sometimes as to why

2463

01:37:16,950 --> 01:37:14,400

they don't

2464

01:37:17,510 --> 01:37:16,960

they're not recognized by others now i i

2465

01:37:19,990 --> 01:37:17,520

wanted

2466

01:37:22,629 --> 01:37:20,000

to uh talk about the fermi paradox for a

2467

01:37:23,910 --> 01:37:22,639

second and not to go off into the fermi

2468

01:37:27,270 --> 01:37:23,920

paradox

2469

01:37:30,950 --> 01:37:27,280

but where we uh

2470

01:37:34,390 --> 01:37:30,960

stand today when enrico

2471

01:37:36,709 --> 01:37:34,400

first had this thought

2472

01:37:37,750 --> 01:37:36,719

there were no exoplanets we thought the

2473

01:37:40,790 --> 01:37:37,760

solar system

2474

01:37:41,350 --> 01:37:40,800

we were it and and and trying to expand

2475

01:37:44,149 --> 01:37:41,360

on that

2476
01:37:45,750 --> 01:37:44,159
and what stars and all the hypotheticals

2477
01:37:46,870 --> 01:37:45,760
that had to be plugged into the fermi

2478
01:37:49,910 --> 01:37:46,880
paradox

2479
01:37:50,870 --> 01:37:49,920
um made that number what it was back

2480
01:37:53,910 --> 01:37:50,880
then

2481
01:37:54,229 --> 01:37:53,920
today what we with what we understand

2482
01:37:57,830 --> 01:37:54,239
with

2483
01:37:59,750 --> 01:37:57,840
modern astronomy stars the ages of

2484
01:38:00,790 --> 01:37:59,760
things and certainly now the amount of

2485
01:38:03,830 --> 01:38:00,800
planets uh

2486
01:38:06,870 --> 01:38:03,840
in the milky way that changes

2487
01:38:08,870 --> 01:38:06,880
the game completely doesn't it

2488
01:38:10,870 --> 01:38:08,880

yeah but also we know that we are

2489

01:38:12,070 --> 01:38:10,880

developing the means for our own

2490

01:38:13,270 --> 01:38:12,080

destruction you know we have

2491

01:38:15,189 --> 01:38:13,280

technologies that

2492

01:38:16,310 --> 01:38:15,199

were developed over the past century and

2493

01:38:18,950 --> 01:38:16,320

they already

2494

01:38:20,070 --> 01:38:18,960

you know have an effect on the planet

2495

01:38:22,310 --> 01:38:20,080

climate

2496

01:38:23,510 --> 01:38:22,320

and it's possible that the technological

2497

01:38:25,910 --> 01:38:23,520

civilizations

2498

01:38:28,149 --> 01:38:25,920

you know have a short lifetime and so

2499

01:38:31,189 --> 01:38:28,159

the chance of us having a conversation

2500

01:38:33,830 --> 01:38:31,199

with another civilization that is

2501
01:38:35,669 --> 01:38:33,840
as advanced as ours is small because

2502
01:38:39,270 --> 01:38:35,679
they are short-lived

2503
01:38:41,030 --> 01:38:39,280
uh and you know the the fermi paradox

2504
01:38:42,790 --> 01:38:41,040
where is everybody

2505
01:38:44,229 --> 01:38:42,800
is a bit presumptuous you know when i

2506
01:38:47,750 --> 01:38:44,239
met my wife

2507
01:38:50,709 --> 01:38:47,760
uh she had friends that used to wait for

2508
01:38:50,950 --> 01:38:50,719
prince charming on a white horse to come

2509
01:38:55,109 --> 01:38:50,960
and

2510
01:38:58,390 --> 01:38:55,119
that never happened

2511
01:39:02,550 --> 01:38:58,400
so i think it's presumptuous of us to

2512
01:39:05,669 --> 01:39:02,560
assume that we deserve a visit you know

2513
01:39:05,990 --> 01:39:05,679

why should anyone care about us uh you

2514

01:39:08,950 --> 01:39:06,000

know

2515

01:39:10,870 --> 01:39:08,960

probably things like us existed for

2516

01:39:12,310 --> 01:39:10,880

billions of years before us

2517

01:39:14,310 --> 01:39:12,320

and even things that are much more

2518

01:39:16,310 --> 01:39:14,320

advanced than we are you know we

2519

01:39:18,070 --> 01:39:16,320

have become a technological civilization

2520

01:39:19,910 --> 01:39:18,080

only over the past century which is

2521

01:39:22,950 --> 01:39:19,920

really a very short time

2522

01:39:24,470 --> 01:39:22,960

relative to the age of the earth and

2523

01:39:25,830 --> 01:39:24,480

why should we assume that anyone would

2524

01:39:26,709 --> 01:39:25,840

pay attention to us you know we're

2525

01:39:29,750 --> 01:39:26,719

probably

2526

01:39:31,270 --> 01:39:29,760

as common as ants are on a sidewalk

2527

01:39:33,270 --> 01:39:31,280

and when you walk down the street you

2528

01:39:35,510 --> 01:39:33,280

don't pay attention to every ant

2529

01:39:37,590 --> 01:39:35,520

so that would be my first inclination

2530

01:39:39,990 --> 01:39:37,600

and then the other thing to recognize is

2531

01:39:41,990 --> 01:39:40,000

most stars are very different than the

2532

01:39:44,310 --> 01:39:42,000

sun most of them are dwarf stars like

2533

01:39:47,750 --> 01:39:44,320

the nearest star proxima centauri

2534

01:39:49,990 --> 01:39:47,760

and they emit infrared light and

2535

01:39:51,270 --> 01:39:50,000

just imagine those creatures that live

2536

01:39:54,550 --> 01:39:51,280

next to them

2537

01:39:58,229 --> 01:39:54,560

they have infrared eyes and

2538

01:40:00,629 --> 01:39:58,239

no interstellar tourist agency

2539

01:40:01,990 --> 01:40:00,639

would advertise the earth as a desired

2540

01:40:04,390 --> 01:40:02,000

destination because

2541

01:40:05,430 --> 01:40:04,400

all we can offer in our vacation sites

2542

01:40:08,550 --> 01:40:05,440

are

2543

01:40:10,709 --> 01:40:08,560

green grass illuminated by visible light

2544

01:40:11,830 --> 01:40:10,719

and the visible light hurts their eyes

2545

01:40:14,550 --> 01:40:11,840

they are used to

2546

01:40:15,510 --> 01:40:14,560

dark red grass so they would never come

2547

01:40:17,990 --> 01:40:15,520

to visit us

2548

01:40:19,830 --> 01:40:18,000

we have to go out find them and entice

2549

01:40:23,270 --> 01:40:19,840

them to come and visit us

2550

01:40:25,109 --> 01:40:23,280

by offering them a water-based drink

2551

01:40:27,270 --> 01:40:25,119

you know and the other thing to keep in

2552

01:40:28,550 --> 01:40:27,280

mind you know if there are very advanced

2553

01:40:31,750 --> 01:40:28,560

civilizations

2554

01:40:34,390 --> 01:40:31,760

they would perhaps close themselves off

2555

01:40:36,070 --> 01:40:34,400

in a cocoon because any contact with a

2556

01:40:39,189 --> 01:40:36,080

lesser civilization

2557

01:40:40,070 --> 01:40:39,199

would degrade their quality of life and

2558

01:40:41,990 --> 01:40:40,080

so

2559

01:40:43,830 --> 01:40:42,000

you might think oh we will never find

2560

01:40:45,270 --> 01:40:43,840

out about them but that's not true

2561

01:40:47,990 --> 01:40:45,280

because they still throw

2562

01:40:50,070 --> 01:40:48,000

out trash and you know just like

2563

01:40:52,629 --> 01:40:50,080

investigative journalists

2564

01:40:54,149 --> 01:40:52,639

that go through the trash cans of

2565

01:40:56,550 --> 01:40:54,159

celebrities in hollywood

2566

01:40:57,510 --> 01:40:56,560

you know we can look through their trash

2567

01:40:59,510 --> 01:40:57,520

and figure out

2568

01:41:01,109 --> 01:40:59,520

the way they live and that that's

2569

01:41:04,310 --> 01:41:01,119

another reason to

2570

01:41:07,750 --> 01:41:04,320

look for debris in space now

2571

01:41:11,830 --> 01:41:07,760

what if we take that idea and i

2572

01:41:15,109 --> 01:41:11,840

appreciate your view i do but

2573

01:41:18,229 --> 01:41:15,119

millions of people on this planet have

2574

01:41:19,030 --> 01:41:18,239

seen witnessed things that they cannot

2575

01:41:21,189 --> 01:41:19,040

explain

2576

01:41:22,870 --> 01:41:21,199

in the sky going back for millennia this

2577

01:41:25,350 --> 01:41:22,880

isn't a modern thing

2578

01:41:26,790 --> 01:41:25,360

i have seen stuff i'm not going to go

2579

01:41:31,270 --> 01:41:26,800

into right now with you

2580

01:41:33,510 --> 01:41:31,280

avi that truly unexplainable unexplained

2581

01:41:34,550 --> 01:41:33,520

lucky i was lucky right place at the

2582

01:41:37,750 --> 01:41:34,560

right time

2583

01:41:38,070 --> 01:41:37,760

but i can tell you it didn't have wings

2584

01:41:41,750 --> 01:41:38,080

or

2585

01:41:44,070 --> 01:41:41,760

jet engines on it right how do we

2586

01:41:45,910 --> 01:41:44,080

how do we how do we do millions of

2587

01:41:46,470 --> 01:41:45,920

people can't be crazy there's something

2588

01:41:49,590 --> 01:41:46,480

else

2589

01:41:50,310 --> 01:41:49,600

to explain this away yeah so i have a

2590

01:41:52,390 --> 01:41:50,320

simple

2591

01:41:54,070 --> 01:41:52,400

approach to that and you know rather

2592

01:41:56,310 --> 01:41:54,080

than rely on

2593

01:41:58,470 --> 01:41:56,320

you know declassifying documents from

2594

01:42:01,510 --> 01:41:58,480

the pentagon or

2595

01:42:03,669 --> 01:42:01,520

reports from the past that were based on

2596

01:42:05,510 --> 01:42:03,679

instruments that were not really at the

2597

01:42:08,310 --> 01:42:05,520

same quality of the cameras and the

2598

01:42:11,510 --> 01:42:08,320

audio sensors that we have right now

2599

01:42:14,709 --> 01:42:11,520

the best way forward is to

2600

01:42:17,830 --> 01:42:14,719

deploy state-of-the-art instruments

2601
01:42:19,910 --> 01:42:17,840
at the locations where reports came from

2602
01:42:21,350 --> 01:42:19,920
you know and either from military

2603
01:42:23,669 --> 01:42:21,360
personnel or or

2604
01:42:24,629 --> 01:42:23,679
you know private public the general

2605
01:42:26,709 --> 01:42:24,639
public

2606
01:42:28,070 --> 01:42:26,719
and record everything that is happening

2607
01:42:29,830 --> 01:42:28,080
there you know we now have the

2608
01:42:31,189 --> 01:42:29,840
technology that allows us to get much

2609
01:42:33,990 --> 01:42:31,199
better data

2610
01:42:34,870 --> 01:42:34,000
and then just analyze it like a

2611
01:42:37,430 --> 01:42:34,880
scientific

2612
01:42:39,669 --> 01:42:37,440
experiment you know that the essence of

2613
01:42:40,870 --> 01:42:39,679

science is reproducibility the ability

2614

01:42:43,030 --> 01:42:40,880

to reproduce

2615

01:42:44,550 --> 01:42:43,040

phenomena that you know someone claims

2616

01:42:47,189 --> 01:42:44,560

to have seen and we can

2617

01:42:47,990 --> 01:42:47,199

see it again and unless you see it again

2618

01:42:50,550 --> 01:42:48,000

you can't really

2619

01:42:51,830 --> 01:42:50,560

verify that you know what the root of

2620

01:42:54,790 --> 01:42:51,840

what the origin of the

2621

01:42:55,270 --> 01:42:54,800

phenomena is and the way i think of it

2622

01:42:56,950 --> 01:42:55,280

is

2623

01:42:58,629 --> 01:42:56,960

just like you know the biblical story

2624

01:43:01,189 --> 01:42:58,639

about abraham

2625

01:43:03,750 --> 01:43:01,199

that heard the voice of god telling him

2626

01:43:07,270 --> 01:43:03,760

to sacrifice his only son

2627

01:43:09,669 --> 01:43:07,280

isaac if abraham had a cell phone

2628

01:43:10,950 --> 01:43:09,679

with a voice memo up he could have

2629

01:43:13,510 --> 01:43:10,960

pressed the button

2630

01:43:15,030 --> 01:43:13,520

and recorded the voice of god and then

2631

01:43:18,390 --> 01:43:15,040

we wouldn't really need

2632

01:43:20,310 --> 01:43:18,400

to um you know either believe him or not

2633

01:43:22,550 --> 01:43:20,320

believe the story of the eyewitness

2634

01:43:23,910 --> 01:43:22,560

testimony that he provided or

2635

01:43:25,910 --> 01:43:23,920

we we could have listened to the

2636

01:43:27,350 --> 01:43:25,920

recording and that's why scientific

2637

01:43:29,109 --> 01:43:27,360

instrumentation

2638

01:43:30,950 --> 01:43:29,119

is so crucial because it's not

2639

01:43:32,950 --> 01:43:30,960

subjective you know

2640

01:43:34,709 --> 01:43:32,960

we can analyze it just like any

2641

01:43:37,750 --> 01:43:34,719

scientific experiment so

2642

01:43:40,470 --> 01:43:37,760

i'm very much in favor of placing

2643

01:43:42,390 --> 01:43:40,480

instrumentation and searching you know

2644

01:43:44,310 --> 01:43:42,400

for any unusual phenomena

2645

01:43:46,950 --> 01:43:44,320

in those locations where reports came

2646

01:43:50,390 --> 01:43:46,960

from for for unidentified flying objects

2647

01:43:53,510 --> 01:43:50,400

now what do you make of uh the sudden

2648

01:43:55,750 --> 01:43:53,520

conversation that is going on uh with

2649

01:43:57,510 --> 01:43:55,760

the pentagon with the navy the senate

2650

01:44:00,550 --> 01:43:57,520

intelligence committee

2651
01:44:01,430 --> 01:44:00,560
uh the uap task force that is looking

2652
01:44:04,470 --> 01:44:01,440
into this

2653
01:44:07,990 --> 01:44:04,480
unidentified aerial phenomenon that

2654
01:44:09,830 --> 01:44:08,000
this this is something that is uh public

2655
01:44:11,109 --> 01:44:09,840
it's it's never really been this way

2656
01:44:15,750 --> 01:44:11,119
before why

2657
01:44:18,790 --> 01:44:15,760
is the pentagon discussing et's

2658
01:44:20,790 --> 01:44:18,800
in the public right well so so

2659
01:44:21,990 --> 01:44:20,800
the the reason the government the

2660
01:44:25,910 --> 01:44:22,000
pentagon

2661
01:44:28,229 --> 01:44:25,920
uh the military is interested in this

2662
01:44:28,950 --> 01:44:28,239
question of what these reports are about

2663
01:44:31,189 --> 01:44:28,960

is of course

2664

01:44:33,030 --> 01:44:31,199

national security because it's also

2665

01:44:34,310 --> 01:44:33,040

possible that other nations have

2666

01:44:36,950 --> 01:44:34,320

technologies that

2667

01:44:38,229 --> 01:44:36,960

we do not possess and are spying on us

2668

01:44:40,470 --> 01:44:38,239

and we want to know that

2669

01:44:42,229 --> 01:44:40,480

okay so that's why the government would

2670

01:44:44,629 --> 01:44:42,239

be interested in those reports

2671

01:44:46,229 --> 01:44:44,639

and it's not because the government is

2672

01:44:48,310 --> 01:44:46,239

interested in extraterrestrial

2673

01:44:51,830 --> 01:44:48,320

intelligence

2674

01:44:52,790 --> 01:44:51,840

so from the perspective of the

2675

01:44:55,910 --> 01:44:52,800

government

2676

01:44:57,750 --> 01:44:55,920

these unusual phenomena are you know

2677

01:44:59,270 --> 01:44:57,760

need to be investigated just to figure

2678

01:45:02,390 --> 01:44:59,280

out that they do not

2679

01:45:03,030 --> 01:45:02,400

imply some technologies that other

2680

01:45:05,910 --> 01:45:03,040

nations

2681

01:45:07,669 --> 01:45:05,920

possess and from the point of view of

2682

01:45:09,990 --> 01:45:07,679

science and the public of course

2683

01:45:11,590 --> 01:45:10,000

we want to know whether they reflect

2684

01:45:13,430 --> 01:45:11,600

something else

2685

01:45:15,030 --> 01:45:13,440

if they are human-made they would not be

2686

01:45:16,310 --> 01:45:15,040

that interesting if there are natural

2687

01:45:18,390 --> 01:45:16,320

phenomena by nature

2688

01:45:20,870 --> 01:45:18,400

also they would not be that interesting

2689

01:45:21,990 --> 01:45:20,880

so i think the best path forward is

2690

01:45:25,030 --> 01:45:22,000

rather than

2691

01:45:26,470 --> 01:45:25,040

insist on the pentagon releasing the

2692

01:45:28,550 --> 01:45:26,480

data

2693

01:45:31,430 --> 01:45:28,560

using the information is for us to just

2694

01:45:34,629 --> 01:45:31,440

do an open uh scientific

2695

01:45:37,669 --> 01:45:34,639

study of whether there are any unusual

2696

01:45:38,629 --> 01:45:37,679

things happening and you know that will

2697

01:45:40,550 --> 01:45:38,639

give us

2698

01:45:42,149 --> 01:45:40,560

all the info the information will not

2699

01:45:44,149 --> 01:45:42,159

will be open to the public

2700

01:45:45,750 --> 01:45:44,159

and will be based on the best scientific

2701

01:45:47,990 --> 01:45:45,760

instrumentation that we have best

2702

01:45:50,950 --> 01:45:48,000

cameras best audio sensors

2703

01:45:52,310 --> 01:45:50,960

now what is scarier to you what is more

2704

01:45:55,030 --> 01:45:52,320

concerning

2705

01:45:55,750 --> 01:45:55,040

the pilots describing something going

2706

01:45:58,070 --> 01:45:55,760

from 80

2707

01:45:58,950 --> 01:45:58,080

000 feet to sea level in a couple of

2708

01:46:01,669 --> 01:45:58,960

seconds

2709

01:46:02,310 --> 01:46:01,679

uh fly you know the the videos that's

2710

01:46:05,350 --> 01:46:02,320

out there

2711

01:46:08,629 --> 01:46:05,360

and and the radar stuff that

2712

01:46:12,790 --> 01:46:08,639

their testimony has uh has stated

2713

01:46:16,470 --> 01:46:12,800

or it being extraterrestrial

2714

01:46:19,830 --> 01:46:16,480

right is it is it us is it is it

2715

01:46:23,030 --> 01:46:19,840

is it uh weapons or something that china

2716

01:46:28,310 --> 01:46:23,040

or russia would have is that alarming

2717

01:46:32,229 --> 01:46:30,390

of course the et would be more alarming

2718

01:46:34,070 --> 01:46:32,239

because it would imply there is

2719

01:46:35,270 --> 01:46:34,080

something that we fundamentally do not

2720

01:46:37,030 --> 01:46:35,280

understand and they are trying to

2721

01:46:39,350 --> 01:46:37,040

collect information on us and

2722

01:46:40,950 --> 01:46:39,360

you know the realm of possibilities of

2723

01:46:44,149 --> 01:46:40,960

who is behind

2724

01:46:45,990 --> 01:46:44,159

uh such a surveillance or spying

2725

01:46:47,270 --> 01:46:46,000

operation from an extraterrestrial

2726

01:46:50,310 --> 01:46:47,280

civilization

2727

01:46:51,910 --> 01:46:50,320

and what other objectives uh you know

2728

01:46:53,510 --> 01:46:51,920

would be much more alarming because we

2729

01:46:55,430 --> 01:46:53,520

are familiar with the intentions of

2730

01:46:57,590 --> 01:46:55,440

russia and china and

2731

01:46:59,030 --> 01:46:57,600

you know they sound pretty mundane they

2732

01:47:00,709 --> 01:46:59,040

you know they just they have

2733

01:47:02,950 --> 01:47:00,719

their military objectives they want to

2734

01:47:05,030 --> 01:47:02,960

get as much information about us and

2735

01:47:06,870 --> 01:47:05,040

you know and so forth but but with

2736

01:47:08,390 --> 01:47:06,880

respect to another civilization we don't

2737

01:47:10,229 --> 01:47:08,400

really know you know there is a lot of

2738

01:47:11,750 --> 01:47:10,239

unknown and

2739

01:47:14,070 --> 01:47:11,760

the more unknown you have the more

2740

01:47:15,669 --> 01:47:14,080

frightened you get uh

2741

01:47:17,350 --> 01:47:15,679

because you don't fully understand where

2742

01:47:19,990 --> 01:47:17,360

it's coming from now

2743

01:47:20,709 --> 01:47:20,000

with us uh when and and i think about

2744

01:47:22,950 --> 01:47:20,719

what these

2745

01:47:24,790 --> 01:47:22,960

things may be that are visiting us i

2746

01:47:27,270 --> 01:47:24,800

think about what we do

2747

01:47:29,030 --> 01:47:27,280

what do we do we've got probes going to

2748

01:47:31,189 --> 01:47:29,040

different planets we're trying to land

2749

01:47:33,350 --> 01:47:31,199

on different planets we're trying to

2750

01:47:34,629 --> 01:47:33,360

videotape and monitor and figure things

2751
01:47:35,830 --> 01:47:34,639
out that's what we're doing we're

2752
01:47:37,510 --> 01:47:35,840
wondering we're trying to find

2753
01:47:40,870 --> 01:47:37,520
exoplanets

2754
01:47:44,470 --> 01:47:40,880
wouldn't et be doing the exact

2755
01:47:45,830 --> 01:47:44,480
same thing well they would do the same

2756
01:47:48,070 --> 01:47:45,840
thing but maybe

2757
01:47:49,350 --> 01:47:48,080
they did it already billions of years

2758
01:47:51,590 --> 01:47:49,360
ago you know and

2759
01:47:52,390 --> 01:47:51,600
uh perhaps you know if they're still

2760
01:47:54,790 --> 01:47:52,400
around they

2761
01:47:56,390 --> 01:47:54,800
know much more than we do and then they

2762
01:47:59,030 --> 01:47:56,400
already answered this question

2763
01:48:00,709 --> 01:47:59,040

and so they may have different

2764

01:48:03,910 --> 01:48:00,719

objectives than we have

2765

01:48:04,629 --> 01:48:03,920

um their body of knowledge is so much

2766

01:48:07,430 --> 01:48:04,639

greater

2767

01:48:09,350 --> 01:48:07,440

and and they develop technologies that

2768

01:48:09,910 --> 01:48:09,360

are so much more advanced than we have

2769

01:48:11,750 --> 01:48:09,920

that

2770

01:48:13,189 --> 01:48:11,760

perhaps they're operating and we don't

2771

01:48:15,109 --> 01:48:13,199

even notice them

2772

01:48:17,189 --> 01:48:15,119

um so you know the realm of

2773

01:48:20,149 --> 01:48:17,199

possibilities is really huge

2774

01:48:21,910 --> 01:48:20,159

when we meet a person uh it's a safe

2775

01:48:23,430 --> 01:48:21,920

assumption to assume that

2776
01:48:25,590 --> 01:48:23,440
you know that person would share the

2777
01:48:28,149 --> 01:48:25,600
same qualities as we do because

2778
01:48:28,950 --> 01:48:28,159
we we share the same genetic heritage

2779
01:48:31,750 --> 01:48:28,960
you know

2780
01:48:34,149 --> 01:48:31,760
and when we meet life from another

2781
01:48:37,189 --> 01:48:34,159
planet that had no contact with

2782
01:48:38,390 --> 01:48:37,199
earth you know it could be shocking

2783
01:48:40,070 --> 01:48:38,400
because

2784
01:48:41,990 --> 01:48:40,080
it may have developed in a completely

2785
01:48:44,229 --> 01:48:42,000
different way and maybe it's also much

2786
01:48:47,510 --> 01:48:44,239
more advanced than we are and

2787
01:48:51,189 --> 01:48:47,520
i think it would be shocking to us uh

2788
01:48:51,830 --> 01:48:51,199

uh once we we meet uh live from another

2789

01:48:53,750 --> 01:48:51,840

planet

2790

01:48:55,430 --> 01:48:53,760

well you know they they're gonna step

2791

01:48:57,270 --> 01:48:55,440

down off of uh

2792

01:48:59,750 --> 01:48:57,280

their starship and they're gonna walk

2793

01:49:03,750 --> 01:48:59,760

down the steps and they're to go

2794

01:49:06,870 --> 01:49:03,760

where's avi we've been listening

2795

01:49:08,870 --> 01:49:06,880

take us to harvey well you know my wife

2796

01:49:11,430 --> 01:49:08,880

jokes about it and says that

2797

01:49:12,149 --> 01:49:11,440

if they ever land in our backyard i

2798

01:49:14,790 --> 01:49:12,159

should do

2799

01:49:17,030 --> 01:49:14,800

two things one is make sure that i leave

2800

01:49:19,270 --> 01:49:17,040

the car keys with her

2801

01:49:21,189 --> 01:49:19,280

and not take them with me if they call

2802

01:49:23,589 --> 01:49:21,199

me into the ship

2803

01:49:26,629 --> 01:49:23,599

and the second is that i should ask them

2804

01:49:29,830 --> 01:49:26,639

not to ruin the loan when they lift off

2805

01:49:33,109 --> 01:49:29,840

that is that is as honest as it gets

2806

01:49:34,070 --> 01:49:33,119

right there let's take our go ahead go

2807

01:49:35,910 --> 01:49:34,080

ahead

2808

01:49:37,270 --> 01:49:35,920

you might ask why is she worried about

2809

01:49:40,830 --> 01:49:37,280

me living no

2810

01:49:42,149 --> 01:49:40,840

uh my wife would say when are you going

2811

01:49:45,589 --> 01:49:42,159

right

2812

01:49:47,990 --> 01:49:45,599

come back avi i want to

2813

01:49:49,990 --> 01:49:48,000

uh i want to discuss breakthrough star

2814

01:49:52,709 --> 01:49:50,000

shot i want to talk about uh

2815

01:49:53,830 --> 01:49:52,719

of course proxima b centauri b and what

2816

01:49:56,709 --> 01:49:53,840

is going on

2817

01:49:57,830 --> 01:49:56,719

with the entire project and where we are

2818

01:49:59,589 --> 01:49:57,840

so stay right there

2819

01:50:01,910 --> 01:49:59,599

this is fade to black i'm your host

2820

01:50:12,240 --> 01:50:01,920

jimmy church on the game changer network

2821

01:50:16,229 --> 01:50:14,870

[Music]

2822

01:50:22,950 --> 01:50:16,239

hi everybody this is rob halpert the

2823

01:50:25,990 --> 01:50:24,950

kgra jimmychurchradio.com broadcasting

2824

01:50:29,669 --> 01:50:26,000

station

2825

01:50:31,510 --> 01:50:29,679

salt lake city utah van buren arkansas

2826

01:50:33,589 --> 01:50:31,520

why is it we're not very good with our

2827

01:50:35,350 --> 01:50:33,599

health regiment until it's too late we

2828

01:50:37,189 --> 01:50:35,360

don't put oil in the car until the

2829

01:50:37,990 --> 01:50:37,199

engine blows up when the body's out of

2830

01:50:40,070 --> 01:50:38,000

balance

2831

01:50:41,189 --> 01:50:40,080

your health is not so good give your

2832

01:50:44,030 --> 01:50:41,199

body some love

2833

01:50:45,189 --> 01:50:44,040

log on to get the tea.com that's get the

2834

01:50:47,189 --> 01:50:45,199

tea.com

2835

01:50:49,109 --> 01:50:47,199

try our life change tea which cleanses

2836

01:50:51,350 --> 01:50:49,119

you from harmful intruders

2837

01:50:52,870 --> 01:50:51,360

a clean colon is one of the ways to

2838

01:50:54,790 --> 01:50:52,880

bring the body in balance

2839

01:50:57,109 --> 01:50:54,800

we also carry organic supplements to

2840

01:50:59,430 --> 01:50:57,119

help you get where you need to go

2841

01:51:03,510 --> 01:50:59,440

so do your body a favor log on to get

2842

01:51:05,669 --> 01:51:03,520

the tea.com that's get the ttea.com

2843

01:51:06,950 --> 01:51:05,679

you can even visit our sales page to

2844

01:51:09,189 --> 01:51:06,960

save some dough

2845

01:51:10,950 --> 01:51:09,199

does anybody call money dough anymore

2846

01:51:12,149 --> 01:51:10,960

anyway if you're looking for short

2847

01:51:14,629 --> 01:51:12,159

helpful health tips

2848

01:51:15,910 --> 01:51:14,639

go to youtube and punch in health

2849

01:51:23,750 --> 01:51:15,920

matters now

2850

01:51:26,070 --> 01:51:23,760

log on to getthet.com shop get balanced

2851
01:51:27,189 --> 01:51:26,080
then learn some cool tips at health

2852
01:51:29,070 --> 01:51:27,199
matters now

2853
01:51:31,189 --> 01:51:29,080
you'll be glad you did that's get the

2854
01:51:33,189 --> 01:51:31,199
tea.com

2855
01:51:34,320 --> 01:51:33,199
your contact for current news and

2856
01:51:36,189 --> 01:51:34,330
trending topics

2857
01:51:38,070 --> 01:51:36,199
[Music]

2858
01:51:39,830 --> 01:51:38,080
kgraradio.com

2859
01:51:41,669 --> 01:51:39,840
this is jimmy church of fade to black

2860
01:51:44,790 --> 01:51:41,679
and i only drink

2861
01:51:45,510 --> 01:51:44,800
fade to black blend coffee from river

2862
01:51:49,750 --> 01:51:45,520
moon

2863
01:51:53,830 --> 01:51:49,760

banner at jimmychurchradio.com

2864

01:51:57,589 --> 01:51:53,840

promo code f2b blend

2865

01:52:00,629 --> 01:51:57,599

this is the only way forward this is

2866

01:52:04,400 --> 01:52:00,639

made to black make contact

2867

01:52:10,149 --> 01:52:08,310

[Music]

2868

01:52:11,510 --> 01:52:10,159

when you're in the house for longer

2869

01:52:13,750 --> 01:52:11,520

periods of time

2870

01:52:16,310 --> 01:52:13,760

you can see them flying or running

2871

01:52:19,189 --> 01:52:16,320

across the floor ooh

2872

01:52:20,629 --> 01:52:19,199

yuck they're unhealthy gross and

2873

01:52:24,870 --> 01:52:20,639

disgusting

2874

01:52:27,990 --> 01:52:24,880

bugs i loathe bugs we keep a clean home

2875

01:52:28,390 --> 01:52:28,000

but occasionally bugs show up well i

2876
01:52:30,790 --> 01:52:28,400
found

2877
01:52:32,070 --> 01:52:30,800
something that is tougher than bugs

2878
01:52:35,109 --> 01:52:32,080
orange guard

2879
01:52:38,790 --> 01:52:35,119
on contact it kills hidden bugs

2880
01:52:41,910 --> 01:52:38,800
including ants roaches and fleas plus

2881
01:52:43,910 --> 01:52:41,920
orange guard is a residual repellent

2882
01:52:45,109 --> 01:52:43,920
all of the ingredients of orange guard

2883
01:52:48,229 --> 01:52:45,119
are on the fda

2884
01:52:50,149 --> 01:52:48,239
generally recognized as safe list orange

2885
01:52:53,910 --> 01:52:50,159
guard may be used around food

2886
01:52:55,910 --> 01:52:53,920
humans and pets it comes with a 30-day

2887
01:52:58,510 --> 01:52:55,920
money-back guarantee

2888
01:52:59,990 --> 01:52:58,520

orange guard available at

2889

01:53:13,189 --> 01:53:00,000

orangeguard.com

2890

01:53:16,310 --> 01:53:13,199

whole foods and ace hardware

2891

01:53:20,149 --> 01:53:16,320

you wanna know a secret i love

2892

01:53:22,070 --> 01:53:20,159

ponies i really love ponies i'm serious

2893

01:53:23,750 --> 01:53:22,080

i couldn't stay sane without pawn

2894

01:53:26,950 --> 01:53:23,760

instabrush

2895

01:53:27,990 --> 01:53:26,960

why fade to black because you never got

2896

01:53:32,310 --> 01:53:28,000

that pony

2897

01:53:36,870 --> 01:53:34,470

this is fade to black with jimmy church

2898

01:53:41,620 --> 01:53:36,880

on the game changer radio network

2899

01:53:54,229 --> 01:53:41,630

and kgra the global radio alliance

2900

01:53:56,310 --> 01:53:54,239

[Music]

2901
01:53:57,589 --> 01:53:56,320
all right welcome back fade to black i

2902
01:53:59,589 --> 01:53:57,599
am your host jimmy church

2903
01:54:02,390 --> 01:53:59,599
tonight much anticipated great

2904
01:54:04,910 --> 01:54:02,400
conversation professor avi loeb

2905
01:54:06,390 --> 01:54:04,920
is with us we're discussing his new book

2906
01:54:08,709 --> 01:54:06,400
extraterrestrial

2907
01:54:09,750 --> 01:54:08,719
but i want to move on he has been

2908
01:54:12,870 --> 01:54:09,760
involved with

2909
01:54:14,470 --> 01:54:12,880
yuri milner and of course uh uh stephen

2910
01:54:17,750 --> 01:54:14,480
hawking when he was with us

2911
01:54:20,870 --> 01:54:17,760
and the breakthrough star shot project

2912
01:54:24,310 --> 01:54:20,880
lots of help behind this project

2913
01:54:27,510 --> 01:54:24,320

uh where are we today well actually

2914

01:54:30,229 --> 01:54:27,520

what's the basic outline avi of of the

2915

01:54:37,430 --> 01:54:34,790

um so uh in may 2015

2916

01:54:39,510 --> 01:54:37,440

a black limousine parked in front of the

2917

01:54:41,990 --> 01:54:39,520

center for astrophysics at harvard and

2918

01:54:44,070 --> 01:54:42,000

out of it came an entrepreneur from

2919

01:54:46,870 --> 01:54:44,080

silicon valley named yuri milner

2920

01:54:48,070 --> 01:54:46,880

he entered my office and sat on the sofa

2921

01:54:50,149 --> 01:54:48,080

in front of me and

2922

01:54:51,830 --> 01:54:50,159

asked me whether i'm willing to lead a

2923

01:54:54,470 --> 01:54:51,840

project to visit

2924

01:54:56,149 --> 01:54:54,480

uh the nearest star uh the alpha

2925

01:54:59,910 --> 01:54:56,159

centauri system

2926

01:55:02,149 --> 01:54:59,920

um within uh his lifetime

2927

01:55:03,589 --> 01:55:02,159

which is this you know he has the same

2928

01:55:06,709 --> 01:55:03,599

age as i am

2929

01:55:09,109 --> 01:55:06,719

as i have 59 and uh

2930

01:55:09,910 --> 01:55:09,119

that meant getting there within 20 years

2931

01:55:13,030 --> 01:55:09,920

or so

2932

01:55:16,310 --> 01:55:13,040

and since the nearest star system is

2933

01:55:18,070 --> 01:55:16,320

four and a quarter light years away uh

2934

01:55:19,750 --> 01:55:18,080

that meant that

2935

01:55:21,350 --> 01:55:19,760

in order to get there in 20 years you

2936

01:55:24,470 --> 01:55:21,360

need to send a spacecraft

2937

01:55:27,270 --> 01:55:24,480

at a fifth of the speed of light uh

2938

01:55:27,910 --> 01:55:27,280

and that's not easy i told him i need

2939

01:55:29,750 --> 01:55:27,920

the

2940

01:55:32,870 --> 01:55:29,760

six months to contemplate what

2941

01:55:35,030 --> 01:55:32,880

technology can allow us to do that and

2942

01:55:36,070 --> 01:55:35,040

after six months i reported back and

2943

01:55:39,910 --> 01:55:36,080

said the only

2944

01:55:41,430 --> 01:55:39,920

possibility is a light sail technology

2945

01:55:43,920 --> 01:55:41,440

where you have a lightweight

2946

01:55:45,270 --> 01:55:43,930

sail that weighs roughly a gram

2947

01:55:48,390 --> 01:55:45,280

[Music]

2948

01:55:50,709 --> 01:55:48,400

roughly the size of a person uh

2949

01:55:51,750 --> 01:55:50,719

being pushed by a very powerful laser

2950

01:55:54,709 --> 01:55:51,760

beam that

2951
01:55:55,430 --> 01:55:54,719
is a hundred gigawatt in power uh

2952
01:55:58,629 --> 01:55:55,440
pushing it

2953
01:56:00,229 --> 01:55:58,639
uh for a few minutes across a distance

2954
01:56:02,629 --> 01:56:00,239
that is comparable to

2955
01:56:03,270 --> 01:56:02,639
five times the distance to the moon and

2956
01:56:06,310 --> 01:56:03,280
then

2957
01:56:08,790 --> 01:56:06,320
that light sail will carry uh

2958
01:56:10,950 --> 01:56:08,800
electronics with it and will reach a

2959
01:56:13,270 --> 01:56:10,960
fifth of the speed of light and

2960
01:56:14,470 --> 01:56:13,280
among the equipment that it will carry

2961
01:56:17,109 --> 01:56:14,480
would be a camera

2962
01:56:17,830 --> 01:56:17,119
where so that when it gets close to the

2963
01:56:20,550 --> 01:56:17,840

nearest

2964

01:56:21,750 --> 01:56:20,560

star system it could take photographs of

2965

01:56:25,830 --> 01:56:21,760

planets

2966

01:56:28,310 --> 01:56:25,840

around those stars and send them back

2967

01:56:29,270 --> 01:56:28,320

to earth so we can tell what's going on

2968

01:56:32,070 --> 01:56:29,280

out there

2969

01:56:34,149 --> 01:56:32,080

now uh how many i've got so many

2970

01:56:37,830 --> 01:56:34,159

questions

2971

01:56:40,149 --> 01:56:37,840

how many of these micro satellites

2972

01:56:42,229 --> 01:56:40,159

would be launched it wouldn't be one

2973

01:56:43,990 --> 01:56:42,239

would it be a thousand

2974

01:56:46,470 --> 01:56:44,000

well every day you can launch another

2975

01:56:49,189 --> 01:56:46,480

one so most of the cost is actually

2976

01:56:49,830 --> 01:56:49,199

in in the infrastructure in the laser

2977

01:56:53,270 --> 01:56:49,840

beam

2978

01:56:55,350 --> 01:56:53,280

uh array um and then

2979

01:56:57,030 --> 01:56:55,360

the spacecraft itself is relatively

2980

01:57:00,870 --> 01:56:57,040

cheap it should be the cost of

2981

01:57:02,629 --> 01:57:00,880

office of a cell phone you know and um

2982

01:57:04,390 --> 01:57:02,639

because it's lightweight and it has

2983

01:57:05,189 --> 01:57:04,400

roughly the electronics that you find in

2984

01:57:08,229 --> 01:57:05,199

a cell phone

2985

01:57:11,990 --> 01:57:08,239

and um the idea is that you know every

2986

01:57:13,589 --> 01:57:12,000

time the the the laser beam is pointed

2987

01:57:15,189 --> 01:57:13,599

in the right direction you can launch a

2988

01:57:17,189 --> 01:57:15,199

new spacecraft so

2989

01:57:18,870 --> 01:57:17,199

it's very different than the current

2990

01:57:21,430 --> 01:57:18,880

method and approach

2991

01:57:22,830 --> 01:57:21,440

taken in launching missions you can

2992

01:57:25,350 --> 01:57:22,840

launch a lot of such

2993

01:57:26,470 --> 01:57:25,360

spacecrafts you know in in different

2994

01:57:29,430 --> 01:57:26,480

direction

2995

01:57:31,510 --> 01:57:29,440

to different destinations so for example

2996

01:57:34,950 --> 01:57:31,520

uh if we had the technology

2997

01:57:37,430 --> 01:57:34,960

uh available today when um was passing

2998

01:57:39,910 --> 01:57:37,440

by you know we could have easily

2999

01:57:42,229 --> 01:57:39,920

reached it with a camera and taken a

3000

01:57:44,229 --> 01:57:42,239

photograph of it because

3001

01:57:45,669 --> 01:57:44,239

we would have a spacecraft that can move

3002

01:57:49,109 --> 01:57:45,679

much faster

3003

01:57:50,790 --> 01:57:49,119

than omomoa moved you know omumo was

3004

01:57:52,629 --> 01:57:50,800

moving at about

3005

01:57:54,790 --> 01:57:52,639

a percent of a percent of the speed of

3006

01:57:55,830 --> 01:57:54,800

light one part in ten thousand of the

3007

01:57:57,750 --> 01:57:55,840

speed of light

3008

01:57:58,870 --> 01:57:57,760

and if you move at twenty percent the

3009

01:58:01,350 --> 01:57:58,880

speed of light

3010

01:58:02,070 --> 01:58:01,360

you're moving uh a thousand times faster

3011

01:58:03,910 --> 01:58:02,080

than the moon

3012

01:58:05,669 --> 01:58:03,920

was moving so you can easily catch up

3013

01:58:10,070 --> 01:58:05,679

with it now i i

3014

01:58:12,870 --> 01:58:10,080

picture almost like a a cloud of these

3015

01:58:15,270 --> 01:58:12,880

you know a cloud of these uh flying

3016

01:58:18,790 --> 01:58:15,280

towards a proxima centauri

3017

01:58:21,910 --> 01:58:18,800

um is it it wouldn't because one is

3018

01:58:22,790 --> 01:58:21,920

is very small right i don't even know

3019

01:58:25,589 --> 01:58:22,800

how you would

3020

01:58:26,790 --> 01:58:25,599

focus a laser at it but it would it be a

3021

01:58:30,870 --> 01:58:26,800

cloud of these

3022

01:58:34,149 --> 01:58:30,880

uh you know what i mean a cloud of mats

3023

01:58:36,070 --> 01:58:34,159

you can focus a laser on a sale roughly

3024

01:58:38,470 --> 01:58:36,080

the size of a person

3025

01:58:39,589 --> 01:58:38,480

but you can send many of those

3026

01:58:42,149 --> 01:58:39,599

spacecrafts

3027

01:58:43,589 --> 01:58:42,159

one after the other and then then in

3028

01:58:46,149 --> 01:58:43,599

principle get

3029

01:58:47,750 --> 01:58:46,159

a group of them a fleet going in this

3030

01:58:50,229 --> 01:58:47,760

direction

3031

01:58:52,149 --> 01:58:50,239

and that helps in the sense that if

3032

01:58:53,910 --> 01:58:52,159

something bad happens to one of them

3033

01:58:55,510 --> 01:58:53,920

it's not such a big

3034

01:58:57,589 --> 01:58:55,520

it's not a catastrophe because you have

3035

01:58:59,030 --> 01:58:57,599

the others and also if one of them

3036

01:59:00,950 --> 01:58:59,040

doesn't go in the right direction the

3037

01:59:04,229 --> 01:59:00,960

others may go in the right direction

3038

01:59:07,109 --> 01:59:04,239

now how quickly

3039

01:59:09,830 --> 01:59:07,119

it would it be one laser is it an array

3040

01:59:12,870 --> 01:59:09,840

of lasers is it multiple lasers

3041

01:59:15,430 --> 01:59:12,880

uh number one yeah go ahead yeah

3042

01:59:18,550 --> 01:59:15,440

it's a lot of low power lasers that

3043

01:59:21,830 --> 01:59:18,560

combine their beams to a very powerful

3044

01:59:22,390 --> 01:59:21,840

single beam how does this quick how

3045

01:59:26,550 --> 01:59:22,400

quick

3046

01:59:30,149 --> 01:59:28,950

is it a burst does this last for minutes

3047

01:59:33,830 --> 01:59:30,159

or days

3048

01:59:36,310 --> 01:59:33,840

uh how how long is the laser focused

3049

01:59:37,350 --> 01:59:36,320

the laser is focused for a few minutes

3050

01:59:41,830 --> 01:59:37,360

because

3051
01:59:44,149 --> 01:59:41,840
light sail is so far away

3052
01:59:45,510 --> 01:59:44,159
that you can't focus the laser anymore

3053
01:59:48,070 --> 01:59:45,520
on the sail

3054
01:59:50,709 --> 01:59:48,080
so the limitation is really how far we

3055
01:59:52,390 --> 01:59:50,719
can focus the laser on the sail and

3056
01:59:53,669 --> 01:59:52,400
that dictates if you want to reach a

3057
01:59:55,189 --> 01:59:53,679
fifth of the speed of light that

3058
01:59:56,550 --> 01:59:55,199
dictates how much time you have

3059
01:59:59,270 --> 01:59:56,560
available

3060
02:00:00,870 --> 01:59:59,280
and it's only a few minutes if you move

3061
02:00:01,990 --> 02:00:00,880
the cell to a fifth of the speed of

3062
02:00:04,310 --> 02:00:02,000
light

3063
02:00:06,470 --> 02:00:04,320

and then that by itself dictates how

3064

02:00:07,270 --> 02:00:06,480

much power you want to put on the laser

3065

02:00:10,229 --> 02:00:07,280

because you want

3066

02:00:11,669 --> 02:00:10,239

within a few minutes to bring it to a

3067

02:00:11,990 --> 02:00:11,679

fifth of the speed of light given the

3068

02:00:13,830 --> 02:00:12,000

weight

3069

02:00:15,350 --> 02:00:13,840

of the sail so that's how the

3070

02:00:17,270 --> 02:00:15,360

calculation goes that

3071

02:00:19,030 --> 02:00:17,280

you first you're first limited by how far

3072

02:00:23,030 --> 02:00:19,040

you can focus the laser

3073

02:00:24,470 --> 02:00:23,040

then uh you know given the amount of

3074

02:00:25,830 --> 02:00:24,480

the speed that you want to reach that

3075

02:00:26,870 --> 02:00:25,840

tells you how much time you have

3076

02:00:29,750 --> 02:00:26,880

available

3077

02:00:31,350 --> 02:00:29,760

and then if for to accelerate a light

3078

02:00:33,510 --> 02:00:31,360

sail to a fifth of the speed of light

3079

02:00:36,709 --> 02:00:33,520

you need a powerful enough laser

3080

02:00:37,669 --> 02:00:36,719

so that it reaches that speed within a

3081

02:00:40,310 --> 02:00:37,679

few minutes

3082

02:00:42,629 --> 02:00:40,320

it it's really strange for me that the

3083

02:00:45,830 --> 02:00:42,639

technology is extreme

3084

02:00:49,750 --> 02:00:45,840

the process is actually very simple

3085

02:00:52,790 --> 02:00:49,760

oh yeah you know that's

3086

02:00:55,030 --> 02:00:52,800

that's the beauty of innovation that you

3087

02:00:57,750 --> 02:00:55,040

don't necessarily need to

3088

02:00:58,790 --> 02:00:57,760

involve engage in something very complex

3089

02:01:01,430 --> 02:00:58,800

in in this case

3090

02:01:03,189 --> 02:01:01,440

um you know the only reason you can

3091

02:01:04,790 --> 02:01:03,199

reach the speed of light or a fraction

3092

02:01:09,430 --> 02:01:04,800

of it is because you're using

3093

02:01:12,470 --> 02:01:09,440

light to push uh the object and

3094

02:01:14,950 --> 02:01:12,480

uh in this way the spacecraft doesn't

3095

02:01:18,390 --> 02:01:14,960

need to carry any fuel with it

3096

02:01:20,470 --> 02:01:18,400

so uh we're talking about uh and again i

3097

02:01:23,510 --> 02:01:20,480

don't have a phd

3098

02:01:26,550 --> 02:01:23,520

uh but i i think i understand

3099

02:01:27,669 --> 02:01:26,560

the the process here in that fifth of

3100

02:01:31,270 --> 02:01:27,679

the speed of light

3101

02:01:33,189 --> 02:01:31,280

alpha centauri is four and a half light

3102

02:01:36,709 --> 02:01:33,199

years away four and a quarter

3103

02:01:40,149 --> 02:01:36,719

so that's about uh 20 years out

3104

02:01:43,510 --> 02:01:40,159

right approximately 20 years out

3105

02:01:46,470 --> 02:01:43,520

once we arrive

3106

02:01:47,990 --> 02:01:46,480

then the transmissions come back at the

3107

02:01:49,669 --> 02:01:48,000

speed of light

3108

02:01:52,470 --> 02:01:49,679

right so that's a that's a four and a

3109

02:01:55,910 --> 02:01:52,480

half year return

3110

02:01:57,589 --> 02:01:55,920

right right man sometimes my brain melts

3111

02:02:00,709 --> 02:01:57,599

but that's actually what's going on

3112

02:02:04,149 --> 02:02:00,719

it's 20 years out five years back

3113

02:02:07,669 --> 02:02:04,159

exactly and so it's a long time

3114

02:02:08,470 --> 02:02:07,679

and you know that's why all the science

3115

02:02:11,589 --> 02:02:08,480

fiction

3116

02:02:12,550 --> 02:02:11,599

stories that you know humans embark a

3117

02:02:14,790 --> 02:02:12,560

spaceship

3118

02:02:16,390 --> 02:02:14,800

like in star trek and and then go

3119

02:02:18,229 --> 02:02:16,400

through the journey you know these are

3120

02:02:21,430 --> 02:02:18,239

not very realistic because

3121

02:02:23,910 --> 02:02:21,440

it's it takes such a long time to go

3122

02:02:25,750 --> 02:02:23,920

from one star to another that i don't

3123

02:02:28,790 --> 02:02:25,760

think humans will ever do that

3124

02:02:30,310 --> 02:02:28,800

you know it's easier to send equipment

3125

02:02:33,189 --> 02:02:30,320

it's also easier for the equipment to

3126

02:02:36,149 --> 02:02:33,199

survive the journey you know humans

3127

02:02:37,589 --> 02:02:36,159

other than aging have other issues with

3128

02:02:39,430 --> 02:02:37,599

being exposed to

3129

02:02:41,030 --> 02:02:39,440

cosmic rays and other stuff you know

3130

02:02:43,430 --> 02:02:41,040

energetic particles

3131

02:02:45,510 --> 02:02:43,440

so it's much better to send equipment

3132

02:02:48,550 --> 02:02:45,520

and probably what we will find

3133

02:02:51,109 --> 02:02:48,560

first in terms of relics are equipment

3134

02:02:53,990 --> 02:02:51,119

you know sent by others not not actual

3135

02:02:57,189 --> 02:02:54,000

you know we will not have a contact with

3136

02:02:59,910 --> 02:02:57,199

a creature uh in at first

3137

02:03:01,189 --> 02:02:59,920

and you know that's what um may be about

3138

02:03:04,629 --> 02:03:01,199

it's just equipment

3139

02:03:07,830 --> 02:03:04,639

now how does the relay come

3140

02:03:10,229 --> 02:03:07,840

back happen uh

3141

02:03:12,070 --> 02:03:10,239

not only the digital information of

3142

02:03:13,430 --> 02:03:12,080

images but anything else that is

3143

02:03:17,510 --> 02:03:13,440

captured

3144

02:03:20,390 --> 02:03:17,520

uh yeah is there a a transmitter

3145

02:03:21,669 --> 02:03:20,400

that is is coming back how how does that

3146

02:03:23,270 --> 02:03:21,679

happen

3147

02:03:25,030 --> 02:03:23,280

well that's an excellent question it's

3148

02:03:27,430 --> 02:03:25,040

one of the challenges of this

3149

02:03:29,750 --> 02:03:27,440

project to communicate the information

3150

02:03:31,109 --> 02:03:29,760

back from the image taken by the camera

3151

02:03:34,310 --> 02:03:31,119

for example and

3152

02:03:37,350 --> 02:03:34,320

uh because of the vast distance of

3153

02:03:39,910 --> 02:03:37,360

four light years you know

3154

02:03:41,109 --> 02:03:39,920

it's not easy to focus the signal on

3155

02:03:43,430 --> 02:03:41,119

earth and

3156

02:03:45,910 --> 02:03:43,440

therefore you know whatever transmits

3157

02:03:49,109 --> 02:03:45,920

the signal from that distance

3158

02:03:51,990 --> 02:03:49,119

you know would be whatever signal we get

3159

02:03:52,390 --> 02:03:52,000

on earth is would be very faint and so

3160

02:03:54,390 --> 02:03:52,400

that's

3161

02:03:56,149 --> 02:03:54,400

a challenge we are working on you know

3162

02:03:58,310 --> 02:03:56,159

we will need to build

3163

02:03:59,510 --> 02:03:58,320

a telescope on earth so that it can

3164

02:04:01,589 --> 02:03:59,520

receive the signal

3165

02:04:03,189 --> 02:04:01,599

from the spacecraft once it reaches the

3166

02:04:05,189 --> 02:04:03,199

destination and

3167

02:04:07,430 --> 02:04:05,199

that's a major challenge and we are now

3168

02:04:09,270 --> 02:04:07,440

working on you know what kind of

3169

02:04:11,589 --> 02:04:09,280

radiation would be best to use what

3170

02:04:12,950 --> 02:04:11,599

wavelength and what kind of transmitter

3171

02:04:15,270 --> 02:04:12,960

to use and how

3172

02:04:17,430 --> 02:04:15,280

you know how best to receive the signal

3173

02:04:20,149 --> 02:04:17,440

and these these are difficult questions

3174

02:04:20,870 --> 02:04:20,159

now a couple of years ago i was very

3175

02:04:23,109 --> 02:04:20,880

excited

3176

02:04:25,910 --> 02:04:23,119

uh right in the middle of your project

3177

02:04:29,750 --> 02:04:25,920

and and yuri and the announcements

3178

02:04:34,310 --> 02:04:29,760

uh came the discovery

3179

02:04:37,430 --> 02:04:34,320

of uh the exoplanets out in

3180

02:04:40,310 --> 02:04:37,440

alpha centauri that one of them may be

3181

02:04:41,990 --> 02:04:40,320

in the goldilocks zone it it's locked

3182

02:04:43,750 --> 02:04:42,000

right it's tidal locked

3183

02:04:46,310 --> 02:04:43,760

am i am i correct you're nodding your

3184

02:04:49,830 --> 02:04:46,320

head but again i'm not a scientist

3185

02:04:53,030 --> 02:04:49,840

but this this planet is called

3186

02:04:55,109 --> 02:04:53,040

proxima b it's in the habitable zone it

3187

02:04:57,830 --> 02:04:55,119

just at the right distance from proxima

3188

02:05:00,709 --> 02:04:57,840

centauri which is the nearest star

3189

02:05:02,550 --> 02:05:00,719

to us uh it's at the right distance to

3190

02:05:03,350 --> 02:05:02,560

potentially have liquid water on its

3191

02:05:05,350 --> 02:05:03,360

surface

3192

02:05:07,189 --> 02:05:05,360

to have the similar temperature to the

3193

02:05:09,830 --> 02:05:07,199

one we have on earth

3194

02:05:12,709 --> 02:05:09,840

we just don't know if it has life or not

3195

02:05:15,109 --> 02:05:12,719

but because it's so close to the star

3196

02:05:16,229 --> 02:05:15,119

20 times closer than the earth is to the

3197

02:05:17,750 --> 02:05:16,239

sun

3198

02:05:19,430 --> 02:05:17,760

and the reason you need to be that close

3199

02:05:21,830 --> 02:05:19,440

is because that star is much

3200

02:05:23,910 --> 02:05:21,840

fainter than the sun it's 12 of the mass

3201

02:05:25,750 --> 02:05:23,920

of the sun it's a dwarf star

3202

02:05:28,310 --> 02:05:25,760

right the kind of star that is much more

3203

02:05:31,430 --> 02:05:28,320

common than the sun is

3204

02:05:33,109 --> 02:05:31,440

and because it's so close to the star 20

3205

02:05:33,750 --> 02:05:33,119

times closer than the earth is from the

3206

02:05:36,790 --> 02:05:33,760

sun

3207

02:05:39,430 --> 02:05:36,800

it's tidally locked

3208

02:05:40,709 --> 02:05:39,440

meaning that it faces the star with the

3209

02:05:43,189 --> 02:05:40,719

same side

3210

02:05:43,750 --> 02:05:43,199

at all times similar to the moon you

3211

02:05:46,629 --> 02:05:43,760

know it's

3212

02:05:48,629 --> 02:05:46,639

the moon is facing us with the same side

3213

02:05:49,589 --> 02:05:48,639

because it's tidally locked by the tidal

3214

02:05:52,950 --> 02:05:49,599

force

3215

02:05:53,830 --> 02:05:52,960

and that means that it has a permanent

3216

02:05:56,310 --> 02:05:53,840

dayside

3217

02:05:58,229 --> 02:05:56,320

on the planet and a permanent night side

3218

02:06:01,750 --> 02:05:58,239

on the planet

3219

02:06:03,910 --> 02:06:01,760

and my daughter says that you know

3220

02:06:06,069 --> 02:06:03,920

if we ever go there she would like to

3221

02:06:07,990 --> 02:06:06,079

have two houses one in the permanent

3222

02:06:11,430 --> 02:06:08,000

night side where she would sleep

3223

02:06:13,589 --> 02:06:11,440

and another one in the permanent sunset

3224

02:06:15,030 --> 02:06:13,599

strip that separates the days from the

3225

02:06:16,629 --> 02:06:15,040

night side because

3226

02:06:18,950 --> 02:06:16,639

that's where you would see the sunset

3227

02:06:20,470 --> 02:06:18,960

forever so that's where the real estate

3228

02:06:23,669 --> 02:06:20,480

would be

3229

02:06:25,270 --> 02:06:23,679

most most expensive in the sunset street

3230

02:06:29,430 --> 02:06:25,280

between them

3231

02:06:33,910 --> 02:06:29,440

now the news after the announcement

3232

02:06:37,830 --> 02:06:33,920

of uh proxima b came

3233

02:06:39,990 --> 02:06:37,840

uh i i i guess

3234

02:06:40,870 --> 02:06:40,000

there was a solar storm there was a

3235

02:06:45,030 --> 02:06:40,880

blast

3236

02:06:48,229 --> 02:06:45,040

that hit proxima b that and so whatever

3237

02:06:49,189 --> 02:06:48,239

was there it was so large the the

3238

02:06:52,709 --> 02:06:49,199

ejection

3239

02:06:56,149 --> 02:06:52,719

that what was ever on proxima b

3240

02:06:57,990 --> 02:06:56,159

is now carbon right

3241

02:06:59,910 --> 02:06:58,000

well uh okay so there is this

3242

02:07:02,149 --> 02:06:59,920

fundamental question of why

3243

02:07:03,510 --> 02:07:02,159

are we next to a star like the sun

3244

02:07:06,709 --> 02:07:03,520

because after all

3245

02:07:09,750 --> 02:07:06,719

stars just like proxima b dwarf stars

3246

02:07:11,030 --> 02:07:09,760

are much more common than the sun and we

3247

02:07:13,030 --> 02:07:11,040

don't find ourselves

3248

02:07:15,510 --> 02:07:13,040

next to such a dwarf star even though

3249

02:07:18,709 --> 02:07:15,520

these stars are much more abundant

3250

02:07:21,669 --> 02:07:18,719

and one possible explanation is these

3251

02:07:22,069 --> 02:07:21,679

stars are indeed common but in order to

3252

02:07:23,750 --> 02:07:22,079

be

3253

02:07:26,550 --> 02:07:23,760

in the habitable zone around them you

3254

02:07:30,310 --> 02:07:26,560

need to be pretty close to them and then

3255

02:07:32,310 --> 02:07:30,320

these storms on the stars wipe out

3256

02:07:34,229 --> 02:07:32,320

the possibility of life because they can

3257

02:07:36,149 --> 02:07:34,239

remove the atmosphere of the planet and

3258

02:07:38,149 --> 02:07:36,159

they can harm life

3259

02:07:39,589 --> 02:07:38,159

and you know without an atmosphere you

3260

02:07:41,589 --> 02:07:39,599

cannot have liquid water

3261

02:07:43,350 --> 02:07:41,599

and so it's a possibility it's a

3262

02:07:45,510 --> 02:07:43,360

possibility that proxima

3263

02:07:47,109 --> 02:07:45,520

b does not have life on it because it's

3264

02:07:51,030 --> 02:07:47,119

being sterilized

3265

02:07:54,310 --> 02:07:51,040

by these storms on proxima centauri and

3266

02:07:55,030 --> 02:07:54,320

the same might hold true for all dwarf

3267

02:07:57,350 --> 02:07:55,040

stars

3268

02:07:58,950 --> 02:07:57,360

and that may explain why we live next to

3269

02:08:01,430 --> 02:07:58,960

the sun and not

3270

02:08:02,790 --> 02:08:01,440

to the more common stars but but we

3271

02:08:05,430 --> 02:08:02,800

don't know as of yet

3272

02:08:07,589 --> 02:08:05,440

and you know hopefully we'll find one

3273

02:08:11,109 --> 02:08:07,599

day whether there is life or not

3274

02:08:14,390 --> 02:08:11,119

on proxima b now uh before i ask

3275

02:08:16,310 --> 02:08:14,400

why alpha centauri because

3276

02:08:18,790 --> 02:08:16,320

i think there's a few obvious answers

3277

02:08:23,350 --> 02:08:18,800

but i want your answers for that

3278

02:08:26,390 --> 02:08:23,360

but do you feel that it's close

3279

02:08:28,149 --> 02:08:26,400

but there was also reports of fast radio

3280

02:08:30,709 --> 02:08:28,159

bursts coming from that direction too

3281

02:08:31,669 --> 02:08:30,719

as well do you think there could be the

3282

02:08:35,189 --> 02:08:31,679

possibility

3283

02:08:36,550 --> 02:08:35,199

of intelligent life well there is always

3284

02:08:41,189 --> 02:08:36,560

a possibility the question is

3285

02:08:44,709 --> 02:08:41,199

is there evidence and there was a

3286

02:08:46,470 --> 02:08:44,719

indeed a radio signal from the direction

3287

02:08:49,589 --> 02:08:46,480

reported from

3288

02:08:49,990 --> 02:08:49,599

the parks telescope in australia uh and

3289

02:08:54,390 --> 02:08:50,000

it was

3290

02:08:55,990 --> 02:08:54,400

very narrow in frequency and um

3291

02:08:57,669 --> 02:08:56,000

the problem i had with the

3292

02:09:01,350 --> 02:08:57,679

interpretation that it came

3293

02:09:03,750 --> 02:09:01,360

from uh proxima b for example is that

3294

02:09:05,030 --> 02:09:03,760

proxima b the planet is moving around

3295

02:09:07,109 --> 02:09:05,040

the star

3296

02:09:08,950 --> 02:09:07,119

and the frequency as a result should

3297

02:09:09,750 --> 02:09:08,960

drift you know it's called the doppler

3298

02:09:12,629 --> 02:09:09,760

effect

3299

02:09:13,430 --> 02:09:12,639

when you hear a siren uh let's say an

3300

02:09:15,270 --> 02:09:13,440

ambulance

3301
02:09:17,750 --> 02:09:15,280
approaching you the pitch is different

3302
02:09:19,910 --> 02:09:17,760
than when it's receding from you because

3303
02:09:20,950 --> 02:09:19,920
because of the motion and as a result

3304
02:09:23,030 --> 02:09:20,960
you know because

3305
02:09:25,350 --> 02:09:23,040
since we know that proxima b is moving

3306
02:09:27,030 --> 02:09:25,360
around proxima centauri we expect the

3307
02:09:29,910 --> 02:09:27,040
frequency to drift

3308
02:09:30,229 --> 02:09:29,920
and the amount of drift i calculated was

3309
02:09:33,990 --> 02:09:30,239
far

3310
02:09:35,750 --> 02:09:34,000
greater than than observed and so that

3311
02:09:37,109 --> 02:09:35,760
convinced me that it cannot come from

3312
02:09:38,950 --> 02:09:37,119
proxima b and

3313
02:09:41,030 --> 02:09:38,960

you know that i based that i was not

3314

02:09:41,990 --> 02:09:41,040

part of the discovery team but i based

3315

02:09:45,270 --> 02:09:42,000

that on

3316

02:09:45,589 --> 02:09:45,280

uh the report in the guardian that came

3317

02:09:48,790 --> 02:09:45,599

out

3318

02:09:52,069 --> 02:09:48,800

and the actual scientific paper is not

3319

02:09:53,589 --> 02:09:52,079

publicized yet so i i don't know the

3320

02:09:56,870 --> 02:09:53,599

full details but

3321

02:09:58,390 --> 02:09:56,880

i would assume that it's probably not

3322

02:10:00,390 --> 02:09:58,400

coming from the surface

3323

02:10:02,790 --> 02:10:00,400

if there is a signal it's not coming

3324

02:10:05,430 --> 02:10:02,800

from proxima b the planet

3325

02:10:06,310 --> 02:10:05,440

uh and the question is is it coming from

3326

02:10:08,390 --> 02:10:06,320

australia

3327

02:10:09,589 --> 02:10:08,400

instead from from some interference

3328

02:10:11,270 --> 02:10:09,599

nearby and

3329

02:10:12,950 --> 02:10:11,280

you know that would be the most likely

3330

02:10:15,109 --> 02:10:12,960

explanation because you know

3331

02:10:17,109 --> 02:10:15,119

we've been broadcasting radio waves for

3332

02:10:18,069 --> 02:10:17,119

a hundred years maybe or a little more

3333

02:10:20,310 --> 02:10:18,079

than that

3334

02:10:21,270 --> 02:10:20,320

um what's the chance that the nearest

3335

02:10:24,149 --> 02:10:21,280

star

3336

02:10:26,310 --> 02:10:24,159

is exactly synchronized with us that you

3337

02:10:28,229 --> 02:10:26,320

know it's a hundred years out of

3338

02:10:30,310 --> 02:10:28,239

uh four and a half billion years that

3339

02:10:33,350 --> 02:10:30,320

the earth existed so

3340

02:10:36,550 --> 02:10:33,360

uh only in the past uh

3341

02:10:38,390 --> 02:10:36,560

you know one part in i don't know 100

3342

02:10:41,510 --> 02:10:38,400

million or so 50 million

3343

02:10:43,030 --> 02:10:41,520

uh we've seen

3344

02:10:44,709 --> 02:10:43,040

you know we we have developed the

3345

02:10:47,030 --> 02:10:44,719

technology to do it ourselves so what's

3346

02:10:48,950 --> 02:10:47,040

the chance that the planet next to us

3347

02:10:50,390 --> 02:10:48,960

has done it exactly at the time that we

3348

02:10:52,709 --> 02:10:50,400

can observe the signal

3349

02:10:54,550 --> 02:10:52,719

i think it's pretty small you know the

3350

02:10:56,390 --> 02:10:54,560

copernican principle argues that we

3351

02:10:59,109 --> 02:10:56,400

don't live at a special

3352

02:11:00,790 --> 02:10:59,119

privilege time so i would not expect the

3353

02:11:03,830 --> 02:11:00,800

nearest star to

3354

02:11:04,310 --> 02:11:03,840

show us a signal uh if we detect ever if

3355

02:11:07,669 --> 02:11:04,320

we ever

3356

02:11:09,109 --> 02:11:07,679

see a signal it will come from a distant

3357

02:11:09,990 --> 02:11:09,119

star you know because there are many

3358

02:11:12,390 --> 02:11:10,000

more stars far

3359

02:11:13,750 --> 02:11:12,400

away there is only one star that is the

3360

02:11:16,629 --> 02:11:13,760

closest to us

3361

02:11:18,069 --> 02:11:16,639

so um you know a priori based on the

3362

02:11:20,069 --> 02:11:18,079

copernican principle i would

3363

02:11:21,510 --> 02:11:20,079

think that it's very unlikely and i

3364

02:11:22,550 --> 02:11:21,520

would think that someone in australia

3365

02:11:25,189 --> 02:11:22,560

produced this signal

3366

02:11:27,669 --> 02:11:25,199

you know the same telescope already

3367

02:11:30,790 --> 02:11:27,679

discovered the fast radio bust um

3368

02:11:33,830 --> 02:11:30,800

you know repeating source um

3369

02:11:36,069 --> 02:11:33,840

uh a few years ago and and

3370

02:11:38,709 --> 02:11:36,079

then they realized oh it comes it's

3371

02:11:40,550 --> 02:11:38,719

detected only at lunchtime

3372

02:11:42,709 --> 02:11:40,560

how is that possible and and then they

3373

02:11:43,589 --> 02:11:42,719

realize oh there is actually a microwave

3374

02:11:46,470 --> 02:11:43,599

oven

3375

02:11:48,310 --> 02:11:46,480

that someone is you know opening the

3376

02:11:49,589 --> 02:11:48,320

door of the microwave oven before it

3377

02:11:51,990 --> 02:11:49,599

finished cooking and

3378

02:11:53,830 --> 02:11:52,000

as a result they get this additional

3379

02:11:55,910 --> 02:11:53,840

signal in their telescope so

3380

02:11:57,030 --> 02:11:55,920

you know i wouldn't be surprised if

3381

02:11:59,990 --> 02:11:57,040

something like that

3382

02:12:02,229 --> 02:12:00,000

is causing it and the only way to find

3383

02:12:04,550 --> 02:12:02,239

out is to detect the same signal

3384

02:12:05,270 --> 02:12:04,560

again reproducibility is an essential

3385

02:12:07,589 --> 02:12:05,280

part

3386

02:12:09,510 --> 02:12:07,599

of science so they take the same signal

3387

02:12:12,149 --> 02:12:09,520

from another telescope located at

3388

02:12:15,589 --> 02:12:12,159

completely different geographical

3389

02:12:18,629 --> 02:12:15,599

site now i i originally thought that

3390

02:12:20,870 --> 02:12:18,639

milner and hawking uh chose

3391

02:12:21,910 --> 02:12:20,880

alpha centauri because they knew

3392

02:12:25,589 --> 02:12:21,920

something

3393

02:12:26,390 --> 02:12:25,599

right no no i mean i was i was part of

3394

02:12:29,030 --> 02:12:26,400

the

3395

02:12:30,069 --> 02:12:29,040

group of people that contemplated this

3396

02:12:32,069 --> 02:12:30,079

project and

3397

02:12:34,149 --> 02:12:32,079

it's simply because it's the nearest

3398

02:12:35,990 --> 02:12:34,159

star system so it takes the short

3399

02:12:38,229 --> 02:12:36,000

the shortest amount of time to get there

3400

02:12:40,470 --> 02:12:38,239

yes i can tell you for sure because i

3401

02:12:42,470 --> 02:12:40,480

you know i i was at the core of this i

3402

02:12:43,910 --> 02:12:42,480

actually was involved in the initiation

3403

02:12:46,149 --> 02:12:43,920

of the project

3404

02:12:48,149 --> 02:12:46,159

so you're you're you're taking the wind

3405

02:12:50,870 --> 02:12:48,159

out of my solar sails uh

3406

02:12:51,589 --> 02:12:50,880

you know by saying that but no i'm just

3407

02:12:54,310 --> 02:12:51,599

i'm reporting

3408

02:12:55,350 --> 02:12:54,320

the facts you know i don't you know like

3409

02:12:57,270 --> 02:12:55,360

like with um

3410

02:12:58,629 --> 02:12:57,280

i don't care what other people say and

3411

02:13:00,069 --> 02:12:58,639

what it does to other people you know

3412

02:13:03,430 --> 02:13:00,079

i'm just telling you the facts

3413

02:13:06,709 --> 02:13:03,440

one day i will tell you uh about

3414

02:13:08,310 --> 02:13:06,719

me meeting uh stephen hawking and

3415

02:13:09,990 --> 02:13:08,320

it was incredible i got to hang out with

3416

02:13:11,910 --> 02:13:10,000

him for a couple of hours uh

3417

02:13:13,030 --> 02:13:11,920

by the way as i tell in my book he came

3418

02:13:16,069 --> 02:13:13,040

for dinner

3419

02:13:18,310 --> 02:13:16,079

for passover dinner at my home uh

3420

02:13:19,109 --> 02:13:18,320

you know that that few weeks when he was

3421

02:13:21,750 --> 02:13:19,119

visiting

3422

02:13:22,550 --> 02:13:21,760

when we uh announced the breakthrough

3423

02:13:25,189 --> 02:13:22,560

starshot

3424

02:13:27,109 --> 02:13:25,199

initiative and and also the black hole

3425

02:13:30,229 --> 02:13:27,119

initiative at harvard university and

3426

02:13:34,550 --> 02:13:30,239

you know it all started from uh

3427

02:13:38,310 --> 02:13:34,560

when i met him in august 2015

3428

02:13:41,589 --> 02:13:38,320

uh in the royal society in london

3429

02:13:45,030 --> 02:13:41,599

and he was in a hall

3430

02:13:45,350 --> 02:13:45,040

and the caretaker approached me and said

3431

02:13:46,950 --> 02:13:45,360

that

3432

02:13:49,430 --> 02:13:46,960

would you mind speaking with stephen

3433

02:13:50,470 --> 02:13:49,440

he's bored there is nobody speaking with

3434

02:13:53,589 --> 02:13:50,480

him right now

3435

02:13:56,310 --> 02:13:53,599

so so i i came to him and i said look

3436

02:13:58,310 --> 02:13:56,320

steven we are about to establish the

3437

02:14:00,229 --> 02:13:58,320

only center in the world that focuses on

3438

02:14:01,350 --> 02:14:00,239

the study of black holes at harvard

3439

02:14:03,830 --> 02:14:01,360

university

3440

02:14:04,709 --> 02:14:03,840

and next year and we would love to have

3441

02:14:06,470 --> 02:14:04,719

you

3442

02:14:09,109 --> 02:14:06,480

for the inauguration because that is a

3443

02:14:11,669 --> 02:14:09,119

subject that you worked on for so long

3444

02:14:13,350 --> 02:14:11,679

and you know i didn't really wait for

3445

02:14:15,669 --> 02:14:13,360

him to respond because

3446

02:14:16,550 --> 02:14:15,679

it always took him a long time to to

3447

02:14:19,750 --> 02:14:16,560

type in

3448

02:14:22,149 --> 02:14:19,760

what he wants to say and right but

3449

02:14:23,830 --> 02:14:22,159

you know about six months later a

3450

02:14:24,550 --> 02:14:23,840

colleague of mine came to my office and

3451
02:14:26,470 --> 02:14:24,560
said

3452
02:14:27,830 --> 02:14:26,480
you know something really incredible

3453
02:14:30,709 --> 02:14:27,840
happened because

3454
02:14:32,229 --> 02:14:30,719
i just visited stephen hawking and he

3455
02:14:35,109 --> 02:14:32,239
spent the whole day

3456
02:14:36,870 --> 02:14:35,119
writing a letter to his physician asking

3457
02:14:39,830 --> 02:14:36,880
the physician for permission

3458
02:14:41,189 --> 02:14:39,840
to visit harvard university and attend

3459
02:14:42,550 --> 02:14:41,199
the inauguration of the black hole

3460
02:14:45,109 --> 02:14:42,560
initiative and

3461
02:14:46,149 --> 02:14:45,119
and the amazing thing is the physician

3462
02:14:49,510 --> 02:14:46,159
approved it

3463
02:14:51,910 --> 02:14:49,520

you know so he never made us a trip for

3464

02:14:53,030 --> 02:14:51,920

a few years and previous trip was to the

3465

02:14:54,870 --> 02:14:53,040

white house and

3466

02:14:56,229 --> 02:14:54,880

so the physician approved it the only

3467

02:14:58,950 --> 02:14:56,239

problem was

3468

02:14:59,350 --> 02:14:58,960

that it would cost half a million dollar

3469

02:15:02,790 --> 02:14:59,360

to

3470

02:15:04,629 --> 02:15:02,800

that's he

3471

02:15:05,990 --> 02:15:04,639

my colleague said well that's your

3472

02:15:07,430 --> 02:15:06,000

problem because you are the founding

3473

02:15:07,990 --> 02:15:07,440

director of the black hole initiative

3474

02:15:11,270 --> 02:15:08,000

you need to

3475

02:15:13,189 --> 02:15:11,280

right

3476

02:15:14,629 --> 02:15:13,199

well not to check so so i found a

3477

02:15:16,709 --> 02:15:14,639

creative solution and

3478

02:15:17,669 --> 02:15:16,719

right you know we didn't within a week

3479

02:15:20,470 --> 02:15:17,679

we had

3480

02:15:21,990 --> 02:15:20,480

that funding and then he came over and

3481

02:15:25,109 --> 02:15:22,000

gladly you know he he

3482

02:15:25,990 --> 02:15:25,119

also came to my house for uh passover

3483

02:15:31,109 --> 02:15:26,000

dinner

3484

02:15:34,229 --> 02:15:31,119

it was april 2016 and it was a very fun

3485

02:15:36,629 --> 02:15:34,239

visit and i talked about it in my book

3486

02:15:39,189 --> 02:15:36,639

his uh same thing happened with me sort

3487

02:15:41,430 --> 02:15:39,199

of his uh caretaker his nurse

3488

02:15:43,189 --> 02:15:41,440

came up to me and said uh can you hang

3489

02:15:44,229 --> 02:15:43,199

out for just a second i've got something

3490

02:15:46,950 --> 02:15:44,239

to do to

3491

02:15:47,990 --> 02:15:46,960

and and and i was like says stephen

3492

02:15:50,149 --> 02:15:48,000

hawking right

3493

02:15:51,669 --> 02:15:50,159

so i go up and it's just the two of us

3494

02:15:55,350 --> 02:15:51,679

and he types out

3495

02:15:56,580 --> 02:15:55,360

on his screen he says

3496

02:15:59,589 --> 02:15:56,590

are you a cop

3497

02:16:02,470 --> 02:15:59,599

[Laughter]

3498

02:16:04,149 --> 02:16:02,480

and i said no i am not but it is a

3499

02:16:06,229 --> 02:16:04,159

pleasure to meet you um

3500

02:16:07,669 --> 02:16:06,239

what a great conversation tonight and

3501

02:16:08,870 --> 02:16:07,679

and i want to thank you for taking the

3502

02:16:11,030 --> 02:16:08,880

time to come on the show

3503

02:16:11,990 --> 02:16:11,040

i wanted one last question about stephen

3504

02:16:15,510 --> 02:16:12,000

hawking

3505

02:16:18,229 --> 02:16:15,520

where he has warned us

3506

02:16:19,030 --> 02:16:18,239

right let's not let's not reach out

3507

02:16:22,069 --> 02:16:19,040

let's

3508

02:16:25,270 --> 02:16:22,079

we don't know we may not

3509

02:16:27,510 --> 02:16:25,280

like what comes and visits us

3510

02:16:29,030 --> 02:16:27,520

they may not have our best intentions in

3511

02:16:32,150 --> 02:16:29,040

mind

3512

02:16:35,349 --> 02:16:32,160

did that change after you

3513

02:16:38,070 --> 02:16:35,359

uh came on board did he change that view

3514

02:16:39,589 --> 02:16:38,080

at all about the possibility of making

3515

02:16:41,349 --> 02:16:39,599

contact

3516

02:16:42,790 --> 02:16:41,359

he didn't change the view and i pretty

3517

02:16:44,950 --> 02:16:42,800

much agree with him

3518

02:16:46,469 --> 02:16:44,960

because when you enter a room full of

3519

02:16:49,429 --> 02:16:46,479

strangers

3520

02:16:50,790 --> 02:16:49,439

you better stay quiet and listen rather

3521

02:16:53,589 --> 02:16:50,800

than speak because you never know

3522

02:16:57,270 --> 02:16:53,599

whether there are predators that may

3523

02:16:59,990 --> 02:16:57,280

endanger your existence and you know the

3524

02:17:01,110 --> 02:17:00,000

the dinosaurs were very happy eating

3525

02:17:03,030 --> 02:17:01,120

grass

3526

02:17:05,349 --> 02:17:03,040

and being very proud of their huge

3527

02:17:06,230 --> 02:17:05,359

bodies and you know they dominated their

3528

02:17:10,389 --> 02:17:06,240

environment

3529

02:17:13,110 --> 02:17:10,399

but their ego trip was tarnished

3530

02:17:14,150 --> 02:17:13,120

abruptly when a giant rock roughly the

3531

02:17:17,190 --> 02:17:14,160

size of manhattan

3532

02:17:17,990 --> 02:17:17,200

island hit the ground 66 million years

3533

02:17:21,110 --> 02:17:18,000

ago

3534

02:17:23,270 --> 02:17:21,120

and killed them and killed the three

3535

02:17:25,990 --> 02:17:23,280

quarters of the life forms on earth

3536

02:17:27,190 --> 02:17:26,000

and you know that is a very important

3537

02:17:30,230 --> 02:17:27,200

lesson for us that

3538

02:17:31,990 --> 02:17:30,240

we need to know about our environment we

3539

02:17:34,469 --> 02:17:32,000

better get that information

3540

02:17:35,830 --> 02:17:34,479

because who knows whether there are

3541

02:17:38,549 --> 02:17:35,840

risks out there

3542

02:17:39,589 --> 02:17:38,559

um i have uh i've done some rough

3543

02:17:42,870 --> 02:17:39,599

numbers

3544

02:17:43,990 --> 02:17:42,880

and we'll close with this uh we've got

3545

02:17:47,270 --> 02:17:44,000

about

3546

02:17:51,429 --> 02:17:47,280

500 star systems that

3547

02:17:55,110 --> 02:17:51,439

are 50 light years from earth

3548

02:17:58,230 --> 02:17:55,120

approximately right okay we have been

3549

02:18:00,309 --> 02:17:58,240

sending radio and television signals of

3550

02:18:02,549 --> 02:18:00,319

strength for about a hundred years

3551
02:18:03,990 --> 02:18:02,559
uh rougher you know rather give or take

3552
02:18:07,429 --> 02:18:04,000
right

3553
02:18:10,549 --> 02:18:07,439
do you anticipate the return

3554
02:18:12,870 --> 02:18:10,559
calls uh coming back now

3555
02:18:13,669 --> 02:18:12,880
where we have achieved you know the 100

3556
02:18:16,389 --> 02:18:13,679
years out

3557
02:18:16,870 --> 02:18:16,399
we need the 50 you know that the 50-year

3558
02:18:20,549 --> 02:18:16,880
round

3559
02:18:23,270 --> 02:18:20,559
trip would it surprise you if we started

3560
02:18:24,790 --> 02:18:23,280
receiving something from somewhere well

3561
02:18:26,950 --> 02:18:24,800
that would be good news

3562
02:18:28,230 --> 02:18:26,960
if we receive a signal what i'm worried

3563
02:18:30,549 --> 02:18:28,240

about

3564

02:18:31,910 --> 02:18:30,559

is that they will come to wipe us out

3565

02:18:35,030 --> 02:18:31,920

you know and

3566

02:18:37,110 --> 02:18:35,040

if they use uh chemical rockets like

3567

02:18:39,349 --> 02:18:37,120

we used in the context of voyager 1

3568

02:18:41,190 --> 02:18:39,359

voyager 2 new horizons

3569

02:18:42,790 --> 02:18:41,200

then it would take them about a million

3570

02:18:45,429 --> 02:18:42,800

years to cross

3571

02:18:46,469 --> 02:18:45,439

a hundred light years okay the distance

3572

02:18:53,349 --> 02:18:46,479

that

3573

02:18:55,990 --> 02:18:53,359

uh so you know we we might still have

3574

02:18:57,990 --> 02:18:56,000

a long time but eventually you know

3575

02:19:00,950 --> 02:18:58,000

within a million years

3576

02:19:02,870 --> 02:19:00,960

they'll get here now if they use their

3577

02:19:04,830 --> 02:19:02,880

propulsion that is much faster than

3578

02:19:08,230 --> 02:19:04,840

rockets they might get

3579

02:19:10,709 --> 02:19:08,240

earlier and we just need to monitor the

3580

02:19:12,870 --> 02:19:10,719

sky for anything unusual coming our way

3581

02:19:15,030 --> 02:19:12,880

you know we need the just like you have

3582

02:19:18,790 --> 02:19:15,040

radar systems warning us

3583

02:19:19,669 --> 02:19:18,800

from uh you know ballistic missiles we

3584

02:19:21,429 --> 02:19:19,679

need the

3585

02:19:23,190 --> 02:19:21,439

other things that warn us you know

3586

02:19:24,709 --> 02:19:23,200

telescopes that warn us of something

3587

02:19:27,830 --> 02:19:24,719

coming our way

3588

02:19:30,469 --> 02:19:27,840

and we should just be on on alert uh

3589

02:19:33,349 --> 02:19:30,479

who knows uh it would have been much

3590

02:19:35,429 --> 02:19:33,359

better if we didn't broadcast

3591

02:19:36,389 --> 02:19:35,439

you know and that was not a wise move on

3592

02:19:39,750 --> 02:19:36,399

our on our

3593

02:19:43,190 --> 02:19:39,760

side the uh uh

3594

02:19:46,469 --> 02:19:43,200

the space force is now with us

3595

02:19:47,349 --> 02:19:46,479

you know and and then what i've got 30

3596

02:19:49,590 --> 02:19:47,359

seconds

3597

02:19:50,630 --> 02:19:49,600

what about faster than light travel or

3598

02:19:53,910 --> 02:19:50,640

folding space

3599

02:19:57,190 --> 02:19:53,920

or wormholes and these other

3600

02:20:00,469 --> 02:19:57,200

crazy concepts and defeating

3601
02:20:03,750 --> 02:20:00,479
the chemical side of space travel and

3602
02:20:05,429 --> 02:20:03,760
mechanical ways of doing it well it's in

3603
02:20:07,190 --> 02:20:05,439
it's worth in investigating those

3604
02:20:10,070 --> 02:20:07,200
possibilities but as of now we

3605
02:20:10,630 --> 02:20:10,080
don't know how to produce faster than

3606
02:20:13,429 --> 02:20:10,640
light

3607
02:20:15,030 --> 02:20:13,439
travel we we just didn't find a

3608
02:20:17,750 --> 02:20:15,040
practical way but not also

3609
02:20:19,830 --> 02:20:17,760
a conceptual way of generating a space

3610
02:20:23,590 --> 02:20:19,840
time that allows us to do that and

3611
02:20:26,309 --> 02:20:23,600
as of now i would say it's not possible

3612
02:20:27,030 --> 02:20:26,319
for et if he's a billion years ahead of

3613
02:20:29,110 --> 02:20:27,040

us

3614

02:20:31,190 --> 02:20:29,120

oh you know everything is possible for

3615

02:20:33,270 --> 02:20:31,200

et because we just don't know what will

3616

02:20:35,510 --> 02:20:33,280

happen in billion years for us

3617

02:20:37,750 --> 02:20:35,520

from now so actually meeting an eti that

3618

02:20:39,510 --> 02:20:37,760

is much more advanced than we are

3619

02:20:41,510 --> 02:20:39,520

is a way of meeting our future and

3620

02:20:44,150 --> 02:20:41,520

that's one additional incentive

3621

02:20:45,830 --> 02:20:44,160

for looking at the sky avi loeb thank

3622

02:20:48,070 --> 02:20:45,840

you so much my friend what a great

3623

02:20:48,790 --> 02:20:48,080

conversation i look forward to the next

3624

02:20:51,830 --> 02:20:48,800

one

3625

02:20:54,630 --> 02:20:51,840

much success to the book it's been great

3626
02:20:55,270 --> 02:20:54,640
and uh be safe out there thanks for

3627
02:20:58,710 --> 02:20:55,280
having me

3628
02:21:00,630 --> 02:20:58,720
you're the best avi loeb

3629
02:21:02,870 --> 02:21:00,640
i'm gonna take a quick break this is

3630
02:21:05,190 --> 02:21:02,880
fade to black i'm your host jimmy church

3631
02:21:15,890 --> 02:21:05,200
i'll be right back with your phone call

3632
02:21:31,429 --> 02:21:28,710
[Music]

3633
02:21:32,950 --> 02:21:31,439
hey what up joshua fox here and you are

3634
02:21:38,230 --> 02:21:32,960
listening to my boy

3635
02:21:44,190 --> 02:21:41,429
despite popular opinion reading a book

3636
02:21:47,440 --> 02:21:44,200
will not make you smarter

3637
02:21:50,469 --> 02:21:48,790
[Applause]

3638
02:21:52,550 --> 02:21:50,479

this is jimmy church of fade to black

3639

02:21:55,750 --> 02:21:52,560

and i take life change t

3640

02:21:56,469 --> 02:21:55,760

supplements every single day it's what i

3641

02:21:58,990 --> 02:21:56,479

do

3642

02:22:02,630 --> 02:21:59,000

click on their banner at

3643

02:22:07,349 --> 02:22:04,790

when you take the beans from central

3644

02:22:08,630 --> 02:22:07,359

america with dashes of indonesian and

3645

02:22:10,870 --> 02:22:08,640

african mixed in

3646

02:22:12,230 --> 02:22:10,880

and then roasted to the dark side of

3647

02:22:15,510 --> 02:22:12,240

fade to black

3648

02:22:18,469 --> 02:22:15,520

you create the ultimate brew of fringe

3649

02:22:19,190 --> 02:22:18,479

introducing the fade to black blend from

3650

02:22:24,710 --> 02:22:19,200

river moon

3651
02:22:25,190 --> 02:22:24,720
customized roast was created for the

3652
02:22:28,389 --> 02:22:25,200
love

3653
02:22:31,270 --> 02:22:28,399
of fade to black the alchemy of

3654
02:22:34,550 --> 02:22:31,280
masterful roasting and smoking the beans

3655
02:22:38,070 --> 02:22:34,560
is in every sip of this full-bodied dark

3656
02:22:40,070 --> 02:22:38,080
java i need my coffee doc deep

3657
02:22:42,630 --> 02:22:40,080
with distinct bittersweet chocolate

3658
02:22:45,030 --> 02:22:42,640
highlights just like the bunker

3659
02:22:45,910 --> 02:22:45,040
leaning further into the darkness of the

3660
02:22:48,230 --> 02:22:45,920
roast is

3661
02:22:49,190 --> 02:22:48,240
fade to black blend from river moon

3662
02:22:50,910 --> 02:22:49,200
coffee

3663
02:22:52,870 --> 02:22:50,920

just click on the banner at

3664

02:22:53,270 --> 02:22:52,880

jimmychurchradio.com and use the promo

3665

02:22:58,630 --> 02:22:53,280

code

3666

02:23:00,630 --> 02:22:58,640

f2b blend for 15 off of your order today

3667

02:23:02,230 --> 02:23:00,640

hello my name is billy carson and i'm a

3668

02:23:03,990 --> 02:23:02,240

bestselling author and the founder of

3669

02:23:05,590 --> 02:23:04,000

forbidden knowledge dot tv

3670

02:23:07,910 --> 02:23:05,600

together with my team we have built a

3671

02:23:09,510 --> 02:23:07,920

all new contest streaming tv platform

3672

02:23:11,429 --> 02:23:09,520

designed with every family member in

3673

02:23:12,710 --> 02:23:11,439

mind if you have ever wanted to travel

3674

02:23:14,230 --> 02:23:12,720

the world and attend lectures and

3675

02:23:15,270 --> 02:23:14,240

workshops from your favorite speakers

3676

02:23:17,990 --> 02:23:15,280

who weren't able to

3677

02:23:18,630 --> 02:23:18,000

look no further forbidden knowledge dot

3678

02:23:20,309 --> 02:23:18,640

tv

3679

02:23:22,230 --> 02:23:20,319

there are dozens of workshops and

3680

02:23:24,309 --> 02:23:22,240

lectures from speakers you know and love

3681

02:23:26,150 --> 02:23:24,319

we have also included amazing categories

3682

02:23:27,990 --> 02:23:26,160

to assure that your consciousness is

3683

02:23:28,630 --> 02:23:28,000

entertained and elevating on a daily

3684

02:23:30,710 --> 02:23:28,640

basis

3685

02:23:33,110 --> 02:23:30,720

amazing interviews ancient history

3686

02:23:35,830 --> 02:23:33,120

ascension knowledge wisdom teachings

3687

02:23:36,870 --> 02:23:35,840

documentaries conspiracies mysteries

3688

02:23:39,270 --> 02:23:36,880

health and fitness

3689

02:23:40,630 --> 02:23:39,280

conscious cooking meditations finance

3690

02:23:42,630 --> 02:23:40,640

yoga and so much more

3691

02:23:43,830 --> 02:23:42,640

to start your free trial on any mobile

3692

02:23:46,469 --> 02:23:43,840

device or computer

3693

02:23:47,030 --> 02:23:46,479

surf to forbidden knowledge dot tv

3694

02:23:49,030 --> 02:23:47,040

that's

3695

02:23:51,270 --> 02:23:49,040

forbidden knowledge with the number four

3696

02:23:55,429 --> 02:23:51,280

forbidden knowledge dot tv

3697

02:23:57,590 --> 02:23:55,439

today

3698

02:23:58,630 --> 02:23:57,600

are you intrigued by paranormal talk

3699

02:24:01,110 --> 02:23:58,640

radio you

3700

02:24:01,990 --> 02:24:01,120

love the new paranormal radio app from

3701
02:24:04,550 --> 02:24:02,000
talk stream

3702
02:24:06,630 --> 02:24:04,560
live you'll find a great selection of

3703
02:24:09,750 --> 02:24:06,640
talk shows covering ufos

3704
02:24:12,150 --> 02:24:09,760
ghosts strange phenomena and much more

3705
02:24:13,910 --> 02:24:12,160
download the paranormal radio app now

3706
02:24:15,830 --> 02:24:13,920
and start listening to the very best in

3707
02:24:17,349 --> 02:24:15,840
paranormal talk entertainment

3708
02:24:20,230 --> 02:24:17,359
including the network you're listening

3709
02:24:26,830 --> 02:24:20,240
to right now the paranormal radio app

3710
02:24:26,840 --> 02:24:32,550
store

3711
02:24:40,830 --> 02:24:35,590
it's not a lifestyle we chose we were

3712
02:24:40,840 --> 02:24:44,950
kgraradio.com

3713
02:24:44,960 --> 02:25:01,310

this is kjcr jimmychurchradio.com

3714

02:25:06,450 --> 02:25:03,750

[Music]

3715

02:25:09,110 --> 02:25:06,460

all right welcome back fade to black

3716

02:25:11,750 --> 02:25:09,120

[Music]

3717

02:25:12,550 --> 02:25:11,760

that was an amazing conversation

3718

02:25:16,790 --> 02:25:12,560

recorded

3719

02:25:20,389 --> 02:25:16,800

earlier tonight without below but we did

3720

02:25:23,670 --> 02:25:20,399

the uh interview uh at about

3721

02:25:26,710 --> 02:25:23,680

uh 4 p.m uh

3722

02:25:30,389 --> 02:25:26,720

right before the show so it was as

3723

02:25:33,070 --> 02:25:30,399

live as we could make it and uh so there

3724

02:25:37,990 --> 02:25:34,550

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3725

02:25:41,110 --> 02:25:38,000

i've opened up the phone lines and

3726

02:25:44,150 --> 02:25:41,120

now i'm live now i'm live live

3727

02:25:47,510 --> 02:25:44,160

and uh i want to say uh a

3728

02:25:49,190 --> 02:25:47,520

big shout out to the youtube a chat room

3729

02:25:53,910 --> 02:25:49,200

where i hung out all night

3730

02:26:00,469 --> 02:25:57,030

right youtube is amazing and i

3731

02:26:04,389 --> 02:26:00,479

am you know i'm so acclimated to the

3732

02:26:08,309 --> 02:26:04,399

uh the sandbox and focusing

3733

02:26:10,710 --> 02:26:08,319

on uh the youtube chat

3734

02:26:13,270 --> 02:26:10,720

um one of my comments uh in there

3735

02:26:17,110 --> 02:26:13,280

earlier first off it's fast

3736

02:26:20,150 --> 02:26:17,120

man man man and and so was the sandbox

3737

02:26:22,150 --> 02:26:20,160

the sandbox is bigger and i've got it's

3738

02:26:26,150 --> 02:26:22,160

colorized it's black

3739

02:26:29,910 --> 02:26:26,160

background with white and

3740

02:26:31,590 --> 02:26:29,920

i can read that i can read the youtube

3741

02:26:34,230 --> 02:26:31,600

chat too as well

3742

02:26:35,670 --> 02:26:34,240

but it is fast it's rapid and it's

3743

02:26:37,510 --> 02:26:35,680

smaller i don't know

3744

02:26:38,790 --> 02:26:37,520

anything about youtube i don't know if

3745

02:26:40,550 --> 02:26:38,800

you can uh

3746

02:26:42,150 --> 02:26:40,560

change the background colors and things

3747

02:26:45,429 --> 02:26:42,160

maybe you can i don't know

3748

02:26:48,070 --> 02:26:45,439

i'll take the advice later but focusing

3749

02:26:52,790 --> 02:26:48,080

on that i was getting cross-eyed

3750

02:26:55,670 --> 02:26:52,800

and trying to comment and i'm missing

3751

02:26:57,030 --> 02:26:55,680

uh so much of it uh trying to keep up

3752

02:26:57,510 --> 02:26:57,040

with it but i'm just gonna say this

3753

02:27:00,630 --> 02:26:57,520

right now

3754

02:27:03,750 --> 02:27:00,640

youtube uh that chat room you guys

3755

02:27:04,070 --> 02:27:03,760

are absolutely amazing and uh i really

3756

02:27:06,710 --> 02:27:04,080

had

3757

02:27:07,429 --> 02:27:06,720

a lot of fun and the comments uh with

3758

02:27:11,590 --> 02:27:07,439

everybody

3759

02:27:14,230 --> 02:27:11,600

over there was uh i appreciate it

3760

02:27:15,510 --> 02:27:14,240

we should do this more often well yeah i

3761

02:27:17,270 --> 02:27:15,520

can't

3762

02:27:18,630 --> 02:27:17,280

the only reason why that happened

3763

02:27:21,349 --> 02:27:18,640

tonight is because

3764

02:27:22,469 --> 02:27:21,359

we taped for like the second or third

3765

02:27:24,309 --> 02:27:22,479

time

3766

02:27:26,790 --> 02:27:24,319

in the history of fade to black and we

3767

02:27:29,910 --> 02:27:26,800

had to do that for avi because

3768

02:27:30,950 --> 02:27:29,920

he gets up uh at 4 00 a.m literally and

3769

02:27:33,910 --> 02:27:30,960

and starts teaching

3770

02:27:35,270 --> 02:27:33,920

over there at harvard and uh it was the

3771

02:27:37,990 --> 02:27:35,280

only way that we could make

3772

02:27:38,870 --> 02:27:38,000

the show happen tonight um lots of

3773

02:27:42,710 --> 02:27:38,880

takeaways

3774

02:27:46,070 --> 02:27:42,720

uh for me in in the show

3775

02:27:48,550 --> 02:27:46,080

in his conversation one

3776

02:27:52,110 --> 02:27:48,560

well i've got a lot i'll get to that um

3777

02:27:57,030 --> 02:27:53,830

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3778

02:27:58,870 --> 02:27:57,040

and what what is really strange is i

3779

02:28:01,750 --> 02:27:58,880

don't see the phone lines lighting up

3780

02:28:03,429 --> 02:28:01,760

i would have assumed i'm speaking

3781

02:28:05,750 --> 02:28:03,439

everybody out there

3782

02:28:06,710 --> 02:28:05,760

i would have assumed that the phone

3783

02:28:11,030 --> 02:28:06,720

lines would have

3784

02:28:16,349 --> 02:28:11,040

lit up and and and they haven't

3785

02:28:21,349 --> 02:28:18,070

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3786

02:28:24,630 --> 02:28:21,359

and okay there's uh

3787

02:28:28,670 --> 02:28:24,640

uh one call coming in let's

3788

02:28:33,510 --> 02:28:31,429

747-228-2051 i want to see okay

3789

02:28:35,270 --> 02:28:33,520

let's go is that what i got to do is

3790

02:28:38,950 --> 02:28:35,280

that what i got to do with all of you

3791

02:28:44,230 --> 02:28:41,670

five 747-228-2051 i'm waiting seven

3792

02:28:50,950 --> 02:28:47,590

i'm cross-eyed man that youtube chat

3793

02:28:54,710 --> 02:28:50,960

whoo man uh and

3794

02:28:58,309 --> 02:28:54,720

and this is um another thing for me

3795

02:29:00,950 --> 02:28:58,319

listening to myself

3796

02:29:03,510 --> 02:29:00,960

i don't dig it all right and my kind you

3797

02:29:06,790 --> 02:29:03,520

know it is it's nails on the chalkboard

3798

02:29:09,910 --> 02:29:06,800

but going back and listening to the

3799

02:29:13,429 --> 02:29:09,920

flow of that conversation with avi i

3800

02:29:17,429 --> 02:29:13,439

i over the last

3801
02:29:20,389 --> 02:29:17,439
well few years certainly but um

3802
02:29:22,070 --> 02:29:20,399
over the uh last couple of months i've

3803
02:29:24,790 --> 02:29:22,080
tried to catch as many of his

3804
02:29:26,230 --> 02:29:24,800
interviews as i can i don't know if he

3805
02:29:29,270 --> 02:29:26,240
mentioned this during the show

3806
02:29:34,830 --> 02:29:29,280
i know he did uh before the show tonight

3807
02:29:37,429 --> 02:29:34,840
um he did 350 interviews this month

3808
02:29:38,469 --> 02:29:37,439
350 now most of them are a couple of

3809
02:29:40,230 --> 02:29:38,479
minutes and

3810
02:29:41,510 --> 02:29:40,240
and five minutes here and there some of

3811
02:29:45,110 --> 02:29:41,520
they are full

3812
02:29:48,550 --> 02:29:45,120
shows and i i know

3813
02:29:50,550 --> 02:29:48,560

what people ask him i do

3814

02:29:52,550 --> 02:29:50,560

and i've heard the same questions over

3815

02:29:55,830 --> 02:29:52,560

and over again he's a professional

3816

02:29:57,590 --> 02:29:55,840

and he addresses everybody but i didn't

3817

02:30:00,710 --> 02:29:57,600

want to do that tonight

3818

02:30:03,590 --> 02:30:00,720

i didn't want to ask one question

3819

02:30:04,469 --> 02:30:03,600

that he has been hit with over and over

3820

02:30:07,270 --> 02:30:04,479

again

3821

02:30:10,389 --> 02:30:07,280

and i think it was refreshing for him he

3822

02:30:13,429 --> 02:30:10,399

was able to just

3823

02:30:15,910 --> 02:30:13,439

let it go and that's uh that's

3824

02:30:19,190 --> 02:30:15,920

that was my takeaway uh with this

3825

02:30:22,070 --> 02:30:19,200

conversation tonight listening to it

3826

02:30:23,110 --> 02:30:22,080

and i think i i i think i hung i think i

3827

02:30:25,830 --> 02:30:23,120

hung with avi

3828

02:30:27,349 --> 02:30:25,840

and remember um and i said this in the

3829

02:30:28,630 --> 02:30:27,359

youtube chat so i'm going to repeat

3830

02:30:32,630 --> 02:30:28,640

myself

3831

02:30:36,630 --> 02:30:32,640

that i'm not a phd i'm not a physicist

3832

02:30:39,750 --> 02:30:36,640

i'm not i study it i try to

3833

02:30:42,790 --> 02:30:39,760

absorb it the best that i can

3834

02:30:45,349 --> 02:30:42,800

and and i think he appreciates that that

3835

02:30:46,150 --> 02:30:45,359

i know a little bit about what i'm

3836

02:30:49,830 --> 02:30:46,160

talking about

3837

02:30:53,670 --> 02:30:49,840

i'm researched in it and

3838

02:30:54,469 --> 02:30:53,680

he i i was able to see his facial

3839

02:30:57,590 --> 02:30:54,479

expressions

3840

02:31:00,070 --> 02:30:57,600

uh during uh the interview

3841

02:31:01,429 --> 02:31:00,080

uh we we uh we had live video running

3842

02:31:04,150 --> 02:31:01,439

back and forth

3843

02:31:06,150 --> 02:31:04,160

and he was he was appreciative he was

3844

02:31:09,349 --> 02:31:06,160

smiling and i think that he

3845

02:31:12,550 --> 02:31:09,359

really enjoyed uh the conversation

3846

02:31:13,349 --> 02:31:12,560

and it was it was pretty solid so for me

3847

02:31:15,830 --> 02:31:13,359

i think i

3848

02:31:16,469 --> 02:31:15,840

got what i wanted out of the interview

3849

02:31:19,750 --> 02:31:16,479

we left

3850

02:31:22,230 --> 02:31:19,760

a lot on the table um i know that we're

3851

02:31:25,110 --> 02:31:22,240

gonna have him back after he gets

3852

02:31:26,630 --> 02:31:25,120

through with uh these interviews uh with

3853

02:31:27,510 --> 02:31:26,640

the publicity for the book and

3854

02:31:29,910 --> 02:31:27,520

everything else

3855

02:31:31,270 --> 02:31:29,920

there's a lot of a lot of media reaching

3856

02:31:33,750 --> 02:31:31,280

out to him right now

3857

02:31:34,469 --> 02:31:33,760

and for him to give us two hours of his

3858

02:31:37,030 --> 02:31:34,479

time

3859

02:31:39,429 --> 02:31:37,040

when he is doing back to back to back to

3860

02:31:41,750 --> 02:31:39,439

back interviews all day long

3861

02:31:42,870 --> 02:31:41,760

i really appreciate it and i hope that

3862

02:31:45,349 --> 02:31:42,880

all of you

3863

02:31:46,230 --> 02:31:45,359

uh enjoyed that conversation tonight all

3864

02:31:49,910 --> 02:31:46,240

right so

3865

02:31:51,830 --> 02:31:49,920

with that uh let's go random let's see

3866

02:31:53,349 --> 02:31:51,840

who's on hold let's see who's up first

3867

02:31:54,870 --> 02:31:53,359

hi you're live on fade to black who's

3868

02:31:58,550 --> 02:31:54,880

calling

3869

02:32:01,990 --> 02:31:58,560

oh wait oh man i am

3870

02:32:04,469 --> 02:32:02,000

i'm asleep at the wheel

3871

02:32:06,230 --> 02:32:04,479

all right now let's see if we can do it

3872

02:32:08,630 --> 02:32:06,240

again hi you're live i'm fade to black

3873

02:32:11,910 --> 02:32:08,640

who's calling

3874

02:32:15,110 --> 02:32:11,920

hey jimmy uh this is uh eric the artist

3875

02:32:17,510 --> 02:32:15,120

hey eric how are you man

3876

02:32:18,550 --> 02:32:17,520

oh great i thoroughly enjoyed the show i

3877

02:32:21,190 --> 02:32:18,560

was actually

3878

02:32:22,309 --> 02:32:21,200

uh eagerly awaiting this episode when

3879

02:32:24,230 --> 02:32:22,319

you uh

3880

02:32:25,670 --> 02:32:24,240

posted it publicly last week i was like

3881

02:32:29,030 --> 02:32:25,680

oh cool i'll be lobe

3882

02:32:30,150 --> 02:32:29,040

i i'm a huge fan well um and and i know

3883

02:32:32,790 --> 02:32:30,160

that you are

3884

02:32:34,389 --> 02:32:32,800

and and eric it it goes without saying

3885

02:32:37,750 --> 02:32:34,399

that you stay on top

3886

02:32:39,110 --> 02:32:37,760

of uh the ufo community and what has

3887

02:32:41,270 --> 02:32:39,120

been going on and you've been doing this

3888

02:32:44,790 --> 02:32:41,280

for a couple of decades so

3889

02:32:46,950 --> 02:32:44,800

uh but avi is is somebody that everybody

3890

02:32:49,110 --> 02:32:46,960

is talking about right now and i'm sure

3891

02:32:50,070 --> 02:32:49,120

that you've listened to other interviews

3892

02:32:52,309 --> 02:32:50,080

what did you think about the

3893

02:32:55,030 --> 02:32:52,319

conversation yeah yeah what'd you think

3894

02:32:58,870 --> 02:32:55,040

about the conversation tonight

3895

02:33:02,150 --> 02:32:58,880

a couple things um the the huge one

3896

02:33:04,790 --> 02:33:02,160

in in obvi's not the only one that

3897

02:33:07,590 --> 02:33:04,800

um conversationally neglects it but i

3898

02:33:11,349 --> 02:33:07,600

find it to be a huge detriment

3899

02:33:15,429 --> 02:33:11,359

in relation to human beings and

3900

02:33:18,710 --> 02:33:15,439

our gross limitations of the

3901

02:33:21,590 --> 02:33:18,720

space exploration surely

3902

02:33:22,710 --> 02:33:21,600

yes we can be exploring the solar system

3903

02:33:25,750 --> 02:33:22,720

and we're doing that

3904

02:33:27,190 --> 02:33:25,760

uh baby steps and we're doing it as

3905

02:33:29,190 --> 02:33:27,200

effectively as we can

3906

02:33:30,309 --> 02:33:29,200

without our own stupidity getting in the

3907

02:33:32,870 --> 02:33:30,319

way

3908

02:33:34,790 --> 02:33:32,880

but the thing that is is the most

3909

02:33:35,990 --> 02:33:34,800

daunting and i made a little blurb in

3910

02:33:39,670 --> 02:33:36,000

the sandbox about it

3911

02:33:41,670 --> 02:33:39,680

is um what most

3912

02:33:43,830 --> 02:33:41,680

human beings don't realize is that the

3913

02:33:45,830 --> 02:33:43,840

earth the solar system itself is right

3914

02:33:46,550 --> 02:33:45,840

smack dab in the middle of one of the

3915

02:33:49,270 --> 02:33:46,560

largest

3916

02:33:50,550 --> 02:33:49,280

voids in our galaxy that we have ever

3917

02:33:53,750 --> 02:33:50,560

found

3918

02:33:57,030 --> 02:33:53,760

it is huge whereas

3919

02:34:00,389 --> 02:33:57,040

there are much more densely packed

3920

02:34:02,710 --> 02:34:00,399

portions of our galaxy that are

3921

02:34:03,510 --> 02:34:02,720

full of planets and stars that make

3922

02:34:07,590 --> 02:34:03,520

travel

3923

02:34:10,630 --> 02:34:07,600

and the time issue much more

3924

02:34:13,910 --> 02:34:10,640

uh workable and a an

3925

02:34:16,150 --> 02:34:13,920

easily achievable thing relatively given

3926

02:34:20,150 --> 02:34:16,160

the technology of whatever

3927

02:34:23,349 --> 02:34:20,160

the exploring civilization is

3928

02:34:26,230 --> 02:34:23,359

however with us you know

3929

02:34:27,670 --> 02:34:26,240

everything that we're doing is going to

3930

02:34:29,349 --> 02:34:27,680

require

3931

02:34:31,349 --> 02:34:29,359

we we shouldn't be looking at

3932

02:34:34,550 --> 02:34:31,359

necessarily speed

3933

02:34:37,270 --> 02:34:34,560

we should be looking at things like uh

3934

02:34:37,990 --> 02:34:37,280

investing in what's called a generation

3935

02:34:41,110 --> 02:34:38,000

ship

3936

02:34:44,790 --> 02:34:41,120

where we actually build something

3937

02:34:47,670 --> 02:34:44,800

very large in space in low earth orbit

3938

02:34:48,230 --> 02:34:47,680

and send it off and whoever's on that

3939

02:34:51,349 --> 02:34:48,240

ship

3940

02:34:54,389 --> 02:34:51,359

will never see them again not only that

3941

02:34:55,990 --> 02:34:54,399

they are set up to where they are going

3942

02:34:58,630 --> 02:34:56,000

to be having children

3943

02:34:59,750 --> 02:34:58,640

grandchildren great-grandchildren and on

3944

02:35:02,389 --> 02:34:59,760

and on and on

3945

02:35:02,790 --> 02:35:02,399

through the entire journey and keeping

3946

02:35:06,070 --> 02:35:02,800

them

3947

02:35:06,870 --> 02:35:06,080

trained with what the objective of the

3948

02:35:08,230 --> 02:35:06,880

mission is

3949

02:35:10,150 --> 02:35:08,240

they're very much a battle star

3950

02:35:12,150 --> 02:35:10,160

galactica scenario right you're going to

3951

02:35:15,750 --> 02:35:12,160

be in space a very long

3952

02:35:16,710 --> 02:35:15,760

time a very long time generations will

3953

02:35:19,590 --> 02:35:16,720

only know

3954

02:35:20,630 --> 02:35:19,600

space that's it they won't know of earth

3955

02:35:23,110 --> 02:35:20,640

except through

3956

02:35:24,710 --> 02:35:23,120

stories and history book pictures that

3957

02:35:26,150 --> 02:35:24,720

they're taught in the classroom on board

3958

02:35:29,590 --> 02:35:26,160

the craft

3959

02:35:33,429 --> 02:35:29,600

and this is why my point number two

3960

02:35:36,389 --> 02:35:33,439

what i think we're experiencing as

3961

02:35:37,309 --> 02:35:36,399

a phenomena on this planet is not

3962

02:35:39,349 --> 02:35:37,319

necessarily

3963

02:35:40,710 --> 02:35:39,359

extraterrestrial i think that would be a

3964

02:35:44,230 --> 02:35:40,720

very rare thing

3965

02:35:46,630 --> 02:35:44,240

even if et could achieve light speed

3966

02:35:47,750 --> 02:35:46,640

uh which is according to special

3967

02:35:51,110 --> 02:35:47,760

relativity

3968

02:35:53,830 --> 02:35:51,120

impossible um

3969

02:35:54,230 --> 02:35:53,840

it would require just that a generation

3970

02:35:57,349 --> 02:35:54,240

ship

3971

02:36:01,270 --> 02:35:57,359

which means uh it would be

3972

02:36:03,190 --> 02:36:01,280

large very large you could not hide that

3973

02:36:05,190 --> 02:36:03,200

we would see it there would be some sort

3974

02:36:08,389 --> 02:36:05,200

of signal

3975

02:36:10,389 --> 02:36:08,399

signature something to look at

3976

02:36:12,070 --> 02:36:10,399

in in the light spectrum and the radio

3977

02:36:14,550 --> 02:36:12,080

spectrum we would we would

3978

02:36:16,230 --> 02:36:14,560

with our current technology we would

3979

02:36:19,270 --> 02:36:16,240

quote unquote see it

3980

02:36:20,710 --> 02:36:19,280

and we're not seeing that now let me let

3981

02:36:24,630 --> 02:36:20,720

me addre you bring up

3982

02:36:27,429 --> 02:36:24,640

uh two of the best points

3983

02:36:27,750 --> 02:36:27,439

uh that i think that constantly need to

3984

02:36:30,790 --> 02:36:27,760

be

3985

02:36:34,150 --> 02:36:30,800

addressed and so let's talk about

3986

02:36:36,870 --> 02:36:34,160

generational ships first um

3987

02:36:38,710 --> 02:36:36,880

i don't know i'm going to make all of

3988

02:36:41,349 --> 02:36:38,720

these responses brief

3989

02:36:42,389 --> 02:36:41,359

because this is a long conversation i

3990

02:36:45,429 --> 02:36:42,399

don't know

3991

02:36:45,990 --> 02:36:45,439

where if we built some ginormous ship

3992

02:36:49,349 --> 02:36:46,000

put 10

3993

02:36:52,710 --> 02:36:49,359

000 people on it 100 000 people on it

3994

02:36:55,990 --> 02:36:52,720

where we would send it

3995

02:36:59,270 --> 02:36:56,000

it would have to go to a star

3996

02:37:00,309 --> 02:36:59,280

system where we know that there is a

3997

02:37:03,429 --> 02:37:00,319

goldilocks

3998

02:37:04,710 --> 02:37:03,439

planet waiting for them you can't just

3999

02:37:07,910 --> 02:37:04,720

send them out

4000

02:37:10,469 --> 02:37:07,920

forever into it right right right

4001
02:37:11,670 --> 02:37:10,479
so i don't know where we would send it

4002
02:37:14,710 --> 02:37:11,680
first

4003
02:37:18,070 --> 02:37:14,720
but i would roll my dice on vega uh

4004
02:37:20,150 --> 02:37:18,080
well okay okay but let's let's say that

4005
02:37:21,990 --> 02:37:20,160
first right i don't know where we would

4006
02:37:25,429 --> 02:37:22,000
send it but

4007
02:37:29,190 --> 02:37:25,439
the uh uh

4008
02:37:32,950 --> 02:37:29,200
the generational idea there

4009
02:37:33,750 --> 02:37:32,960
where it would be flying for a million

4010
02:37:36,950 --> 02:37:33,760
years

4011
02:37:39,270 --> 02:37:36,960
right it could go not not for 10

4012
02:37:40,630 --> 02:37:39,280
000 years you know not for a thousand

4013
02:37:43,830 --> 02:37:40,640

years it would have to

4014

02:37:46,790 --> 02:37:43,840

go for forever

4015

02:37:47,590 --> 02:37:46,800

if it is longer than there has been

4016

02:37:49,990 --> 02:37:47,600

humanity

4017

02:37:51,990 --> 02:37:50,000

in civilization form on this planet by

4018

02:37:55,110 --> 02:37:52,000

the time it gets to where it's going

4019

02:37:59,030 --> 02:37:55,120

earth won't be here okay

4020

02:38:02,309 --> 02:37:59,040

right we will have burnt up but

4021

02:38:06,150 --> 02:38:02,319

um uh there's another part to this

4022

02:38:11,270 --> 02:38:06,160

and avi uh addressed it and it

4023

02:38:18,870 --> 02:38:14,710

a couple of minutes of laser time

4024

02:38:24,070 --> 02:38:18,880

on the micro satellites solar sail

4025

02:38:26,150 --> 02:38:24,080

achieves one fifth of the speed of light

4026

02:38:27,750 --> 02:38:26,160

a couple of minutes eric a couple of

4027

02:38:30,389 --> 02:38:27,760

minutes and you

4028

02:38:31,590 --> 02:38:30,399

are traveling faster than anything that

4029

02:38:35,349 --> 02:38:31,600

has ever been before

4030

02:38:39,349 --> 02:38:35,359

and we have that technology right now

4031

02:38:42,389 --> 02:38:39,359

we all we also have nuclear technology

4032

02:38:45,190 --> 02:38:42,399

right now and if we had non-weaponized

4033

02:38:47,110 --> 02:38:45,200

nuclear fuel on board our spacecraft and

4034

02:38:50,070 --> 02:38:47,120

removed that stupid treaty

4035

02:38:51,910 --> 02:38:50,080

out of the our program space program

4036

02:38:52,870 --> 02:38:51,920

that we signed during cold war which is

4037

02:38:56,389 --> 02:38:52,880

nonsense

4038

02:38:59,670 --> 02:38:56,399

right um we we could then

4039

02:39:02,790 --> 02:38:59,680

uh start creating craft

4040

02:39:06,309 --> 02:39:02,800

that could potentially

4041

02:39:07,750 --> 02:39:06,319

uh create a constant 1g thrust

4042

02:39:10,150 --> 02:39:07,760

now which means you don't have to turn

4043

02:39:12,870 --> 02:39:10,160

off the damn engine right and right

4044

02:39:13,429 --> 02:39:12,880

right right we did that we're talking

4045

02:39:17,030 --> 02:39:13,439

about

4046

02:39:20,710 --> 02:39:17,040

we could get to places like proxima b

4047

02:39:22,950 --> 02:39:20,720

right in like five years now and

4048

02:39:24,309 --> 02:39:22,960

there's and now when we talk about the

4049

02:39:27,990 --> 02:39:24,319

mechanical sense

4050

02:39:31,110 --> 02:39:28,000

of uh of engines

4051
02:39:32,710 --> 02:39:31,120
right as especially a nuclear version

4052
02:39:34,710 --> 02:39:32,720
that you're talking about mechanical

4053
02:39:38,550 --> 02:39:34,720
chemicals whatever

4054
02:39:42,790 --> 02:39:38,560
um the faster you go you're slowing down

4055
02:39:45,429 --> 02:39:42,800
time and you're also creating mass

4056
02:39:46,870 --> 02:39:45,439
right and if you get to light speed it's

4057
02:39:49,990 --> 02:39:46,880
infinite mass and

4058
02:39:53,429 --> 02:39:50,000
and time is now frozen and

4059
02:39:55,190 --> 02:39:53,439
so you would want to get to like 99

4060
02:39:57,270 --> 02:39:55,200
of the speed of light you don't want to

4061
02:40:01,030 --> 02:39:57,280
hit a hundred

4062
02:40:03,190 --> 02:40:01,040
i'm not so sure if that's the way to go

4063
02:40:04,309 --> 02:40:03,200

the other way to go and and that's a

4064

02:40:07,750 --> 02:40:04,319

mechanical sense

4065

02:40:10,790 --> 02:40:07,760

what avi is talking about here um

4066

02:40:14,309 --> 02:40:10,800

with you know lasers and light sails

4067

02:40:17,590 --> 02:40:14,319

you are no longer taking that with you

4068

02:40:20,790 --> 02:40:17,600

on this ship and once the ship is

4069

02:40:22,710 --> 02:40:20,800

up to that speed you don't need any more

4070

02:40:23,670 --> 02:40:22,720

propellant you don't need to worry about

4071

02:40:26,950 --> 02:40:23,680

anything

4072

02:40:30,550 --> 02:40:26,960

but you have to stop wherever you are

4073

02:40:33,590 --> 02:40:30,560

flying to right you have to hit the

4074

02:40:35,510 --> 02:40:33,600

you have to you don't slow down and uh

4075

02:40:36,710 --> 02:40:35,520

you have no resistance however long it

4076

02:40:39,190 --> 02:40:36,720

took you to

4077

02:40:40,710 --> 02:40:39,200

accelerate is exactly how long you need

4078

02:40:43,429 --> 02:40:40,720

to decelerate

4079

02:40:43,990 --> 02:40:43,439

and so somewhere halfway through the

4080

02:40:47,670 --> 02:40:44,000

trip

4081

02:40:49,750 --> 02:40:47,680

you gotta you gotta start slowing down

4082

02:40:51,590 --> 02:40:49,760

however you do that natural rockets

4083

02:40:54,230 --> 02:40:51,600

whatever some sort of bursts

4084

02:40:55,190 --> 02:40:54,240

right there's a third factor that well

4085

02:40:57,510 --> 02:40:55,200

hold on there's

4086

02:40:59,190 --> 02:40:57,520

entertained but there's the other part

4087

02:41:02,950 --> 02:40:59,200

that i wanted to address with this

4088

02:41:06,070 --> 02:41:02,960

directly is

4089

02:41:07,190 --> 02:41:06,080

if i understand when you said we're not

4090

02:41:08,389 --> 02:41:07,200

seeing that we're not seeing that we're

4091

02:41:10,309 --> 02:41:08,399

not seeing that from e.t

4092

02:41:12,870 --> 02:41:10,319

we're not seeing generational ships out

4093

02:41:17,110 --> 02:41:12,880

there we're not seeing any signatures

4094

02:41:19,590 --> 02:41:17,120

if et is

4095

02:41:22,230 --> 02:41:19,600

10 000 years in front of us that's it

4096

02:41:26,150 --> 02:41:22,240

just 10 000 years of advancement

4097

02:41:28,870 --> 02:41:26,160

e.t has figured out a way to circumvent

4098

02:41:30,230 --> 02:41:28,880

all of that it's not about traveling at

4099

02:41:32,389 --> 02:41:30,240

the speed of light

4100

02:41:34,870 --> 02:41:32,399

it's not about a mechanical movement

4101

02:41:37,510 --> 02:41:34,880

it's not about chemistry or chemicals

4102

02:41:39,110 --> 02:41:37,520

uh pushing these crafts forward it's not

4103

02:41:42,950 --> 02:41:39,120

about any of that

4104

02:41:45,830 --> 02:41:42,960

they are moving from point a to point b

4105

02:41:47,990 --> 02:41:45,840

instantly they're not dealing with the

4106

02:41:50,150 --> 02:41:48,000

speed of light they're not dealing with

4107

02:41:51,429 --> 02:41:50,160

e equals mt squared they're not dealing

4108

02:41:54,309 --> 02:41:51,439

with infinite mass

4109

02:41:56,070 --> 02:41:54,319

they're not dealing with frozen time

4110

02:41:59,110 --> 02:41:56,080

they're not dealing with any of that

4111

02:41:59,830 --> 02:41:59,120

they are somehow getting from point a to

4112

02:42:02,870 --> 02:41:59,840

point b

4113

02:42:05,030 --> 02:42:02,880

and we are not seeing those ships move

4114

02:42:08,230 --> 02:42:05,040

we're not seeing a signature out there

4115

02:42:10,950 --> 02:42:08,240

because it's not there to begin with

4116

02:42:11,349 --> 02:42:10,960

that's how you travel the stars it won't

4117

02:42:15,830 --> 02:42:11,359

be

4118

02:42:18,870 --> 02:42:15,840

generational ship

4119

02:42:21,349 --> 02:42:18,880

our view of technology right now is

4120

02:42:23,510 --> 02:42:21,359

ah we got to build a generational ship i

4121

02:42:26,870 --> 02:42:23,520

understand that we don't have any other

4122

02:42:29,110 --> 02:42:26,880

concept to base things on but

4123

02:42:30,070 --> 02:42:29,120

yeah and i think we'll actually do it

4124

02:42:33,030 --> 02:42:30,080

because

4125

02:42:34,070 --> 02:42:33,040

we're going to be i mean the big push

4126

02:42:38,150 --> 02:42:34,080

now

4127

02:42:41,349 --> 02:42:38,160

bezos who i don't think will actually

4128

02:42:42,469 --> 02:42:41,359

ever achieve orbit it drives me nuts but

4129

02:42:45,670 --> 02:42:42,479

his idea

4130

02:42:46,950 --> 02:42:45,680

and others will take it on is he wants

4131

02:42:49,349 --> 02:42:46,960

to remove

4132

02:42:51,110 --> 02:42:49,359

resource harvesting from the planet

4133

02:42:53,429 --> 02:42:51,120

altogether and begin

4134

02:42:54,389 --> 02:42:53,439

taking it from the moon asteroids things

4135

02:42:58,150 --> 02:42:54,399

like that sure

4136

02:42:58,870 --> 02:42:58,160

and if we start taking those materials

4137

02:43:02,309 --> 02:42:58,880

on moss

4138

02:43:04,389 --> 02:43:02,319

like that from those places of resource

4139

02:43:06,630 --> 02:43:04,399

we can begin constructing the

4140

02:43:08,790 --> 02:43:06,640

large-scale craft we can't do that right

4141

02:43:10,710 --> 02:43:08,800

now without some serious depletion of

4142

02:43:13,349 --> 02:43:10,720

our own planet's resources

4143

02:43:14,469 --> 02:43:13,359

and threaten the environment and and you

4144

02:43:16,389 --> 02:43:14,479

know other that

4145

02:43:17,750 --> 02:43:16,399

earth excuse me other stuff that needs

4146

02:43:21,110 --> 02:43:17,760

to stay alive

4147

02:43:23,670 --> 02:43:21,120

on on this planet you know just to begin

4148

02:43:24,230 --> 02:43:23,680

constructing large scale like is needed

4149

02:43:27,990 --> 02:43:24,240

to do

4150

02:43:31,349 --> 02:43:28,000

something like that requires i think

4151
02:43:33,830 --> 02:43:31,359
beyond our planet's capability to

4152
02:43:34,389 --> 02:43:33,840
uh generate the material that is needed

4153
02:43:37,269 --> 02:43:34,399
well yeah

4154
02:43:38,950 --> 02:43:37,279
and we're putting putting those but

4155
02:43:42,710 --> 02:43:38,960
putting that material on

4156
02:43:45,030 --> 02:43:42,720
rockets mining it from the earth right

4157
02:43:46,309 --> 02:43:45,040
and and going through the industrial

4158
02:43:48,950 --> 02:43:46,319
processes

4159
02:43:50,469 --> 02:43:48,960
uh that will all be done in space it

4160
02:43:52,230 --> 02:43:50,479
would have to be done in space you've

4161
02:43:55,830 --> 02:43:52,240
got to grab an asteroid

4162
02:43:56,790 --> 02:43:55,840
tow it into orbit and and do it that way

4163
02:44:00,389 --> 02:43:56,800

that's the only way

4164

02:44:04,070 --> 02:44:00,399

it would ever possibly get done um i

4165

02:44:07,990 --> 02:44:04,080

also firmly believe i'm telling you

4166

02:44:11,429 --> 02:44:08,000

this is fact this is absolute fact

4167

02:44:14,389 --> 02:44:11,439

we can't stay on this planet forever

4168

02:44:14,950 --> 02:44:14,399

no way it's not we're gonna get we gotta

4169

02:44:21,830 --> 02:44:14,960

go

4170

02:44:25,030 --> 02:44:21,840

trillion years from now our solar system

4171

02:44:27,269 --> 02:44:25,040

is a distant memory okay that's right

4172

02:44:27,750 --> 02:44:27,279

ice evidence we're on restart number

4173

02:44:29,590 --> 02:44:27,760

three

4174

02:44:31,349 --> 02:44:29,600

yeah we are pressing our luck yeah we're

4175

02:44:35,670 --> 02:44:31,359

pressing our luck we've got

4176
02:44:36,950 --> 02:44:35,680
we only have uh at the farthest extreme

4177
02:44:41,190 --> 02:44:36,960
of the numbers

4178
02:44:44,710 --> 02:44:41,200
is five billion years left with our son

4179
02:44:45,510 --> 02:44:44,720
but during that during that five billion

4180
02:44:48,469 --> 02:44:45,520
years

4181
02:44:49,590 --> 02:44:48,479
the sun is going to expand it's going to

4182
02:44:51,190 --> 02:44:49,600
overheat

4183
02:44:53,429 --> 02:44:51,200
it's going to do a lot of different

4184
02:44:56,469 --> 02:44:53,439
things in that five billion

4185
02:44:58,230 --> 02:44:56,479
zones gonna be in europa you know before

4186
02:45:00,469 --> 02:44:58,240
we do anything about it unless we

4187
02:45:02,150 --> 02:45:00,479
smarten up that's right so we only have

4188
02:45:06,630 --> 02:45:02,160

we've got about a billion

4189

02:45:08,389 --> 02:45:06,640

years of of of what we are right now

4190

02:45:09,110 --> 02:45:08,399

we've got about a billion years and

4191

02:45:13,510 --> 02:45:09,120

that's not

4192

02:45:16,550 --> 02:45:13,520

much we have to we have to make plans

4193

02:45:19,510 --> 02:45:16,560

right now about leaving

4194

02:45:21,429 --> 02:45:19,520

everybody everybody's got to go there

4195

02:45:24,710 --> 02:45:21,439

there can't be anybody left

4196

02:45:26,830 --> 02:45:24,720

we've got to go somewhere

4197

02:45:28,389 --> 02:45:26,840

here's the third factor and it's very

4198

02:45:30,230 --> 02:45:28,399

important

4199

02:45:32,550 --> 02:45:30,240

you think of how much debris we've been

4200

02:45:33,349 --> 02:45:32,560

pummeled by just our solar system alone

4201
02:45:36,150 --> 02:45:33,359
i mean

4202
02:45:38,230 --> 02:45:36,160
the the crater evidence on moons and

4203
02:45:38,630 --> 02:45:38,240
other planets just in our solar system

4204
02:45:41,190 --> 02:45:38,640
alone

4205
02:45:41,990 --> 02:45:41,200
is overwhelming it's been hit with

4206
02:45:45,190 --> 02:45:42,000
debris

4207
02:45:47,830 --> 02:45:45,200
for billions of years and that's

4208
02:45:49,910 --> 02:45:47,840
us in the middle of a void now you get

4209
02:45:50,469 --> 02:45:49,920
in the middle of a densely populated

4210
02:45:54,830 --> 02:45:50,479
region

4211
02:45:58,309 --> 02:45:54,840
of our galaxy and there's going to be

4212
02:46:01,750 --> 02:45:58,319
exponentially billions squared

4213
02:46:05,510 --> 02:46:01,760

times billion squared amount of debris

4214

02:46:08,550 --> 02:46:05,520

and so i think our level

4215

02:46:10,389 --> 02:46:08,560

of technology and our level of

4216

02:46:12,070 --> 02:46:10,399

understanding of the universe is

4217

02:46:15,990 --> 02:46:12,080

probably going to be the most

4218

02:46:18,790 --> 02:46:16,000

common one as a result of that

4219

02:46:20,150 --> 02:46:18,800

and that the advanced civilizations that

4220

02:46:23,030 --> 02:46:20,160

everybody's looking for

4221

02:46:25,269 --> 02:46:23,040

are going to be far more rare than what

4222

02:46:28,710 --> 02:46:25,279

we think they are simply because

4223

02:46:30,630 --> 02:46:28,720

of that planetary restart they've been

4224

02:46:32,710 --> 02:46:30,640

pummeled and pummeled and pummeled in

4225

02:46:33,830 --> 02:46:32,720

some cases obliterated we've got an

4226

02:46:36,950 --> 02:46:33,840

asteroid belt

4227

02:46:39,190 --> 02:46:36,960

showing evidence of that you know it's

4228

02:46:40,870 --> 02:46:39,200

in the process of forming planets right

4229

02:46:42,950 --> 02:46:40,880

now we got ceres

4230

02:46:44,550 --> 02:46:42,960

and it's taken billions of years to

4231

02:46:47,110 --> 02:46:44,560

reform that

4232

02:46:47,830 --> 02:46:47,120

well and there's always you're right

4233

02:46:50,550 --> 02:46:47,840

about that

4234

02:46:51,030 --> 02:46:50,560

and there's there's always right now as

4235

02:46:55,030 --> 02:46:51,040

you

4236

02:46:57,269 --> 02:46:55,040

have talked

4237

02:47:01,110 --> 02:46:57,279

i'm looking at the clock okay so we've

4238

02:47:04,309 --> 02:47:01,120

talked for about 15 minutes

4239

02:47:07,830 --> 02:47:04,319

15 solar systems

4240

02:47:09,990 --> 02:47:07,840

have been created in that last 50 years

4241

02:47:12,469 --> 02:47:10,000

it's like every minute you just think

4242

02:47:14,630 --> 02:47:12,479

about it every minute that goes by

4243

02:47:15,910 --> 02:47:14,640

another solar system is created the

4244

02:47:19,349 --> 02:47:15,920

universe is not

4245

02:47:21,910 --> 02:47:19,359

done and it's not over in its creation

4246

02:47:23,349 --> 02:47:21,920

what we need to do i mean there's always

4247

02:47:23,910 --> 02:47:23,359

going to be something new and fresh out

4248

02:47:26,950 --> 02:47:23,920

there

4249

02:47:30,309 --> 02:47:26,960

but what we need to do is find a star

4250

02:47:33,269 --> 02:47:30,319

system with a star that is balanced

4251
02:47:34,469 --> 02:47:33,279
correct with the goldilocks planet in

4252
02:47:37,269 --> 02:47:34,479
front of it

4253
02:47:38,150 --> 02:47:37,279
with a star that where the temperatures

4254
02:47:40,230 --> 02:47:38,160
are correct

4255
02:47:42,070 --> 02:47:40,240
and a star that is going to be there for

4256
02:47:45,110 --> 02:47:42,080
a trillion years

4257
02:47:49,590 --> 02:47:45,120
not 10 billion years and there are

4258
02:47:52,469 --> 02:47:49,600
there are literally tens of trillions

4259
02:47:53,910 --> 02:47:52,479
of billions of stars out there like that

4260
02:47:56,790 --> 02:47:53,920
we just have to find them

4261
02:47:57,670 --> 02:47:56,800
to stop looking at the red dwarf planets

4262
02:47:59,110 --> 02:47:57,680
because

4263
02:48:01,030 --> 02:47:59,120

those are all going to be eyeball

4264

02:48:03,830 --> 02:48:01,040

planets so uh um

4265

02:48:04,550 --> 02:48:03,840

proxima centauri is is a red dwarf

4266

02:48:06,710 --> 02:48:04,560

planet

4267

02:48:08,230 --> 02:48:06,720

which means if there is any life on any

4268

02:48:11,510 --> 02:48:08,240

of its planets

4269

02:48:12,469 --> 02:48:11,520

in uh orbit around it uh they're all

4270

02:48:15,670 --> 02:48:12,479

firstly

4271

02:48:19,030 --> 02:48:15,680

they they are um radiation

4272

02:48:21,190 --> 02:48:19,040

yeah well and they're also radiated

4273

02:48:23,349 --> 02:48:21,200

and everything there's going to see

4274

02:48:24,309 --> 02:48:23,359

probably infrared like avi was talking

4275

02:48:27,349 --> 02:48:24,319

about that's right

4276

02:48:29,269 --> 02:48:27,359

uh yeah yeah there's no white light

4277

02:48:31,110 --> 02:48:29,279

we need to stop looking at that stuff

4278

02:48:32,469 --> 02:48:31,120

because we're going to have a very

4279

02:48:35,910 --> 02:48:32,479

difficult you don't send

4280

02:48:39,429 --> 02:48:35,920

out a civilization that has been

4281

02:48:42,309 --> 02:48:39,439

you know taken millions of years

4282

02:48:43,429 --> 02:48:42,319

of adaptation and evolution to get to

4283

02:48:46,630 --> 02:48:43,439

where it is

4284

02:48:48,389 --> 02:48:46,640

to suddenly go to full restart and it

4285

02:48:51,910 --> 02:48:48,399

would be a full restart

4286

02:48:54,710 --> 02:48:51,920

on a habitat like that

4287

02:48:55,110 --> 02:48:54,720

it'd be a full-on eyeball planet if

4288

02:48:57,429 --> 02:48:55,120

there's

4289

02:48:58,309 --> 02:48:57,439

any possibility of life on any of those

4290

02:49:01,910 --> 02:48:58,319

planets in

4291

02:49:03,750 --> 02:49:01,920

alpha centauri at all and

4292

02:49:06,150 --> 02:49:03,760

which means you're going to be in

4293

02:49:09,030 --> 02:49:06,160

constant radiated heat

4294

02:49:11,429 --> 02:49:09,040

with living closer toward the poles and

4295

02:49:14,870 --> 02:49:11,439

then the back side of that planet is

4296

02:49:16,710 --> 02:49:14,880

nothing but freaking ice you know

4297

02:49:18,389 --> 02:49:16,720

you know what you're not just you know

4298

02:49:19,830 --> 02:49:18,399

what you know what's funny you're not

4299

02:49:23,110 --> 02:49:19,840

just an artist

4300

02:49:26,230 --> 02:49:23,120

and your your artwork is based on

4301
02:49:28,710 --> 02:49:26,240
knowledge and thought uh and

4302
02:49:29,910 --> 02:49:28,720
and just incredible eric thank you so

4303
02:49:33,349 --> 02:49:29,920
much man

4304
02:49:36,870 --> 02:49:33,359
and uh let's speak soon my friend

4305
02:49:39,269 --> 02:49:36,880
yeah eric

4306
02:49:40,070 --> 02:49:39,279
you know you know you know what's funny

4307
02:49:44,070 --> 02:49:40,080
you just

4308
02:49:46,070 --> 02:49:44,080
15 minutes

4309
02:49:48,150 --> 02:49:46,080
you get to the end and you're out of

4310
02:49:51,269 --> 02:49:48,160
words i love it eric

4311
02:49:54,070 --> 02:49:51,279
don't change man

4312
02:49:56,870 --> 02:49:54,080
see you jimmy go beckley tuffy sam and

4313
02:50:00,550 --> 02:49:56,880

have a great night thank you so much

4314

02:50:03,670 --> 02:50:00,560

bye bye now eric stitt now how is

4315

02:50:07,030 --> 02:50:03,680

that now everybody that's on hold i

4316

02:50:10,070 --> 02:50:07,040

i apologize it's uh but eric

4317

02:50:13,590 --> 02:50:10,080

calls into this show like i don't know

4318

02:50:15,670 --> 02:50:13,600

once a year and uh there you go but

4319

02:50:17,190 --> 02:50:15,680

absolutely we've got to get off this

4320

02:50:20,790 --> 02:50:17,200

planet

4321

02:50:22,230 --> 02:50:20,800

probably um and unfolding space and

4322

02:50:25,190 --> 02:50:22,240

doing all of that is

4323

02:50:26,630 --> 02:50:25,200

is in the future and we'll get to that

4324

02:50:30,550 --> 02:50:26,640

but there is no doubt

4325

02:50:33,429 --> 02:50:30,560

that eventually us humans

4326
02:50:33,830 --> 02:50:33,439
we may not live on planets at all we may

4327
02:50:37,269 --> 02:50:33,840
not

4328
02:50:40,790 --> 02:50:37,279
we just may cruise the universe

4329
02:50:43,910 --> 02:50:40,800
on on ships that we build as we go

4330
02:50:44,870 --> 02:50:43,920
build on make bigger visit asteroids

4331
02:50:47,269 --> 02:50:44,880
visit planets

4332
02:50:48,230 --> 02:50:47,279
get resources and then keep moving

4333
02:50:50,870 --> 02:50:48,240
forward

4334
02:50:52,309 --> 02:50:50,880
and a trillion years from now that's

4335
02:50:53,590 --> 02:50:52,319
that's what we're going to do that's

4336
02:50:56,630 --> 02:50:53,600
that's how we're going to live

4337
02:50:59,590 --> 02:50:56,640
that's how we are going to exist

4338
02:51:01,670 --> 02:50:59,600

now with all of that what an amazing

4339

02:51:03,429 --> 02:51:01,680

night tonight what an amazing show i

4340

02:51:05,750 --> 02:51:03,439

want to thank avi loeb

4341

02:51:06,870 --> 02:51:05,760

uh for coming in and spending all of

4342

02:51:10,150 --> 02:51:06,880

that time with us

4343

02:51:11,670 --> 02:51:10,160

two hours of avi loeb tonight

4344

02:51:13,590 --> 02:51:11,680

tomorrow night is fader night don't

4345

02:51:15,349 --> 02:51:13,600

forget open lines all night long fade to

4346

02:51:17,110 --> 02:51:15,359

black's executive producer

4347

02:51:19,110 --> 02:51:17,120

is rita murray on show it's produced by

4348

02:51:21,030 --> 02:51:19,120

hilton j paul renee dennis and kevin

4349

02:51:23,190 --> 02:51:21,040

announcers are steve harter gene vettel

4350

02:51:26,429 --> 02:51:23,200

mark d kovar webmaster is drew the geek

4351
02:51:27,750 --> 02:51:26,439
music doug aldrige intro spaceboy

4352
02:51:29,830 --> 02:51:27,760
spaceboymusic.com

4353
02:51:31,790 --> 02:51:29,840
beta black is produced by kjcr for the

4354
02:51:33,349 --> 02:51:31,800
game changer network and syndication is

4355
02:51:36,710 --> 02:51:33,359
kgra

4356
02:51:38,710 --> 02:51:36,720
the planet spark has owned a copyrighted

4357
02:51:39,910 --> 02:51:38,720
2021 by fade to black in the game

4358
02:51:41,830 --> 02:51:39,920
changer network inc

4359
02:51:43,349 --> 02:51:41,840
it cannot be re-broadcast downloaded

4360
02:51:43,990 --> 02:51:43,359
copied or used anywhere in the known

4361
02:51:45,590 --> 02:51:44,000
universe

4362
02:51:47,349 --> 02:51:45,600
without written permission from fade to

4363
02:51:49,670 --> 02:51:47,359

black or the game changer network

4364

02:51:51,429 --> 02:51:49,680

our murals jimmy church we'll see

4365

02:51:53,030 --> 02:51:51,439

everybody tomorrow night for fader night

4366

02:51:58,830 --> 02:51:53,040

thank you avi loeb

4367

02:52:00,060 --> 02:51:59,880

black

4368

02:52:02,660 --> 02:52:00,070

[Music]

4369

02:52:21,820 --> 02:52:02,670

[Applause]