



***FADE to BLACK***

*Jimmy Church w/ Prof. Avi Loeb*

1  
00:01:52,799 --> 00:01:55,670  
number

2  
00:01:59,590 --> 00:01:58,709  
the spoke radio for the masses headline

3  
00:02:03,190 --> 00:01:59,600  
edition july

4  
00:02:04,230 --> 00:02:03,200  
8 1947 the army air forces has announced

5  
00:02:05,990 --> 00:02:04,240  
that a flying disc

6  
00:02:08,389 --> 00:02:06,000  
has been found and is now in the

7  
00:02:08,949 --> 00:02:08,399  
possession of the army if the game is

8  
00:02:12,309 --> 00:02:08,959  
rigged

9  
00:02:15,430 --> 00:02:12,319  
change the game game changer

10  
00:02:17,430 --> 00:02:15,440  
i occasionally think how quickly our

11  
00:02:20,470 --> 00:02:17,440  
differences worldwide

12  
00:02:21,270 --> 00:02:20,480  
would vanish if we were facing an alien

13  
00:02:27,670 --> 00:02:21,280

threat

14

00:02:31,589 --> 00:02:30,470

this is fade to black with your host

15

00:02:34,070 --> 00:02:31,599

jimmy church

16

00:02:35,190 --> 00:02:34,080

on the game changer radio network and

17

00:02:39,990 --> 00:02:35,200

kgra

18

00:02:49,110 --> 00:02:43,070

i need your help to get to the year

19

00:03:02,550 --> 00:02:51,110

you're listening to fate to flag with

20

00:03:02,560 --> 00:03:09,750

good evening night fade to black

21

00:03:20,149 --> 00:03:14,229

bespoke radio for

22

00:03:23,990 --> 00:03:23,430

how you doing how you doing today is

23

00:03:33,030 --> 00:03:24,000

monday

24

00:03:36,869 --> 00:03:33,040

may 10 2021

25

00:03:39,509 --> 00:03:36,879

130 days into the new year

26

00:03:40,789 --> 00:03:39,519

only 235 days left we are live from a

27

00:03:42,550 --> 00:03:40,799

bunker somewhere in the middle of

28

00:03:46,949 --> 00:03:42,560

nowhere

29

00:03:48,789 --> 00:03:46,959

a total undisclosed location

30

00:03:50,390 --> 00:03:48,799

but it's beautiful how you doing all

31

00:03:51,830 --> 00:03:50,400

right monday

32

00:03:53,350 --> 00:03:51,840

i would like to welcome everybody

33

00:03:56,070 --> 00:03:53,360

listening all around the world all

34

00:03:57,990 --> 00:03:56,080

across the united states

35

00:03:59,750 --> 00:03:58,000

hither and tether to and throw back and

36

00:04:00,710 --> 00:03:59,760

forth up and down east and west north

37

00:04:05,190 --> 00:04:00,720

and south far

38

00:04:07,589 --> 00:04:05,200

and near this is fade to black for kjcr

39

00:04:09,350 --> 00:04:07,599

the game changer network and kgra the

40

00:04:11,830 --> 00:04:09,360

planet

41

00:04:12,470 --> 00:04:11,840

i'm real jimmy church what is cracking

42

00:04:15,110 --> 00:04:12,480

everybody

43

00:04:21,990 --> 00:04:15,120

what are you doing how you doing hold on

44

00:04:28,150 --> 00:04:25,510

i was gifted this today i don't know if

45

00:04:32,469 --> 00:04:28,160

you see it's cool

46

00:04:37,030 --> 00:04:32,479

little diorama diorama

47

00:04:42,710 --> 00:04:40,629

all right what a week we have coming up

48

00:04:46,710 --> 00:04:42,720

on fade to black

49

00:04:48,790 --> 00:04:46,720

oh man here we go

50

00:04:50,390 --> 00:04:48,800

starts with tonight very special guest

51

00:04:53,590 --> 00:04:50,400

professor avi loeb

52

00:04:56,230 --> 00:04:53,600

joins us for a full-on discussion on the

53

00:04:59,110 --> 00:04:56,240

size of everything that's tonight

54

00:05:00,230 --> 00:04:59,120

tomorrow night alan steinfeld is here

55

00:05:02,629 --> 00:05:00,240

for the first time

56

00:05:03,430 --> 00:05:02,639

i can't believe it's been 10 years alan

57

00:05:05,590 --> 00:05:03,440

steinfeld

58

00:05:06,950 --> 00:05:05,600

finally on the show with us it's going

59

00:05:10,150 --> 00:05:06,960

to be talking about his new book

60

00:05:11,950 --> 00:05:10,160

best seller it is called making contact

61

00:05:14,230 --> 00:05:11,960

preparing for the realities of

62

00:05:17,590 --> 00:05:14,240

extraterrestrial existence

63

00:05:21,029 --> 00:05:17,600

that's tomorrow night wednesday night

64

00:05:23,749 --> 00:05:21,039

another first time guest nancy tremaine

65

00:05:25,350 --> 00:05:23,759

is joining us and her new book

66

00:05:27,990 --> 00:05:25,360

enlightened

67

00:05:28,550 --> 00:05:28,000

chapters of my life and that is

68

00:05:32,390 --> 00:05:28,560

wednesday

69

00:05:35,430 --> 00:05:32,400

and then thursday yeah you got the news

70

00:05:36,310 --> 00:05:35,440

jacques valet and biola harris are going

71

00:05:40,469 --> 00:05:36,320

to be here

72

00:05:43,189 --> 00:05:40,479

a very uh special and exclusive evening

73

00:05:44,230 --> 00:05:43,199

right here on fade to black to announce

74

00:05:47,270 --> 00:05:44,240

and talk about

75

00:05:50,629 --> 00:05:47,280

their new book trinity okay

76

00:05:54,990 --> 00:05:50,639

and more on that in just a bit uh but

77

00:05:57,830 --> 00:05:55,000

yeah what what a week what a week

78

00:06:01,270 --> 00:05:57,840

unbelievable i love my job

79

00:06:02,710 --> 00:06:01,280

i do i love my job everybody that wants

80

00:06:04,550 --> 00:06:02,720

their own crystal skull

81

00:06:06,150 --> 00:06:04,560

i've got a bunch sitting right over

82

00:06:08,070 --> 00:06:06,160

there you want yours

83

00:06:10,870 --> 00:06:08,080

i want you to go to carolyn ford's

84

00:06:12,550 --> 00:06:10,880

website einstein the crystalskull.com

85

00:06:15,110 --> 00:06:12,560

that's all you got to do promo code

86

00:06:16,309 --> 00:06:15,120

jimmy gets you 10 off of your order

87

00:06:18,870 --> 00:06:16,319

today

88

00:06:20,870 --> 00:06:18,880

your first crystal skull your second or

89

00:06:24,230 --> 00:06:20,880

you're just adding to your collection

90

00:06:25,990 --> 00:06:24,240

carolyn ford has the absolute very best

91

00:06:27,670 --> 00:06:26,000

man she was posting incredible stuff

92

00:06:30,390 --> 00:06:27,680

over the weekend

93

00:06:31,830 --> 00:06:30,400

i want them all i can't have them all i

94

00:06:33,990 --> 00:06:31,840

want them all

95

00:06:36,189 --> 00:06:34,000

amazing stuff carolyn ford go visit her

96

00:06:38,629 --> 00:06:36,199

website the links are over at

97

00:06:39,270 --> 00:06:38,639

jimmychurchradio.com now i am going to

98

00:06:42,070 --> 00:06:39,280

be at

99

00:06:44,550 --> 00:06:42,080

the ufo megacon this june 6th through

100

00:06:48,230 --> 00:06:44,560

the 12th in laughlin nevada

101  
00:06:51,830 --> 00:06:48,240  
uh today i got uh

102  
00:06:55,270 --> 00:06:51,840  
the notice of where our booth is

103  
00:06:58,150 --> 00:06:55,280  
and uh it's a big big big booth

104  
00:06:59,350 --> 00:06:58,160  
and uh so when you walk in uh the main

105  
00:07:02,150 --> 00:06:59,360  
doors right there

106  
00:07:03,909 --> 00:07:02,160  
for the vendor area we're right there

107  
00:07:06,230 --> 00:07:03,919  
right at the entrance

108  
00:07:07,670 --> 00:07:06,240  
and uh yeah it's uh it's pretty cool

109  
00:07:08,710 --> 00:07:07,680  
right there on the left you just walk in

110  
00:07:11,350 --> 00:07:08,720  
we're right there

111  
00:07:13,430 --> 00:07:11,360  
come on by and say hi get all of your

112  
00:07:16,870 --> 00:07:13,440  
tickets all of your information

113  
00:07:19,629 --> 00:07:16,880

over at laughlinufomegacon.com we have

114

00:07:21,430 --> 00:07:19,639

uh links and banners over at

115

00:07:22,309 --> 00:07:21,440

jimmychurchradio.com this is a real in

116

00:07:27,189 --> 00:07:22,319

person live

117

00:07:31,430 --> 00:07:27,199

event yeah and i cannot wait and

118

00:07:33,430 --> 00:07:31,440

today's the 10th man three weeks

119

00:07:35,670 --> 00:07:33,440

we're gonna be in laughlin hanging out

120

00:07:38,469 --> 00:07:35,680

with you go and get your tickets

121

00:07:39,589 --> 00:07:38,479

today follow me on twitter at j church

122

00:07:42,629 --> 00:07:39,599

radio

123

00:07:44,550 --> 00:07:42,639

yeah yeah follow me right there i've got

124

00:07:46,710 --> 00:07:44,560

some uh

125

00:07:48,469 --> 00:07:46,720

announcements i'm going to be making

126  
00:07:51,430 --> 00:07:48,479  
here in just a second

127  
00:07:52,950 --> 00:07:51,440  
but hello to everybody over on youtube

128  
00:07:56,629 --> 00:07:52,960  
facebook

129  
00:07:58,469 --> 00:07:56,639  
the bunker cam speaker uh what am i

130  
00:08:00,390 --> 00:07:58,479  
what am i leaving out of course twitter

131  
00:08:03,430 --> 00:08:00,400  
you know right in front of me

132  
00:08:06,230 --> 00:08:03,440  
um but i've got an announcement here in

133  
00:08:07,830 --> 00:08:06,240  
just a little bit and you've got to uh

134  
00:08:10,469 --> 00:08:07,840  
i can't believe i'm doing this again but

135  
00:08:13,510 --> 00:08:10,479  
i'm going to be doing it again

136  
00:08:15,909 --> 00:08:13,520  
in just a minute uh hashtag f2b is the

137  
00:08:18,230 --> 00:08:15,919  
sandbox it's right up in front of me

138  
00:08:19,510 --> 00:08:18,240

twitter has been out of control all

139

00:08:22,390 --> 00:08:19,520

weekend long i can

140

00:08:23,589 --> 00:08:22,400

barely keep up with it and we all know

141

00:08:27,990 --> 00:08:23,599

what i'm talking about

142

00:08:30,710 --> 00:08:28,000

because it was another ufo friday

143

00:08:32,149 --> 00:08:30,720

yeah certainly dig it you can also email

144

00:08:36,149 --> 00:08:32,159

throughout the show

145

00:08:39,350 --> 00:08:36,159

jimmy jimmychurchradio.com

146

00:08:43,670 --> 00:08:39,360

let's get to the breaking news man i

147

00:08:43,680 --> 00:08:49,269

river moon coffee river moon wellness

148

00:08:52,870 --> 00:08:51,910

this show would not exist without coffee

149

00:08:56,230 --> 00:08:52,880

uh

150

00:08:58,389 --> 00:08:56,240

man what a day what

151  
00:08:59,910 --> 00:08:58,399  
a day all right i'm gonna start off with

152  
00:09:04,470 --> 00:08:59,920  
this

153  
00:09:10,870 --> 00:09:07,509  
how much is too big

154  
00:09:14,310 --> 00:09:10,880  
how big is too big how big is too much

155  
00:09:18,949 --> 00:09:14,320  
too much well jeff bezos

156  
00:09:21,990 --> 00:09:18,959  
just ordered a new boat or a ship

157  
00:09:25,350 --> 00:09:22,000  
a 417 foot

158  
00:09:28,870 --> 00:09:25,360  
super yacht that's so massive

159  
00:09:32,710 --> 00:09:28,880  
it has its own support yacht

160  
00:09:34,630 --> 00:09:32,720  
with a helipad that's on the other boat

161  
00:09:36,310 --> 00:09:34,640  
the estimated cost not including the

162  
00:09:42,070 --> 00:09:36,320  
boats support

163  
00:09:44,710 --> 00:09:42,080

yacht is 500 million dollars

164

00:09:46,150 --> 00:09:44,720

bezos fortune rose a staggering 75

165

00:09:49,350 --> 00:09:46,160

percent last year

166

00:09:51,670 --> 00:09:49,360

as the panden pandemic upended

167

00:09:53,670 --> 00:09:51,680

the rest of the world and this seems

168

00:09:55,430 --> 00:09:53,680

like really bad timing for jeff

169

00:09:56,870 --> 00:09:55,440

seriously you don't make that

170

00:10:00,470 --> 00:09:56,880

announcement today

171

00:10:01,829 --> 00:10:00,480

there you go do you do you return the

172

00:10:04,790 --> 00:10:01,839

boat

173

00:10:05,829 --> 00:10:04,800

do you return the ship do you cancel the

174

00:10:09,190 --> 00:10:05,839

order

175

00:10:12,310 --> 00:10:09,200

i think you should jeff osiris-rex

176

00:10:14,310 --> 00:10:12,320

is in the news it happened today

177

00:10:16,470 --> 00:10:14,320

it is returning back to earth with the

178

00:10:18,389 --> 00:10:16,480

largest space souvenir from a nasa

179

00:10:19,190 --> 00:10:18,399

mission since apollo astronauts brought

180

00:10:22,230 --> 00:10:19,200

back

181

00:10:24,150 --> 00:10:22,240

moon rocks after a few years of hanging

182

00:10:26,870 --> 00:10:24,160

out with asteroid bennu

183

00:10:28,150 --> 00:10:26,880

nasa's osiris-rex is saying goodbye

184

00:10:31,670 --> 00:10:28,160

today

185

00:10:34,069 --> 00:10:31,680

and returning to earth that's right

186

00:10:37,509 --> 00:10:34,079

osiris-rex aims to return

187

00:10:38,550 --> 00:10:37,519

the 2.1 ounce sample it collected from

188

00:10:41,509 --> 00:10:38,560

medu

189

00:10:43,110 --> 00:10:41,519

for an air drop at the utah test and

190

00:10:48,150 --> 00:10:43,120

training range

191

00:10:50,470 --> 00:10:48,160

on september 24th 2023

192

00:10:51,430 --> 00:10:50,480

that's pretty exciting man that's space

193

00:10:54,389 --> 00:10:51,440

age right there

194

00:10:56,069 --> 00:10:54,399

at space age the group behind the

195

00:10:59,790 --> 00:10:56,079

ransomware that took down the

196

00:11:02,550 --> 00:10:59,800

uh colonial pipeline last week has

197

00:11:05,910 --> 00:11:02,560

apologized for the

198

00:11:07,269 --> 00:11:05,920

social consequences their words now mind

199

00:11:10,150 --> 00:11:07,279

claiming

200

00:11:12,710 --> 00:11:10,160

that its goal is to just make money not

201  
00:11:16,150 --> 00:11:12,720  
to cause societal problems

202  
00:11:17,910 --> 00:11:16,160  
the group is called darkside and the fbi

203  
00:11:20,630 --> 00:11:17,920  
has confirmed that the group's

204  
00:11:22,150 --> 00:11:20,640  
malware was responsible for compromising

205  
00:11:27,110 --> 00:11:22,160  
one of the united states

206  
00:11:28,069 --> 00:11:27,120  
largest fuel pipelines the 5500 mile

207  
00:11:31,829 --> 00:11:28,079  
long colonial

208  
00:11:34,389 --> 00:11:31,839  
pipeline is responsible for carrying 45

209  
00:11:37,670 --> 00:11:34,399  
percent of the fuel for the entire

210  
00:11:40,710 --> 00:11:37,680  
eastern united states and cp says

211  
00:11:44,389 --> 00:11:40,720  
its goal is to restore service

212  
00:11:47,269 --> 00:11:44,399  
by the end of the week i'm sorry

213  
00:11:48,389 --> 00:11:47,279

i'm sorry it's not going to fly not cool

214

00:11:51,430 --> 00:11:48,399

not cool

215

00:11:54,710 --> 00:11:51,440

well uh chernobyl is back in the news

216

00:11:58,710 --> 00:11:54,720

nuclear fission reactions are happening

217

00:12:01,990 --> 00:11:58,720

right now at chernobyl a melted

218

00:12:06,150 --> 00:12:02,000

amalgam of nuclear fuel at chernobyl

219

00:12:09,030 --> 00:12:06,160

is beginning to react and the issue

220

00:12:11,269 --> 00:12:09,040

is rain water which has activated

221

00:12:13,670 --> 00:12:11,279

minerals buried deep within the closed

222

00:12:14,629 --> 00:12:13,680

plant the reaction could burn out

223

00:12:17,829 --> 00:12:14,639

naturally but

224

00:12:20,389 --> 00:12:17,839

it could also require human intervention

225

00:12:21,190 --> 00:12:20,399

ukrainian scientists recently realized

226

00:12:23,750 --> 00:12:21,200

that

227

00:12:25,590 --> 00:12:23,760

leftover nuclear fission fuel made of

228

00:12:29,230 --> 00:12:25,600

uranium

229

00:12:33,110 --> 00:12:29,240

has begun reacting again in an

230

00:12:36,870 --> 00:12:33,120

inaccessible room deep within a damaged

231

00:12:39,670 --> 00:12:36,880

area of the shuttered plant holy crap

232

00:12:40,310 --> 00:12:39,680

right let's get this show cracking happy

233

00:12:45,750 --> 00:12:40,320

birthday to

234

00:12:50,949 --> 00:12:49,829

bono is 61.

235

00:12:55,110 --> 00:12:50,959

you know what i'm gonna i'm gonna share

236

00:12:58,069 --> 00:12:55,120

a bono story a very short bono story

237

00:12:58,550 --> 00:12:58,079

uh i go with my friend uh billy moeller

238

00:13:01,910 --> 00:12:58,560

um

239

00:13:04,790 --> 00:13:01,920

i take him to uh see you two

240

00:13:06,230 --> 00:13:04,800

down at the pond in anaheim and the

241

00:13:07,430 --> 00:13:06,240

whole thing was set up and it was

242

00:13:10,790 --> 00:13:07,440

billy's birthday

243

00:13:13,509 --> 00:13:10,800

and and things billy was like 18

244

00:13:15,750 --> 00:13:13,519

19 i think at the time and he was in a

245

00:13:17,350 --> 00:13:15,760

band that had a number one hit record at

246

00:13:20,470 --> 00:13:17,360

the time anyway that doesn't matter

247

00:13:23,509 --> 00:13:20,480

so i take billy to the show but i know

248

00:13:26,389 --> 00:13:23,519

that you two has set me up with

249

00:13:27,110 --> 00:13:26,399

uh backstage passes after show passes

250

00:13:29,590 --> 00:13:27,120

i'm gonna go

251  
00:13:31,190 --> 00:13:29,600  
meet the band uh we're gonna take a tour

252  
00:13:33,030 --> 00:13:31,200  
of the stage after the show

253  
00:13:34,629 --> 00:13:33,040  
i've got everything set up right this

254  
00:13:36,629 --> 00:13:34,639  
exclusive evening

255  
00:13:39,030 --> 00:13:36,639  
and uh so we go we do all that stuff but

256  
00:13:41,030 --> 00:13:39,040  
later we go

257  
00:13:43,350 --> 00:13:41,040  
uh and hang out with the band from like

258  
00:13:46,829 --> 00:13:43,360  
midnight until like four in the morning

259  
00:13:48,230 --> 00:13:46,839  
it was crazy what time we left anyway

260  
00:13:51,350 --> 00:13:48,240  
bono

261  
00:13:54,389 --> 00:13:51,360  
so uh i i go up and

262  
00:13:57,430 --> 00:13:54,399  
bono and i are chat and adam sandler

263  
00:13:58,310 --> 00:13:57,440

is there and it's it's adam in front of

264

00:14:01,590 --> 00:13:58,320

me

265

00:14:01,990 --> 00:14:01,600

bono uh to my right i'm here and adam's

266

00:14:03,829 --> 00:14:02,000

leaning

267

00:14:05,189 --> 00:14:03,839

against the wall and bono's like you

268

00:14:05,910 --> 00:14:05,199

know jimmy thank you thank you thank you

269

00:14:07,350 --> 00:14:05,920

for everything

270

00:14:09,990 --> 00:14:07,360

today it was great to finally meet you a

271

00:14:14,389 --> 00:14:10,000

little bit and adam sandler

272

00:14:17,750 --> 00:14:14,399

was rolling his eyes he couldn't believe

273

00:14:21,030 --> 00:14:17,760

that bono was talking to a

274

00:14:22,710 --> 00:14:21,040

lowly civilian i'm serious

275

00:14:26,629 --> 00:14:22,720

i couldn't believe look at it adam and

276

00:14:30,310 --> 00:14:28,949

it was unbelievable anyway that's my

277

00:14:34,150 --> 00:14:30,320

bono story

278

00:14:36,629 --> 00:14:34,160

donovan today is 75 sunshine superman

279

00:14:37,829 --> 00:14:36,639

mellow yellow hurty gertie man i like

280

00:14:41,110 --> 00:14:37,839

herdy gertie man

281

00:14:43,990 --> 00:14:41,120

tool drummer danny carey today

282

00:14:45,430 --> 00:14:44,000

is 60. unbelievable our dead guy's

283

00:14:49,430 --> 00:14:45,440

birthday today is

284

00:14:53,430 --> 00:14:49,440

moment of silence please sid vicious

285

00:14:55,509 --> 00:14:53,440

1957 to 1979 died at the age of 21.

286

00:14:56,550 --> 00:14:55,519

sid of course was the basis for the sex

287

00:14:58,949 --> 00:14:56,560

pistols

288

00:15:00,790 --> 00:14:58,959

sid replaced glenn matlock who had

289

00:15:02,069 --> 00:15:00,800

fallen out of favor with uh the rest of

290

00:15:05,509 --> 00:15:02,079

the band so

291

00:15:07,910 --> 00:15:05,519

glenn gets fired they hire sid because

292

00:15:09,829 --> 00:15:07,920

he looked like a punk rocker i didn't

293

00:15:12,790 --> 00:15:09,839

even think he played base

294

00:15:13,829 --> 00:15:12,800

and uh as the sex pistols were i mean

295

00:15:17,189 --> 00:15:13,839

that too

296

00:15:17,910 --> 00:15:17,199

we're gaining attention uh syd met nancy

297

00:15:20,069 --> 00:15:17,920

spungen

298

00:15:22,550 --> 00:15:20,079

and the couple began a relationship that

299

00:15:23,189 --> 00:15:22,560

ended in her death from an apparent stab

300

00:15:24,790 --> 00:15:23,199

wound

301  
00:15:26,310 --> 00:15:24,800  
while they were staying at the new york

302  
00:15:29,110 --> 00:15:26,320  
city's hotel

303  
00:15:31,509 --> 00:15:29,120  
chelsea under suspicion of murder

304  
00:15:33,189 --> 00:15:31,519  
vicious was released on bail and was

305  
00:15:35,590 --> 00:15:33,199  
arrested again

306  
00:15:38,150 --> 00:15:35,600  
for assaulting todd smith brother of

307  
00:15:40,550 --> 00:15:38,160  
singer patty smith at a nightclub

308  
00:15:41,509 --> 00:15:40,560  
and underwent drug rehab on rikers

309  
00:15:43,790 --> 00:15:41,519  
island

310  
00:15:45,189 --> 00:15:43,800  
on the evening of the first of february

311  
00:15:47,350 --> 00:15:45,199  
1979

312  
00:15:49,110 --> 00:15:47,360  
a small group of friends including jerry

313  
00:15:52,470 --> 00:15:49,120

only of the misfits and future

314

00:15:54,389 --> 00:15:52,480

d generation founding member howie pyro

315

00:15:56,790 --> 00:15:54,399

gathered at the manhattan apartment of

316

00:16:00,310 --> 00:15:56,800

vicious's new girlfriend

317

00:16:00,870 --> 00:16:00,320

michelle robeson to celebrate his having

318

00:16:04,310 --> 00:16:00,880

made

319

00:16:06,710 --> 00:16:04,320

bail sid died sometime in the night

320

00:16:07,590 --> 00:16:06,720

from an overdose and was discovered by

321

00:16:10,629 --> 00:16:07,600

his mother and

322

00:16:13,829 --> 00:16:10,639

beverly early the next morning he was

323

00:16:15,829 --> 00:16:13,839

just 21 years old

324

00:16:18,710 --> 00:16:15,839

unbelievable story on this day in

325

00:16:21,509 --> 00:16:18,720

history otd 1869

326

00:16:22,790 --> 00:16:21,519

the transcontinental railroad is

327

00:16:26,389 --> 00:16:22,800

completed

328

00:16:28,629 --> 00:16:26,399

unifying the united states no longer

329

00:16:29,590 --> 00:16:28,639

would western-bound travelers need to

330

00:16:33,749 --> 00:16:29,600

take that long

331

00:16:37,509 --> 00:16:33,759

and dangerous journey by wagon train

332

00:16:39,990 --> 00:16:37,519

that's a big deal fader fact now this

333

00:16:42,069 --> 00:16:40,000

here you go it's that time of the night

334

00:16:47,189 --> 00:16:42,079

fader fact

335

00:16:51,110 --> 00:16:47,199

adidas otherwise known as adidas adidas

336

00:16:53,990 --> 00:16:51,120

bought their three stripe design

337

00:16:55,590 --> 00:16:54,000

from a finnish sportswear company called

338

00:16:59,430 --> 00:16:55,600

car who

339

00:17:01,430 --> 00:16:59,440

they bought the design for two bottles

340

00:17:06,870 --> 00:17:01,440

of whiskey

341

00:17:11,990 --> 00:17:09,829

and that is your fader fact that's a

342

00:17:13,510 --> 00:17:12,000

true story

343

00:17:15,510 --> 00:17:13,520

that is unbelievable tonight very

344

00:17:17,669 --> 00:17:15,520

special guest professor

345

00:17:19,270 --> 00:17:17,679

avi loeb joins us for a discussion on

346

00:17:21,590 --> 00:17:19,280

the size of everything

347

00:17:22,470 --> 00:17:21,600

it is a full-on classroom situation

348

00:17:24,549 --> 00:17:22,480

coming up

349

00:17:26,630 --> 00:17:24,559

tomorrow night alan steinfeld is here

350

00:17:29,029 --> 00:17:26,640

for the first time

351

00:17:30,789 --> 00:17:29,039

and uh it's funny because alan's like

352

00:17:32,710 --> 00:17:30,799

man jimmy it's been 10 years man can we

353

00:17:34,310 --> 00:17:32,720

finally do this i said yes

354

00:17:36,870 --> 00:17:34,320

because he's got a new book out it's

355

00:17:38,909 --> 00:17:36,880

great it's called making contact

356

00:17:40,070 --> 00:17:38,919

preparing for the new realities of

357

00:17:43,270 --> 00:17:40,080

extraterrestrial

358

00:17:44,230 --> 00:17:43,280

existence and wednesday night another

359

00:17:47,029 --> 00:17:44,240

first time guest

360

00:17:49,750 --> 00:17:47,039

nancy trephine is with us she's got a

361

00:17:51,990 --> 00:17:49,760

new book out too this is new book week

362

00:17:53,110 --> 00:17:52,000

it seems she's got a new book out it's

363

00:17:55,510 --> 00:17:53,120

called enlightened

364

00:17:56,390 --> 00:17:55,520

chapters of my life and then thursday

365

00:17:58,710 --> 00:17:56,400

night

366

00:18:00,470 --> 00:17:58,720

that's right jacques valet and paola

367

00:18:03,190 --> 00:18:00,480

harris are here

368

00:18:05,350 --> 00:18:03,200

for an exclusive announcement and

369

00:18:08,870 --> 00:18:05,360

evening here on fade to black

370

00:18:12,150 --> 00:18:08,880

about their new book trinity the best

371

00:18:14,669 --> 00:18:12,160

kept secret all right now let me hit

372

00:18:16,230 --> 00:18:14,679

this river moon coffee once again

373

00:18:17,870 --> 00:18:16,240

rivermoonwellness.com

374

00:18:19,909 --> 00:18:17,880

good go to our website go to

375

00:18:21,350 --> 00:18:19,919

jimmychurchradio.com all of the river

376

00:18:23,590 --> 00:18:21,360

moon links

377

00:18:25,190 --> 00:18:23,600

are right there the amazon store the

378

00:18:27,270 --> 00:18:25,200

website

379

00:18:28,430 --> 00:18:27,280

uh all of our black moon products

380

00:18:30,310 --> 00:18:28,440

everything is right there at

381

00:18:31,669 --> 00:18:30,320

jimmychurchradio.com go support the show

382

00:18:40,830 --> 00:18:31,679

get yourself the best coffee in the

383

00:18:46,950 --> 00:18:43,909

well adidas

384

00:18:49,190 --> 00:18:46,960

yeah there it is right there

385

00:18:50,150 --> 00:18:49,200

that's good that's carhoo yeah it's

386

00:18:53,270 --> 00:18:50,160

crazy isn't it

387

00:18:59,909 --> 00:18:53,280

yeah true story it's a fact

388

00:19:06,230 --> 00:19:02,950

well this past

389

00:19:08,230 --> 00:19:06,240

ufo friday certainly didn't disappoint

390

00:19:11,590 --> 00:19:08,240

over the weekend did it

391

00:19:13,590 --> 00:19:11,600

as the internet blew up with the news

392

00:19:16,230 --> 00:19:13,600

that jacques valet and paula harris have

393

00:19:18,390 --> 00:19:16,240

a new book coming out

394

00:19:20,789 --> 00:19:18,400

it is called trinity the best kept

395

00:19:24,870 --> 00:19:20,799

secret

396

00:19:28,549 --> 00:19:24,880

and it all went viral it's cover

397

00:19:29,909 --> 00:19:28,559

the cover went viral and the rumors

398

00:19:32,950 --> 00:19:29,919

around it were equally

399

00:19:36,390 --> 00:19:32,960

just as viral it's crazy a lot of fun

400

00:19:38,710 --> 00:19:36,400

a lot of fun and uh

401  
00:19:39,750 --> 00:19:38,720  
jock said today said to me jimmy's like

402  
00:19:41,830 --> 00:19:39,760  
playing whack-a-mole

403  
00:19:42,789 --> 00:19:41,840  
with the rumors i said man you ain't

404  
00:19:47,830 --> 00:19:42,799  
lying

405  
00:19:53,110 --> 00:19:51,110  
the rumors were crazy and uh

406  
00:19:55,590 --> 00:19:53,120  
one of them oh man it was up on jock's

407  
00:19:57,190 --> 00:19:55,600  
site and then it was pulled down

408  
00:19:59,669 --> 00:19:57,200  
and that right there is cause for a new

409  
00:20:02,789 --> 00:19:59,679  
conspiracy theory right now i get it

410  
00:20:05,270 --> 00:20:02,799  
and then of course it was the subject of

411  
00:20:08,549 --> 00:20:05,280  
the book a ufo crash

412  
00:20:11,669 --> 00:20:08,559  
and retrieval that predates roswell

413  
00:20:13,350 --> 00:20:11,679

by two years right and you've got

414

00:20:14,950 --> 00:20:13,360

everything that goes along with it

415

00:20:17,990 --> 00:20:14,960

you've got a government cover-up you've

416

00:20:20,549 --> 00:20:18,000

got witnesses you've got debris

417

00:20:22,789 --> 00:20:20,559

and a book like this from any other

418

00:20:24,710 --> 00:20:22,799

author or authors

419

00:20:26,310 --> 00:20:24,720

probably would not get that much

420

00:20:29,510 --> 00:20:26,320

attention

421

00:20:32,549 --> 00:20:29,520

if any at all but

422

00:20:36,310 --> 00:20:32,559

this is jacques vale and paula harris

423

00:20:41,909 --> 00:20:36,320

so it was like here we go

424

00:20:48,070 --> 00:20:45,590

yes is the answer before you ask the

425

00:20:49,830 --> 00:20:48,080

question because i know what you want i

426  
00:20:51,750 --> 00:20:49,840  
i know what you're thinking yeah which

427  
00:20:53,110 --> 00:20:51,760  
is you know jimmy did you know about

428  
00:20:55,590 --> 00:20:53,120  
this

429  
00:20:57,270 --> 00:20:55,600  
well yeah sorta i did i knew that paula

430  
00:20:58,310 --> 00:20:57,280  
had been working on this for a number of

431  
00:21:00,390 --> 00:20:58,320  
years

432  
00:21:02,149 --> 00:21:00,400  
and yes i knew that they were working on

433  
00:21:03,830 --> 00:21:02,159  
a book together

434  
00:21:05,590 --> 00:21:03,840  
uh they both have told me this over the

435  
00:21:09,190 --> 00:21:05,600  
last year or so but no

436  
00:21:12,950 --> 00:21:09,200  
i didn't know the specifics no

437  
00:21:16,950 --> 00:21:12,960  
i didn't i did speak with jacques impala

438  
00:21:19,909 --> 00:21:16,960

um at length earlier today

439

00:21:21,750 --> 00:21:19,919

and and i'll say this they both wanted

440

00:21:23,350 --> 00:21:21,760

to come on the show as soon as possible

441

00:21:25,830 --> 00:21:23,360

to put the rumors to rest

442

00:21:27,669 --> 00:21:25,840

that was first and out front and you

443

00:21:28,070 --> 00:21:27,679

know i said absolutely you know let's do

444

00:21:29,430 --> 00:21:28,080

this

445

00:21:30,950 --> 00:21:29,440

and of course they want to announce the

446

00:21:31,990 --> 00:21:30,960

date that the book is going to be

447

00:21:33,669 --> 00:21:32,000

published

448

00:21:35,270 --> 00:21:33,679

there's been a few dates that have been

449

00:21:36,710 --> 00:21:35,280

thrown around there and the rumors i

450

00:21:38,390 --> 00:21:36,720

know the date but i'm not going to say

451  
00:21:41,350 --> 00:21:38,400  
anything we're going to wait until

452  
00:21:43,669 --> 00:21:41,360  
thursday but another thing i would like

453  
00:21:47,110 --> 00:21:43,679  
to add is this

454  
00:21:50,390 --> 00:21:47,120  
we all know that

455  
00:21:51,510 --> 00:21:50,400  
paola harris is a great investigator and

456  
00:21:53,990 --> 00:21:51,520  
a researcher

457  
00:21:55,750 --> 00:21:54,000  
she's been at this for a very long time

458  
00:21:57,190 --> 00:21:55,760  
going back to jay allen heineke that's

459  
00:21:59,190 --> 00:21:57,200  
that's the number one and two

460  
00:22:00,549 --> 00:21:59,200  
she has many sources and contacts

461  
00:22:03,510 --> 00:22:00,559  
throughout the world she's been doing

462  
00:22:07,110 --> 00:22:03,520  
this for a very long time

463  
00:22:08,710 --> 00:22:07,120

and the same goes for jacques

464

00:22:11,750 --> 00:22:08,720

we all know that when he gets involved

465

00:22:15,350 --> 00:22:11,760

in something he's not playing around

466

00:22:18,710 --> 00:22:15,360

and if you go back look at

467

00:22:21,510 --> 00:22:18,720

look at his books look at what

468

00:22:22,789 --> 00:22:21,520

he has released over the years and it's

469

00:22:25,990 --> 00:22:22,799

not just been

470

00:22:28,230 --> 00:22:26,000

you know ufos and et in contact

471

00:22:29,430 --> 00:22:28,240

those are some of the best books in all

472

00:22:31,270 --> 00:22:29,440

of ufology

473

00:22:34,470 --> 00:22:31,280

you know and they all come from shock

474

00:22:37,029 --> 00:22:34,480

but it's his vast amount of work

475

00:22:37,750 --> 00:22:37,039

and the subjects that he is interested

476

00:22:41,430 --> 00:22:37,760

in

477

00:22:43,750 --> 00:22:41,440

and he has got the respect

478

00:22:45,669 --> 00:22:43,760

you know so we know you know and when

479

00:22:47,110 --> 00:22:45,679

when when the rumors about this started

480

00:22:49,430 --> 00:22:47,120

and i get it

481

00:22:51,029 --> 00:22:49,440

you know okay so you've got paula there

482

00:22:53,190 --> 00:22:51,039

right we expect

483

00:22:54,390 --> 00:22:53,200

uh this kind of research coming from her

484

00:22:56,549 --> 00:22:54,400

we do

485

00:22:59,190 --> 00:22:56,559

right that's what she does and then when

486

00:23:00,630 --> 00:22:59,200

you get jacques tied to it and what he

487

00:23:02,149 --> 00:23:00,640

brings to the game

488

00:23:04,710 --> 00:23:02,159

that's going to get everybody's

489

00:23:05,110 --> 00:23:04,720

attention these two are releasing this

490

00:23:07,990 --> 00:23:05,120

book

491

00:23:09,750 --> 00:23:08,000

together as co-authors this is a big

492

00:23:12,710 --> 00:23:09,760

deal man

493

00:23:13,990 --> 00:23:12,720

this is not you know and with everything

494

00:23:16,149 --> 00:23:14,000

that has been going on

495

00:23:17,430 --> 00:23:16,159

in and around the ufo community this

496

00:23:19,510 --> 00:23:17,440

last month

497

00:23:21,190 --> 00:23:19,520

you know the whole you know what does

498

00:23:24,470 --> 00:23:21,200

the government really know

499

00:23:28,149 --> 00:23:24,480

question well

500

00:23:31,270 --> 00:23:28,159

we get this potentially huge news

501  
00:23:34,310 --> 00:23:31,280  
now a story this big

502  
00:23:36,630 --> 00:23:34,320  
with its possible implications

503  
00:23:37,590 --> 00:23:36,640  
you know have to rely on a few things

504  
00:23:40,710 --> 00:23:37,600  
and we know this

505  
00:23:44,149 --> 00:23:40,720  
and first the witnesses

506  
00:23:47,350 --> 00:23:44,159  
what have we got it's number one

507  
00:23:50,549 --> 00:23:47,360  
number two a paper trail

508  
00:23:54,630 --> 00:23:50,559  
what have we got gotta have that

509  
00:23:58,230 --> 00:23:54,640  
and third physical evidence

510  
00:23:58,710 --> 00:23:58,240  
if we go back to roswell we certainly

511  
00:24:02,149 --> 00:23:58,720  
had

512  
00:24:05,510 --> 00:24:02,159  
all three witnesses

513  
00:24:07,590 --> 00:24:05,520

can't even count them the amount of

514

00:24:09,350 --> 00:24:07,600

evidence and paper trail out there on

515

00:24:11,669 --> 00:24:09,360

roswell

516

00:24:13,750 --> 00:24:11,679

and stacks of it starting with the

517

00:24:16,950 --> 00:24:13,760

roswell daily record

518

00:24:19,909 --> 00:24:16,960

right and and third

519

00:24:21,190 --> 00:24:19,919

the physical evidence uh we have

520

00:24:23,510 --> 00:24:21,200

photographs

521

00:24:24,789 --> 00:24:23,520

of fake physical evidence it doesn't get

522

00:24:28,630 --> 00:24:24,799

any better than that

523

00:24:31,990 --> 00:24:28,640

does it you know um

524

00:24:35,909 --> 00:24:32,000

what will valet and harris

525

00:24:37,909 --> 00:24:35,919

present to the world right

526

00:24:39,750 --> 00:24:37,919

well we'll have to wait for the book to

527

00:24:41,830 --> 00:24:39,760

come out number one

528

00:24:43,269 --> 00:24:41,840

and i should have it in my hot little

529

00:24:45,510 --> 00:24:43,279

hands

530

00:24:47,590 --> 00:24:45,520

later this week and that's that's

531

00:24:47,909 --> 00:24:47,600

because i do this show and i get this

532

00:24:50,230 --> 00:24:47,919

stuff

533

00:24:51,350 --> 00:24:50,240

in advance but i'll have it i'll have it

534

00:24:53,510 --> 00:24:51,360

later on this week

535

00:24:55,430 --> 00:24:53,520

in time for the show with them on

536

00:24:58,870 --> 00:24:55,440

thursday night

537

00:25:00,710 --> 00:24:58,880

when i will be able to ask all of the

538

00:25:03,669 --> 00:25:00,720

right questions

539

00:25:04,310 --> 00:25:03,679

like man i know what everybody's

540

00:25:06,149 --> 00:25:04,320

thinking too

541

00:25:07,830 --> 00:25:06,159

jimmy come on don't mess this up and i'm

542

00:25:11,269 --> 00:25:07,840

not because

543

00:25:14,630 --> 00:25:11,279

i want to know when

544

00:25:16,710 --> 00:25:14,640

what did you find out about trinity

545

00:25:19,269 --> 00:25:16,720

what did you find out this is explosive

546

00:25:22,470 --> 00:25:19,279

news who disclosed it to

547

00:25:25,190 --> 00:25:22,480

you right where did that come from

548

00:25:27,269 --> 00:25:25,200

how many witnesses do we have right at

549

00:25:29,190 --> 00:25:27,279

this point this 2021 that happened in

550

00:25:30,789 --> 00:25:29,200

1945.

551

00:25:33,350 --> 00:25:30,799

all right so how many witnesses are

552

00:25:36,950 --> 00:25:33,360

still alive

553

00:25:39,190 --> 00:25:36,960

right what is the evidence i've seen

554

00:25:41,190 --> 00:25:39,200

what everybody has posted i've seen that

555

00:25:43,350 --> 00:25:41,200

i've gotten all the emails from all of

556

00:25:45,190 --> 00:25:43,360

you i've been reading it i get that

557

00:25:46,470 --> 00:25:45,200

so what is the evidence what is the

558

00:25:48,230 --> 00:25:46,480

debris

559

00:25:50,549 --> 00:25:48,240

i've seen those images too and i've

560

00:25:54,230 --> 00:25:50,559

heard the chatter too

561

00:25:57,430 --> 00:25:54,240

so and of course with the debris

562

00:26:01,350 --> 00:25:57,440

if yes and we have to assume that the

563

00:26:03,990 --> 00:26:01,360

answer is yes has it been tested

564

00:26:05,510 --> 00:26:04,000

that is one of the things that jacques

565

00:26:08,549 --> 00:26:05,520

does

566

00:26:09,029 --> 00:26:08,559

we know this and he has stated before in

567

00:26:11,350 --> 00:26:09,039

the show

568

00:26:13,029 --> 00:26:11,360

he's stated to me personally he stated

569

00:26:16,470 --> 00:26:13,039

out there in public

570

00:26:18,789 --> 00:26:16,480

many times that he has got debris

571

00:26:20,870 --> 00:26:18,799

you've seen the movie phenomenon right

572

00:26:22,149 --> 00:26:20,880

and that's what jock is all about is

573

00:26:23,990 --> 00:26:22,159

testing

574

00:26:26,710 --> 00:26:24,000

so is that going to be part of this book

575

00:26:29,269 --> 00:26:26,720

i don't know haven't read the book yet

576

00:26:31,510 --> 00:26:29,279

okay but we're going to find out all of

577

00:26:34,950 --> 00:26:31,520

this on thursday night

578

00:26:35,990 --> 00:26:34,960

and this reminds me if you think about

579

00:26:38,390 --> 00:26:36,000

it

580

00:26:41,269 --> 00:26:38,400

this reminds me so much about the early

581

00:26:43,190 --> 00:26:41,279

days into the roswell investigation

582

00:26:44,549 --> 00:26:43,200

you know there's so much to do there's

583

00:26:46,870 --> 00:26:44,559

so many questions

584

00:26:49,430 --> 00:26:46,880

and the excitement behind it all you

585

00:26:53,350 --> 00:26:49,440

know and that's not even the best part

586

00:26:56,070 --> 00:26:53,360

the best part everybody and listen to me

587

00:26:56,950 --> 00:26:56,080

is that this is coming from our

588

00:26:59,590 --> 00:26:56,960

community

589

00:27:01,350 --> 00:26:59,600

this is not coming from tsa it's not

590

00:27:03,350 --> 00:27:01,360

coming from the pentagon or the

591

00:27:07,909 --> 00:27:03,360

department of defense

592

00:27:11,190 --> 00:27:07,919

no this is us getting it done

593

00:27:13,350 --> 00:27:11,200

as it should be these are exciting times

594

00:27:14,549 --> 00:27:13,360

and to be honest when jacques said to me

595

00:27:16,870 --> 00:27:14,559

earlier today

596

00:27:18,070 --> 00:27:16,880

he said i'm quoting he said you know

597

00:27:21,190 --> 00:27:18,080

jimmy

598

00:27:23,029 --> 00:27:21,200

this is big this is huge

599

00:27:25,909 --> 00:27:23,039

and i can't wait to tell you all about

600

00:27:29,190 --> 00:27:25,919

it right

601  
00:27:33,510 --> 00:27:29,200  
it scared the crap out of me i'm not

602  
00:27:37,029 --> 00:27:33,520  
joking so here we go another great

603  
00:27:40,710 --> 00:27:37,039  
week on fade to black unbelievable

604  
00:27:43,510 --> 00:27:40,720  
starting with right tonight professor

605  
00:27:44,549 --> 00:27:43,520  
avi loeb is here tonight it's a

606  
00:27:48,630 --> 00:27:44,559  
classroom

607  
00:27:50,310 --> 00:27:48,640  
discussion

608  
00:27:52,149 --> 00:27:50,320  
is the size of everything tomorrow night

609  
00:27:53,510 --> 00:27:52,159  
alan steinfeld is here his new book

610  
00:27:55,110 --> 00:27:53,520  
making contact

611  
00:27:56,710 --> 00:27:55,120  
wednesday night another first time guest

612  
00:27:58,630 --> 00:27:56,720  
nancy tremaine is here thursday night

613  
00:28:02,389 --> 00:27:58,640

jack vale and paula harris

614

00:28:06,230 --> 00:28:02,399

and now here's my announcement

615

00:28:09,350 --> 00:28:06,240

this conversation with avi was recorded

616

00:28:11,990 --> 00:28:09,360

right before the show tonight

617

00:28:13,110 --> 00:28:12,000

we actually wrapped a few minutes before

618

00:28:17,110 --> 00:28:13,120

show time

619

00:28:21,430 --> 00:28:17,120

this interview is live this conversation

620

00:28:23,510 --> 00:28:21,440

is live but avi had to be up early

621

00:28:24,789 --> 00:28:23,520

he's a teacher he's got to be up early

622

00:28:26,630 --> 00:28:24,799

can't stay up late

623

00:28:27,830 --> 00:28:26,640

hanging out with fade to black live on

624

00:28:30,389 --> 00:28:27,840

the air and

625

00:28:31,350 --> 00:28:30,399

he said jimmy man can we just do a pre-k

626

00:28:32,789 --> 00:28:31,360

can we can we

627

00:28:34,950 --> 00:28:32,799

you know i'll stay up with you if you're

628

00:28:38,070 --> 00:28:34,960

gonna make me do it but please

629

00:28:40,630 --> 00:28:38,080

and i said hey you know what let's do it

630

00:28:41,830 --> 00:28:40,640

because i'll be able to go and hang out

631

00:28:45,830 --> 00:28:41,840

on twitter

632

00:28:48,549 --> 00:28:45,840

and youtube all night tonight

633

00:28:49,510 --> 00:28:48,559

and really honestly i can't believe i'm

634

00:28:53,029 --> 00:28:49,520

doing this again

635

00:28:56,470 --> 00:28:53,039

i have only done uh four pre-records

636

00:28:59,110 --> 00:28:56,480

in nine years i've done two now

637

00:29:01,510 --> 00:28:59,120

in a week but it was a lot of fun over

638

00:29:03,029 --> 00:29:01,520

there on youtube and twitter last week

639

00:29:04,630 --> 00:29:03,039

so i'm looking forward to that again

640

00:29:06,149 --> 00:29:04,640

tonight let's hang out

641

00:29:08,310 --> 00:29:06,159

let's have a good time it's going to be

642

00:29:11,430 --> 00:29:08,320

awesome this conversation

643

00:29:13,990 --> 00:29:11,440

uh with avi and uh i

644

00:29:14,950 --> 00:29:14,000

i'm going to get to listen to it again

645

00:29:18,230 --> 00:29:14,960

was very

646

00:29:21,830 --> 00:29:18,240

wide-ranging and i wanted to

647

00:29:23,590 --> 00:29:21,840

for me everybody knows how uh i enjoy

648

00:29:24,870 --> 00:29:23,600

physics and studying science and trying

649

00:29:27,909 --> 00:29:24,880

to get answers

650

00:29:31,110 --> 00:29:27,919

this was an opportunity for me to

651  
00:29:33,669 --> 00:29:31,120  
to sit with one of the great professors

652  
00:29:35,269 --> 00:29:33,679  
and and theoretical and astrophysicists

653  
00:29:38,230 --> 00:29:35,279  
on this planet

654  
00:29:39,590 --> 00:29:38,240  
and ask the questions that i needed

655  
00:29:42,789 --> 00:29:39,600  
answers to

656  
00:29:45,669 --> 00:29:42,799  
and that's what we did tonight so enjoy

657  
00:29:46,389 --> 00:29:45,679  
all of it and uh there are some moments

658  
00:29:48,950 --> 00:29:46,399  
in this

659  
00:29:50,789 --> 00:29:48,960  
that are pretty amazing and i broke it

660  
00:29:54,149 --> 00:29:50,799  
down into four sections

661  
00:29:55,430 --> 00:29:54,159  
and i saved the last section for the

662  
00:29:58,389 --> 00:29:55,440  
questions about et

663  
00:29:59,510 --> 00:29:58,399

and life and what is out there and how

664

00:30:02,470 --> 00:29:59,520

and why

665

00:30:04,070 --> 00:30:02,480

and when have we been visited this is an

666

00:30:06,389 --> 00:30:04,080

incredible conversation

667

00:30:07,669 --> 00:30:06,399

get ready for all of that avi loeb is

668

00:30:10,310 --> 00:30:07,679

our guest tonight

669

00:30:11,990 --> 00:30:10,320

and as soon as we get this started and

670

00:30:13,110 --> 00:30:12,000

we head to commercial break i'm going to

671

00:30:15,269 --> 00:30:13,120

jump over to

672

00:30:17,269 --> 00:30:15,279

youtube i'll be hanging out on twitter

673

00:30:17,830 --> 00:30:17,279

all night and we're going to be able to

674

00:30:20,070 --> 00:30:17,840

just

675

00:30:22,070 --> 00:30:20,080

have fun and ask some questions here we

676

00:30:23,750 --> 00:30:22,080

go this is fade to black i

677

00:30:26,710 --> 00:30:23,760

am your host jimmy church tonight avi

678

00:30:29,510 --> 00:30:26,720

loeb tomorrow night alan steinfeld

679

00:30:29,990 --> 00:30:29,520

wednesday night nancy tremaine thursday

680

00:30:32,549 --> 00:30:30,000

night

681

00:30:35,110 --> 00:30:32,559

jacques vale and paula harris i'm your

682

00:30:38,549 --> 00:30:35,120

host jimmy church this is fade to black

683

00:30:40,070 --> 00:30:38,559

on the game changer network and kgra

684

00:30:41,909 --> 00:30:40,080

the planet follow me right now on

685

00:30:59,830 --> 00:30:41,919

twitter i'm going to be there all night

686

00:31:04,230 --> 00:31:01,990

this is nicole church daughter of you

687

00:31:06,549 --> 00:31:04,240

know who and you're listening to fade to

688

00:31:10,630 --> 00:31:06,559

black on jimmychurchradio.com and the

689

00:31:17,029 --> 00:31:12,950

you're listening to jimmy church fade to

690

00:31:21,590 --> 00:31:19,269

fate to black will now pause for alien

691

00:31:28,310 --> 00:31:21,600

identification

692

00:31:32,070 --> 00:31:30,549

this is jimmy church and i'll be at the

693

00:31:35,029 --> 00:31:32,080

ufo megacon this

694

00:31:36,389 --> 00:31:35,039

june 6th through the 12th 2021 in

695

00:31:39,590 --> 00:31:36,399

laughlin nevada

696

00:31:42,070 --> 00:31:39,600

the laughlin ufo megacon is unique it's

697

00:31:45,350 --> 00:31:42,080

seven days of education and disclosure

698

00:31:47,350 --> 00:31:45,360

it's unlike all other ufo conferences

699

00:31:49,990 --> 00:31:47,360

the laughlin ufo mega conference

700

00:31:52,549 --> 00:31:50,000

specializes in bringing you new people

701  
00:31:54,549 --> 00:31:52,559  
offering new information and disclosure

702  
00:31:57,190 --> 00:31:54,559  
all of this is offered at prices so

703  
00:31:58,470 --> 00:31:57,200  
low you can actually afford to be there

704  
00:32:00,950 --> 00:31:58,480  
for instance

705  
00:32:03,750 --> 00:32:00,960  
seven night hotel packages one or two

706  
00:32:06,549 --> 00:32:03,760  
people start at just 320

707  
00:32:08,549 --> 00:32:06,559  
inclusive education and disclosure is

708  
00:32:09,190 --> 00:32:08,559  
why the laughlin ufo mega conference

709  
00:32:11,350 --> 00:32:09,200  
exists

710  
00:32:13,029 --> 00:32:11,360  
join us for all seven days or a half a

711  
00:32:16,350 --> 00:32:13,039  
week or just a day or two

712  
00:32:17,590 --> 00:32:16,360  
but join us go to

713  
00:32:20,389 --> 00:32:17,600

laughlinufomegaconference.com

714

00:32:21,750 --> 00:32:20,399

register now the only thing keeping you

715

00:32:26,830 --> 00:32:21,760

from being with all of us

716

00:32:26,840 --> 00:32:33,110

laughlinufomegaconference.com

717

00:32:37,350 --> 00:32:35,430

introducing the game changer blend from

718

00:32:39,830 --> 00:32:37,360

river moon coffee that delivers a

719

00:32:41,110 --> 00:32:39,840

customized blend made specifically for

720

00:32:44,389 --> 00:32:41,120

the fader knots

721

00:32:47,350 --> 00:32:44,399

if the game is rigged change the game

722

00:32:49,269 --> 00:32:47,360

it's a boulder cup with some bite game

723

00:32:50,230 --> 00:32:49,279

changer is the coffee of choice for

724

00:32:52,710 --> 00:32:50,240

those that prefer

725

00:32:54,389 --> 00:32:52,720

an organic dark roast that is slightly

726

00:32:57,350 --> 00:32:54,399

lighter and milder

727

00:32:59,669 --> 00:32:57,360

but it's still dark with wild notes of

728

00:33:02,230 --> 00:32:59,679

pecans and chocolate with a rich

729

00:33:04,310 --> 00:33:02,240

balanced full-bodied cup that is roasted

730

00:33:05,430 --> 00:33:04,320

to perfection for a great coffee to

731

00:33:08,470 --> 00:33:05,440

start your day

732

00:33:09,430 --> 00:33:08,480

as an after dinner coffee or anywhere in

733

00:33:11,350 --> 00:33:09,440

between

734

00:33:14,070 --> 00:33:11,360

artisan small batch roasted to

735

00:33:16,710 --> 00:33:14,080

perfection usda certified organic

736

00:33:18,789 --> 00:33:16,720

all river moon coffee is freshly roasted

737

00:33:20,950 --> 00:33:18,799

and packaged in the usa

738

00:33:21,990 --> 00:33:20,960

just go to [rivermooncoffee.com](http://rivermooncoffee.com) or click

739

00:33:25,029 --> 00:33:22,000

on the banners over

740

00:33:37,430 --> 00:33:25,039

on our site and use the promo code f2b

741

00:33:43,990 --> 00:33:42,230

make [rivermooncoffee.com](http://rivermooncoffee.com) [kgraradio.com](http://kgraradio.com)

742

00:33:46,389 --> 00:33:44,000

this is jimmy church of fade to black

743

00:33:48,950 --> 00:33:46,399

and you can get our podcast for just

744

00:33:51,110 --> 00:33:48,960

two dollars per month all you have to do

745

00:33:54,310 --> 00:33:51,120

is click on the podcast banner

746

00:33:56,950 --> 00:33:54,320

over at [jimmychurchradio.com](http://jimmychurchradio.com)

747

00:33:58,230 --> 00:33:56,960

hi folks it's trembling times and fear

748

00:34:00,470 --> 00:33:58,240

is pushing emotions

749

00:34:01,909 --> 00:34:00,480

which in turn pushes health the wrong

750

00:34:03,269 --> 00:34:01,919

direction do you ever get an ache

751  
00:34:05,909 --> 00:34:03,279  
because life is uneasy

752  
00:34:07,830 --> 00:34:05,919  
try life change tea get the tea.com life

753  
00:34:09,190 --> 00:34:07,840  
change tea works on your digestive tract

754  
00:34:11,349 --> 00:34:09,200  
helping to move food through

755  
00:34:12,470 --> 00:34:11,359  
quicker and comfortably so your health

756  
00:34:14,230 --> 00:34:12,480  
is spot on

757  
00:34:16,310 --> 00:34:14,240  
life change tea may not help with world

758  
00:34:17,750 --> 00:34:16,320  
issues but it will help with your

759  
00:34:19,669 --> 00:34:17,760  
digestive issues

760  
00:34:21,430 --> 00:34:19,679  
a glass a day helps keep the intruders

761  
00:34:23,710 --> 00:34:21,440  
away so

762  
00:34:26,230 --> 00:34:23,720  
change your life today log on to

763  
00:34:28,869 --> 00:34:26,240

getthet.com that's get the tea

764

00:34:30,869 --> 00:34:28,879

dot com if your health game is off get

765

00:34:33,349 --> 00:34:30,879

on by ordering life change tea

766

00:34:35,750 --> 00:34:33,359

get the tea.com and while you're on our

767

00:34:37,430 --> 00:34:35,760

site look around at the great non-gmo

768

00:34:40,069 --> 00:34:37,440

organic supplements and if you're a

769

00:34:41,829 --> 00:34:40,079

sales shopper go to our specials page

770

00:34:43,589 --> 00:34:41,839

and see what's for you i've been

771

00:34:45,669 --> 00:34:43,599

drinking the tea for 12 years and i'm

772

00:34:49,349 --> 00:34:45,679

sure glad for its health benefits

773

00:34:52,950 --> 00:34:49,359

again that's get the tea.com get the tea

774

00:34:54,950 --> 00:34:52,960

dot com the tea that makes you go

775

00:34:56,790 --> 00:34:54,960

vader knots when you think about the

776  
00:34:58,630 --> 00:34:56,800  
future of our country and where we're

777  
00:34:59,589 --> 00:34:58,640  
headed do you wonder about the food

778  
00:35:03,750 --> 00:34:59,599  
supply

779  
00:35:05,910 --> 00:35:03,760  
chain could be disastrous

780  
00:35:08,150 --> 00:35:05,920  
and they usually occur with little

781  
00:35:09,190 --> 00:35:08,160  
warning that's why the smartest thing

782  
00:35:12,310 --> 00:35:09,200  
you can do today

783  
00:35:14,710 --> 00:35:12,320  
is to stockpile emergency food water

784  
00:35:15,349 --> 00:35:14,720  
and other essentials i personally

785  
00:35:17,990 --> 00:35:15,359  
recommend

786  
00:35:20,470 --> 00:35:18,000  
my patriot supply they're the nation's

787  
00:35:22,790 --> 00:35:20,480  
largest emergency preparedness company

788  
00:35:23,910 --> 00:35:22,800

serving millions of customers for more

789

00:35:26,230 --> 00:35:23,920

than a decade

790

00:35:28,870 --> 00:35:26,240

in fact they're the only source my

791

00:35:32,069 --> 00:35:28,880

family trusts for our preparedness plan

792

00:35:34,550 --> 00:35:32,079

you should too right now save 20

793

00:35:35,990 --> 00:35:34,560

off a full four week supply of delicious

794

00:35:39,589 --> 00:35:36,000

meals that provide 2

795

00:35:42,550 --> 00:35:39,599

000 calories a day saving 20 helps too

796

00:35:44,790 --> 00:35:42,560

doesn't it especially now so go to

797

00:35:45,510 --> 00:35:44,800

prepare [preparewithjimmy.com](http://preparewithjimmy.com) and get

798

00:35:48,790 --> 00:35:45,520

ready

799

00:35:50,150 --> 00:35:48,800

that's prepare with [jimmy.com](http://jimmy.com) there's no

800

00:35:53,349 --> 00:35:50,160

time to lose

801  
00:36:02,230 --> 00:35:58,390  
nine out of ten geneticists agree

802  
00:36:05,829 --> 00:36:02,240  
fade to black is not

803  
00:36:07,510 --> 00:36:05,839  
your father's radio show on the game

804  
00:36:12,150 --> 00:36:07,520  
changer radio network

805  
00:36:14,150 --> 00:36:12,160  
and kgra the planet

806  
00:36:18,710 --> 00:36:14,160  
hi this is rob reiner from anvil and

807  
00:36:21,589 --> 00:36:18,720  
you're listening to jimmychurchradio.com

808  
00:36:38,790 --> 00:36:21,599  
what's up i'm chris what up this is

809  
00:36:43,270 --> 00:36:40,710  
all right welcome back fade to black i

810  
00:36:46,230 --> 00:36:43,280  
am your host jimmy church tonight

811  
00:36:48,550 --> 00:36:46,240  
professor avi love joins us and i want

812  
00:36:50,470 --> 00:36:48,560  
to remind everybody about what is going

813  
00:36:52,630 --> 00:36:50,480

on with the rest of this week

814

00:36:53,750 --> 00:36:52,640

tomorrow night alan steinfeld is here

815

00:36:57,030 --> 00:36:53,760

for the first time to

816

00:36:58,790 --> 00:36:57,040

announce his new book making contact

817

00:37:01,030 --> 00:36:58,800

preparing for the new realities of

818

00:37:02,950 --> 00:37:01,040

extraterrestrial existence

819

00:37:04,150 --> 00:37:02,960

wednesday night another first time guest

820

00:37:07,430 --> 00:37:04,160

nancy tremaine

821

00:37:09,990 --> 00:37:07,440

is with us and her new book enlightened

822

00:37:10,710 --> 00:37:10,000

chapters of my life and then thursday

823

00:37:13,589 --> 00:37:10,720

night

824

00:37:14,150 --> 00:37:13,599

jacques valet and paola harris are here

825

00:37:17,030 --> 00:37:14,160

for the

826  
00:37:17,430 --> 00:37:17,040  
exclusive announcement about their new

827  
00:37:20,550 --> 00:37:17,440  
book

828  
00:37:22,710 --> 00:37:20,560  
it is called trinity the best kept

829  
00:37:24,230 --> 00:37:22,720  
secret but tonight it's harvard's

830  
00:37:26,790 --> 00:37:24,240  
professor avi loeb

831  
00:37:28,310 --> 00:37:26,800  
is joining us to take us back to school

832  
00:37:28,950 --> 00:37:28,320  
he's certainly going to take me to

833  
00:37:30,230 --> 00:37:28,960  
school

834  
00:37:32,550 --> 00:37:30,240  
we're going to have a full discussion

835  
00:37:35,829 --> 00:37:32,560  
tonight about the size and origins of

836  
00:37:37,430 --> 00:37:35,839  
everything our universe the milky way

837  
00:37:38,870 --> 00:37:37,440  
and yes we're going to jump into some

838  
00:37:40,870 --> 00:37:38,880

big bang theory

839

00:37:42,069 --> 00:37:40,880

aviloba of course is a theoretical

840

00:37:45,190 --> 00:37:42,079

physicist who works on

841

00:37:46,710 --> 00:37:45,200

astrophysics and cosmology professor

842

00:37:49,190 --> 00:37:46,720

loeb is the frank b

843

00:37:50,230 --> 00:37:49,200

bear jr professor of science at harvard

844

00:37:52,390 --> 00:37:50,240

university

845

00:37:54,390 --> 00:37:52,400

he has been the longest serving chair of

846

00:37:56,150 --> 00:37:54,400

harvard's department of astronomy

847

00:37:57,990 --> 00:37:56,160

founding director of harvard's black

848

00:38:00,630 --> 00:37:58,000

hole initiative and director of the

849

00:38:02,790 --> 00:38:00,640

institute for theory and computation

850

00:38:04,310 --> 00:38:02,800

within the harvard smithsonian center

851  
00:38:06,069 --> 00:38:04,320  
for astrophysics

852  
00:38:08,230 --> 00:38:06,079  
he is the author of the best-selling

853  
00:38:10,230 --> 00:38:08,240  
book extraterrestrial the first sign of

854  
00:38:11,589 --> 00:38:10,240  
intelligent life beyond earth which i

855  
00:38:13,349 --> 00:38:11,599  
have read now

856  
00:38:15,190 --> 00:38:13,359  
at least 10 times i would like to

857  
00:38:17,990 --> 00:38:15,200  
welcome back to fade to black

858  
00:38:19,109 --> 00:38:18,000  
professor avi loeb avi good evening how

859  
00:38:21,829 --> 00:38:19,119  
are you

860  
00:38:22,950 --> 00:38:21,839  
thanks for having me and it's good it's

861  
00:38:26,390 --> 00:38:22,960  
good to have you back

862  
00:38:27,990 --> 00:38:26,400  
and there's a couple of things that i

863  
00:38:31,670 --> 00:38:28,000

want to discuss tonight but

864

00:38:35,109 --> 00:38:31,680

here's the thing numbers change

865

00:38:36,069 --> 00:38:35,119

every single day how do you get

866

00:38:38,950 --> 00:38:36,079

acclimated

867

00:38:42,790 --> 00:38:38,960

how do you stay up on the changing

868

00:38:47,750 --> 00:38:45,510

well some of the numbers change because

869

00:38:49,750 --> 00:38:47,760

the universe is changing

870

00:38:51,349 --> 00:38:49,760

and we have to get used to that nothing

871

00:38:54,630 --> 00:38:51,359

stays forever

872

00:38:57,270 --> 00:38:54,640

uh other numbers change because we get

873

00:38:58,470 --> 00:38:57,280

better data better evidence so we know

874

00:39:01,589 --> 00:38:58,480

better what

875

00:39:04,310 --> 00:39:01,599

the correct numbers are i just follow

876

00:39:05,270 --> 00:39:04,320

the updates and i have no problem

877

00:39:09,589 --> 00:39:05,280

adapting to

878

00:39:11,910 --> 00:39:09,599

changing numbers uh it's part of life

879

00:39:14,710 --> 00:39:11,920

you know even the universe at large is

880

00:39:19,030 --> 00:39:14,720

not remaining the same the sun will

881

00:39:22,550 --> 00:39:19,040

die in about 7 billion years

882

00:39:24,790 --> 00:39:22,560

the universe itself is expanding and

883

00:39:26,470 --> 00:39:24,800

will look very different 10 billion

884

00:39:28,470 --> 00:39:26,480

years from now

885

00:39:30,150 --> 00:39:28,480

so we just have to get used to it that

886

00:39:33,670 --> 00:39:30,160

nothing stays forever

887

00:39:37,230 --> 00:39:33,680

is there i have to know in your circle

888

00:39:39,270 --> 00:39:37,240

of friends you know your your

889

00:39:41,310 --> 00:39:39,280

astrophysicist friends your circle of

890

00:39:42,470 --> 00:39:41,320

friends do you guys have a central

891

00:39:45,589 --> 00:39:42,480

depository

892

00:39:49,109 --> 00:39:45,599

of information where numbers are there

893

00:39:52,630 --> 00:39:49,119

that you all draw from

894

00:39:56,230 --> 00:39:52,640

yeah it depends on the context but um

895

00:39:58,870 --> 00:39:56,240

definitely there are some summaries of

896

00:40:01,510 --> 00:39:58,880

the numbers we agree on for example

897

00:40:02,390 --> 00:40:01,520

the the fundamental parameters of the

898

00:40:05,430 --> 00:40:02,400

universe what

899

00:40:07,670 --> 00:40:05,440

are the constituents of matter

900

00:40:09,829 --> 00:40:07,680

and otherwise in the universe you know

901  
00:40:11,190 --> 00:40:09,839  
these numbers are measured to exquisite

902  
00:40:15,109 --> 00:40:11,200  
the precision by now

903  
00:40:17,990 --> 00:40:15,119  
uh using the the radiation that was left

904  
00:40:20,309 --> 00:40:18,000  
over from the big bang and uh there are

905  
00:40:22,470 --> 00:40:20,319  
tables summarizing those numbers with

906  
00:40:24,069 --> 00:40:22,480  
the uncertainties that are quite small

907  
00:40:27,670 --> 00:40:24,079  
they're of the order of a percent

908  
00:40:30,390 --> 00:40:27,680  
now and we are in the uh realm of

909  
00:40:31,190 --> 00:40:30,400  
uh precision cosmology the study of the

910  
00:40:34,550 --> 00:40:31,200  
universe

911  
00:40:36,069 --> 00:40:34,560  
is now getting into you know the really

912  
00:40:39,589 --> 00:40:36,079  
fundamental questions of

913  
00:40:40,309 --> 00:40:39,599

how things started what the matter is

914

00:40:43,030 --> 00:40:40,319

made of

915

00:40:44,710 --> 00:40:43,040

um but we pretty much know the

916

00:40:47,750 --> 00:40:44,720

quantities

917

00:40:48,550 --> 00:40:47,760

the uh the changing numbers and the

918

00:40:52,069 --> 00:40:48,560

reason why

919

00:40:54,550 --> 00:40:52,079

i'm so concerned with this is

920

00:40:55,510 --> 00:40:54,560

the rest of the world pop culture right

921

00:40:58,790 --> 00:40:55,520

now is

922

00:41:00,790 --> 00:40:58,800

interested in science like never before

923

00:41:02,390 --> 00:41:00,800

and they are hearing numbers and

924

00:41:05,349 --> 00:41:02,400

different reports

925

00:41:07,349 --> 00:41:05,359

um do they i'm talking about the rest of

926  
00:41:10,870 --> 00:41:07,359  
the world right the status quo

927  
00:41:14,150 --> 00:41:10,880  
do do they understand how big everything

928  
00:41:14,790 --> 00:41:14,160  
really is or is it starting to get maybe

929  
00:41:17,510 --> 00:41:14,800  
a little

930  
00:41:19,510 --> 00:41:17,520  
numbing and they don't understand how

931  
00:41:20,630 --> 00:41:19,520  
big the universe or our milky way really

932  
00:41:23,750 --> 00:41:20,640  
is

933  
00:41:27,510 --> 00:41:23,760  
world

934  
00:41:28,470 --> 00:41:27,520  
like actors put on a stage uh without a

935  
00:41:31,030 --> 00:41:28,480  
script we

936  
00:41:32,470 --> 00:41:31,040  
we don't really know much and we tend to

937  
00:41:34,309 --> 00:41:32,480  
think that the play is about

938  
00:41:36,710 --> 00:41:34,319

us and you know if you go back a

939

00:41:38,790 --> 00:41:36,720

thousand or two thousand years

940

00:41:39,829 --> 00:41:38,800

humans used to think that the world

941

00:41:43,510 --> 00:41:39,839

centers on us

942

00:41:45,030 --> 00:41:43,520

uh the ancient philosopher aristotle

943

00:41:45,750 --> 00:41:45,040

argued that that there are spheres

944

00:41:48,470 --> 00:41:45,760

around us

945

00:41:49,349 --> 00:41:48,480

and for a thousand years people believed

946

00:41:52,150 --> 00:41:49,359

him and

947

00:41:53,349 --> 00:41:52,160

until copernicus and galileo realized by

948

00:41:55,910 --> 00:41:53,359

looking through the

949

00:41:56,470 --> 00:41:55,920

their telescope collecting data that in

950

00:41:59,589 --> 00:41:56,480

fact

951

00:42:02,630 --> 00:41:59,599

we are not at the center uh of of the

952

00:42:04,950 --> 00:42:02,640

world of the universe and um and

953

00:42:06,710 --> 00:42:04,960

the one thing to recognize is you know

954

00:42:09,829 --> 00:42:06,720

the stage is huge

955

00:42:11,030 --> 00:42:09,839

uh it cannot be about us and moreover we

956

00:42:14,230 --> 00:42:11,040

live just for us

957

00:42:16,230 --> 00:42:14,240

about a hundred years at best and that's

958

00:42:18,870 --> 00:42:16,240

one part in 100 million

959

00:42:19,750 --> 00:42:18,880

of the age of the universe so we've been

960

00:42:23,190 --> 00:42:19,760

witnessing

961

00:42:24,790 --> 00:42:23,200

only the very last bit of of the history

962

00:42:26,309 --> 00:42:24,800

of the universe you know one part in a

963

00:42:29,030 --> 00:42:26,319

hundred million

964

00:42:30,069 --> 00:42:29,040

so not only the stage is huge you know

965

00:42:34,870 --> 00:42:30,079

it's 10 to the power

966

00:42:37,270 --> 00:42:34,880

26 one with 26 zeros afterwards

967

00:42:39,349 --> 00:42:37,280

bigger than the size of our body but

968

00:42:40,309 --> 00:42:39,359

also the play has been going around for

969

00:42:43,190 --> 00:42:40,319

much longer

970

00:42:43,750 --> 00:42:43,200

before we came to exist so so we are

971

00:42:47,109 --> 00:42:43,760

this

972

00:42:49,430 --> 00:42:47,119

is clearly a message that we are playing

973

00:42:51,109 --> 00:42:49,440

no no significant role in this we are

974

00:42:53,030 --> 00:42:51,119

not the central players

975

00:42:54,550 --> 00:42:53,040

and it's not about us and you know

976

00:42:56,150 --> 00:42:54,560

that's that's the first thing we should

977

00:42:58,710 --> 00:42:56,160

recognize that we are not

978

00:43:01,030 --> 00:42:58,720

the main actors and and the next thing

979

00:43:03,510 --> 00:43:01,040

for us to recognize is of course

980

00:43:05,030 --> 00:43:03,520

uh that maybe we should search if there

981

00:43:08,870 --> 00:43:05,040

are other actors around

982

00:43:10,870 --> 00:43:08,880

and and see um maybe they know

983

00:43:12,390 --> 00:43:10,880

maybe they have a better idea about what

984

00:43:15,430 --> 00:43:12,400

the play is about

985

00:43:19,270 --> 00:43:15,440

now now when when we

986

00:43:22,870 --> 00:43:19,280

see and i mean us when we see the images

987

00:43:26,309 --> 00:43:22,880

of our milky way i think

988

00:43:30,710 --> 00:43:26,319

we see it as a very small place

989

00:43:34,870 --> 00:43:30,720

that it's not that big and the truth is

990

00:43:38,630 --> 00:43:34,880

our little galaxy is ginormous

991

00:43:41,510 --> 00:43:38,640

it's really big isn't it yeah it's

992

00:43:43,589 --> 00:43:41,520

the region that we can see the light

993

00:43:45,589 --> 00:43:43,599

that we can see from stars extends to

994

00:43:48,630 --> 00:43:45,599

tens of thousands of

995

00:43:49,349 --> 00:43:48,640

light years away but from us but in fact

996

00:43:52,470 --> 00:43:49,359

the milky way

997

00:43:54,710 --> 00:43:52,480

is even bigger it's uh hundreds of

998

00:43:58,230 --> 00:43:54,720

thousands of light years big

999

00:43:58,870 --> 00:43:58,240

there is a hell of a matter that we

1000

00:44:01,109 --> 00:43:58,880

can't see

1001  
00:44:03,030 --> 00:44:01,119  
it's called dark matter which makes most

1002  
00:44:05,510 --> 00:44:03,040  
of the matter in the universe

1003  
00:44:06,630 --> 00:44:05,520  
we just label it as dark matter because

1004  
00:44:09,829 --> 00:44:06,640  
it doesn't

1005  
00:44:12,630 --> 00:44:09,839  
emit any light or scatter any light

1006  
00:44:14,150 --> 00:44:12,640  
we don't know what it's made of and uh

1007  
00:44:18,230 --> 00:44:14,160  
we've been searching for

1008  
00:44:19,750 --> 00:44:18,240  
four decades various types of particles

1009  
00:44:20,710 --> 00:44:19,760  
we didn't find them we didn't detect

1010  
00:44:22,390 --> 00:44:20,720  
them

1011  
00:44:24,230 --> 00:44:22,400  
hundreds of millions of dollars were

1012  
00:44:26,470 --> 00:44:24,240  
invested in experiments trying to detect

1013  
00:44:28,230 --> 00:44:26,480

the dark matter without success so

1014

00:44:29,990 --> 00:44:28,240

that's one of the mysteries about the

1015

00:44:33,030 --> 00:44:30,000

universe what most of the matter

1016

00:44:36,069 --> 00:44:33,040

is uh it looks like there is five times

1017

00:44:39,109 --> 00:44:36,079

more matter than the one that we can see

1018

00:44:42,150 --> 00:44:39,119

now the last

1019

00:44:45,270 --> 00:44:42,160

measurements that i'm aware of

1020

00:44:48,470 --> 00:44:45,280

uh the guesstimate which is pretty solid

1021

00:44:51,270 --> 00:44:48,480

the milky way is about 150 000

1022

00:44:51,990 --> 00:44:51,280

light years across that's huge i mean

1023

00:44:54,950 --> 00:44:52,000

that's

1024

00:44:57,670 --> 00:44:54,960

our near celestial neighbor as we know a

1025

00:45:00,790 --> 00:44:57,680

near star system proxima centauri

1026  
00:45:03,990 --> 00:45:00,800  
is four and a half light years away that

1027  
00:45:07,190 --> 00:45:04,000  
is the closest neighbor that's a long

1028  
00:45:08,470 --> 00:45:07,200  
ways from us if we're 150 000 light

1029  
00:45:11,349 --> 00:45:08,480  
years across

1030  
00:45:13,589 --> 00:45:11,359  
what are the latest counts of actual

1031  
00:45:16,150 --> 00:45:13,599  
stars in the milky way

1032  
00:45:17,190 --> 00:45:16,160  
oh they extend the close to that

1033  
00:45:20,470 --> 00:45:17,200  
distance

1034  
00:45:22,230 --> 00:45:20,480  
in fact now the milky way seems to

1035  
00:45:23,990 --> 00:45:22,240  
i mean is estimated to extend it a

1036  
00:45:26,870 --> 00:45:24,000  
little farther than that and

1037  
00:45:27,349 --> 00:45:26,880  
there is another sister galaxy that is

1038  
00:45:30,710 --> 00:45:27,359

uh

1039

00:45:32,870 --> 00:45:30,720

roughly grazing the milky way right now

1040

00:45:35,990 --> 00:45:32,880

it's called the andromeda

1041

00:45:37,910 --> 00:45:36,000

and it's on its path

1042

00:45:40,069 --> 00:45:37,920

towards a collision with the milky way

1043

00:45:42,150 --> 00:45:40,079

so in a few billion years the two

1044

00:45:45,430 --> 00:45:42,160

galaxies will collide

1045

00:45:46,150 --> 00:45:45,440

and the stars inside the them will mix

1046

00:45:53,349 --> 00:45:46,160

up

1047

00:45:55,190 --> 00:45:53,359

milk omeda which is the merger product

1048

00:45:58,790 --> 00:45:55,200

of the milky way in andromeda and

1049

00:46:01,750 --> 00:45:58,800

it would look sort of like a football

1050

00:46:02,710 --> 00:46:01,760

not the like the milky way looks right

1051

00:46:06,230 --> 00:46:02,720

now which is

1052

00:46:08,069 --> 00:46:06,240

uh a disc or a plate uh uh so both the

1053

00:46:10,309 --> 00:46:08,079

milky way and andromeda look like

1054

00:46:12,630 --> 00:46:10,319

discs but when they will merge they will

1055

00:46:15,430 --> 00:46:12,640

create something that is rounder

1056

00:46:17,670 --> 00:46:15,440

uh sort of like a football and that is

1057

00:46:19,670 --> 00:46:17,680

called an elliptical galaxy when we see

1058

00:46:21,670 --> 00:46:19,680

those galaxies in the sky

1059

00:46:23,349 --> 00:46:21,680

they were most likely the result of

1060

00:46:25,750 --> 00:46:23,359

mergers of this type

1061

00:46:27,349 --> 00:46:25,760

and the night sky will change completely

1062

00:46:30,550 --> 00:46:27,359

in a few billion years and

1063

00:46:31,349 --> 00:46:30,560

in fact the sun will be kicked out away

1064

00:46:34,069 --> 00:46:31,359

from

1065

00:46:34,790 --> 00:46:34,079

uh the center and there is even a chance

1066

00:46:37,750 --> 00:46:34,800

that

1067

00:46:40,390 --> 00:46:37,760

during the merger uh the andromeda

1068

00:46:42,870 --> 00:46:40,400

galaxy will pick up the

1069

00:46:44,870 --> 00:46:42,880

sun and we will be able to see the milky

1070

00:46:48,710 --> 00:46:44,880

way from a distance

1071

00:46:52,230 --> 00:46:48,720

and that would be a fascinating view um

1072

00:46:53,270 --> 00:46:52,240

are we looking at about 500 million

1073

00:46:56,630 --> 00:46:53,280

stars

1074

00:46:58,870 --> 00:46:56,640

in the milky way roughly

1075

00:46:59,910 --> 00:46:58,880

yes most of the stars are much smaller

1076

00:47:02,470 --> 00:46:59,920

than the sun

1077

00:47:03,109 --> 00:47:02,480

most of them are called dwarf stars they

1078

00:47:05,829 --> 00:47:03,119

are about

1079

00:47:06,950 --> 00:47:05,839

a tenth of the mass of the sun and they

1080

00:47:10,470 --> 00:47:06,960

emit mostly

1081

00:47:13,349 --> 00:47:10,480

infrared light it turns out

1082

00:47:14,069 --> 00:47:13,359

um about the quarter to half of all the

1083

00:47:17,829 --> 00:47:14,079

stars

1084

00:47:20,150 --> 00:47:17,839

have a planet the size of the earth

1085

00:47:22,309 --> 00:47:20,160

in the habitable zone roughly you know

1086

00:47:24,549 --> 00:47:22,319

around sun like stars roughly at the

1087

00:47:25,430 --> 00:47:24,559

same separation as the earth is from the

1088

00:47:27,829 --> 00:47:25,440

sun

1089

00:47:29,750 --> 00:47:27,839

so you could have life around a

1090

00:47:33,349 --> 00:47:29,760

significant fraction of

1091

00:47:36,549 --> 00:47:33,359

of those stars and

1092

00:47:39,109 --> 00:47:36,559

uh most of the if there is life around

1093

00:47:40,309 --> 00:47:39,119

many stars most of the stars emit

1094

00:47:42,710 --> 00:47:40,319

infrared light so the

1095

00:47:44,309 --> 00:47:42,720

the creatures on the surface of the

1096

00:47:47,589 --> 00:47:44,319

planets around them

1097

00:47:49,670 --> 00:47:47,599

they should have infrared eyes and

1098

00:47:50,710 --> 00:47:49,680

in a class that i teach at harvard i

1099

00:47:53,670 --> 00:47:50,720

asked the students

1100

00:47:54,549 --> 00:47:53,680

a few weeks ago whether they know about

1101

00:47:57,990 --> 00:47:54,559

any

1102

00:48:01,270 --> 00:47:58,000

animal on earth that has infrared eyes

1103

00:48:02,870 --> 00:48:01,280

and one of the students found an image

1104

00:48:06,150 --> 00:48:02,880

of a shrimp

1105

00:48:08,630 --> 00:48:06,160

that has infrared eyes which look like

1106

00:48:09,829 --> 00:48:08,640

two ping pong balls connected with cords

1107

00:48:13,349 --> 00:48:09,839

to the head of the shrimp

1108

00:48:16,069 --> 00:48:13,359

and it did look like an alien to me but

1109

00:48:16,549 --> 00:48:16,079

surely uh those creatures um you know

1110

00:48:19,190 --> 00:48:16,559

that

1111

00:48:20,069 --> 00:48:19,200

are sensitive to infrared radiation are

1112

00:48:23,270 --> 00:48:20,079

probably very

1113

00:48:24,150 --> 00:48:23,280

strange looking and and you can imagine

1114

00:48:26,790 --> 00:48:24,160

that

1115

00:48:27,910 --> 00:48:26,800

if there are any interstellar travel

1116

00:48:30,549 --> 00:48:27,920

agencies

1117

00:48:32,790 --> 00:48:30,559

they will never advertise the earth as a

1118

00:48:33,430 --> 00:48:32,800

desired destination for a vacation

1119

00:48:35,430 --> 00:48:33,440

because

1120

00:48:36,549 --> 00:48:35,440

all that we can offer in our vacation

1121

00:48:39,589 --> 00:48:36,559

sites are

1122

00:48:40,790 --> 00:48:39,599

uh green loans that are illuminated by

1123

00:48:43,829 --> 00:48:40,800

visible light

1124

00:48:47,430 --> 00:48:43,839

and that light hurts the eyes of those

1125

00:48:50,150 --> 00:48:47,440

infrared viewing creatures and

1126  
00:48:52,069 --> 00:48:50,160  
and they're used to dark red grass so

1127  
00:48:55,510 --> 00:48:52,079  
they will never come to visit us

1128  
00:48:55,829 --> 00:48:55,520  
now what would we look like what would

1129  
00:48:58,470 --> 00:48:55,839  
we

1130  
00:48:59,270 --> 00:48:58,480  
look like to them would it just be an

1131  
00:49:02,470 --> 00:48:59,280  
infrared

1132  
00:49:05,510 --> 00:49:02,480  
outline of our bodies

1133  
00:49:07,910 --> 00:49:05,520  
oh yeah in fact um our body

1134  
00:49:09,349 --> 00:49:07,920  
emits infrared radiation that's why uh

1135  
00:49:12,870 --> 00:49:09,359  
the military is using

1136  
00:49:14,230 --> 00:49:12,880  
uh special goggles that can detect

1137  
00:49:17,270 --> 00:49:14,240  
infrared light

1138  
00:49:20,710 --> 00:49:17,280

at night and

1139

00:49:21,670 --> 00:49:20,720

so every warm body roughly at room

1140

00:49:24,630 --> 00:49:21,680

temperature

1141

00:49:26,549 --> 00:49:24,640

emits mostly infrared light so in fact

1142

00:49:29,589 --> 00:49:26,559

they would be able to see our body

1143

00:49:32,230 --> 00:49:29,599

emitting light even at night just like

1144

00:49:33,349 --> 00:49:32,240

military personnel you know can see

1145

00:49:36,390 --> 00:49:33,359

soldiers

1146

00:49:36,870 --> 00:49:36,400

with infrared goggles now that's crazy

1147

00:49:38,150 --> 00:49:36,880

to me

1148

00:49:40,069 --> 00:49:38,160

that's great i didn't expect this

1149

00:49:43,910 --> 00:49:40,079

conversation to go in that direction

1150

00:49:44,549 --> 00:49:43,920

but let's back up for a second okay so

1151

00:49:48,390 --> 00:49:44,559

uh

1152

00:49:52,069 --> 00:49:48,400

if we are talking about 500 million

1153

00:49:54,390 --> 00:49:52,079

stars and the latest guesstimates

1154

00:49:55,190 --> 00:49:54,400

have been that each one of those stars

1155

00:49:58,549 --> 00:49:55,200

should have

1156

00:50:01,829 --> 00:49:58,559

a planet or more

1157

00:50:04,870 --> 00:50:01,839

then that means 500 million

1158

00:50:08,309 --> 00:50:04,880

planets just in our milky way at least

1159

00:50:11,430 --> 00:50:08,319

when in 1995 there was only one

1160

00:50:15,270 --> 00:50:11,440

right 500 billion yes yeah 500 billion

1161

00:50:18,150 --> 00:50:15,280

i said million you know so in a way

1162

00:50:19,190 --> 00:50:18,160

once again the sky is teaching us

1163

00:50:21,589 --> 00:50:19,200

modesty you know

1164

00:50:23,190 --> 00:50:21,599

not only we are not at the center of the

1165

00:50:25,990 --> 00:50:23,200

universe

1166

00:50:26,870 --> 00:50:26,000

as we discussed before but also our

1167

00:50:28,470 --> 00:50:26,880

backyard

1168

00:50:30,309 --> 00:50:28,480

is not very special we are not

1169

00:50:32,150 --> 00:50:30,319

privileged you know things like the

1170

00:50:34,950 --> 00:50:32,160

earth and the sun

1171

00:50:36,950 --> 00:50:34,960

are quite common and to me that's an

1172

00:50:38,309 --> 00:50:36,960

important lesson it means that

1173

00:50:39,990 --> 00:50:38,319

you know we shouldn't feel that we are

1174

00:50:42,549 --> 00:50:40,000

privileged that we are unique and

1175

00:50:44,069 --> 00:50:42,559

special sort of like my daughters you

1176  
00:50:45,510 --> 00:50:44,079  
know when they were young they thought

1177  
00:50:45,750 --> 00:50:45,520  
that they are unique and special they

1178  
00:50:47,670 --> 00:50:45,760  
are

1179  
00:50:49,829 --> 00:50:47,680  
the smartest in the world and when we

1180  
00:50:52,470 --> 00:50:49,839  
took them to the kindergarten

1181  
00:50:53,990 --> 00:50:52,480  
on the first day they had a shock and

1182  
00:50:55,990 --> 00:50:54,000  
they realized that there are other

1183  
00:50:58,309 --> 00:50:56,000  
kids that are smarter than they are and

1184  
00:51:01,349 --> 00:50:58,319  
i think our civilization are

1185  
00:51:03,270 --> 00:51:01,359  
is up for the same kind of psychological

1186  
00:51:05,270 --> 00:51:03,280  
shock when we will find that

1187  
00:51:06,790 --> 00:51:05,280  
you know even the life that we find here

1188  
00:51:09,430 --> 00:51:06,800

on earth is not unique

1189

00:51:10,470 --> 00:51:09,440

and and we are not the smartest kid on

1190

00:51:14,950 --> 00:51:10,480

the block

1191

00:51:18,069 --> 00:51:14,960

now again uh to your circle of friends

1192

00:51:20,150 --> 00:51:18,079

um when we talk about 500 billion

1193

00:51:23,270 --> 00:51:20,160

planets and that's a really big

1194

00:51:24,790 --> 00:51:23,280

number right that's a big number um and

1195

00:51:26,390 --> 00:51:24,800

some of these i keep going back to

1196

00:51:27,270 --> 00:51:26,400

guesstimates because we really don't

1197

00:51:30,790 --> 00:51:27,280

know

1198

00:51:32,549 --> 00:51:30,800

but now 20 billion

1199

00:51:34,309 --> 00:51:32,559

rocky earth-like planets in the

1200

00:51:37,109 --> 00:51:34,319

goldilocks zone

1201  
00:51:38,710 --> 00:51:37,119  
is what is is being talked about in the

1202  
00:51:41,349 --> 00:51:38,720  
in the science community

1203  
00:51:43,670 --> 00:51:41,359  
that's that's a pretty big number it's a

1204  
00:51:45,750 --> 00:51:43,680  
huge number and it could be even more

1205  
00:51:48,150 --> 00:51:45,760  
uh there are some significant

1206  
00:51:52,150 --> 00:51:48,160  
uncertainties in this number and

1207  
00:51:54,950 --> 00:51:52,160  
uh it it among the sun-like stars

1208  
00:51:56,470 --> 00:51:54,960  
the fraction of uh stars that have a

1209  
00:51:58,630 --> 00:51:56,480  
planet like the earth roughly at the

1210  
00:51:59,109 --> 00:51:58,640  
same separation could be as large as a

1211  
00:52:04,150 --> 00:51:59,119  
half

1212  
00:52:07,190 --> 00:52:04,160  
you know it uh so um yeah uh

1213  
00:52:08,710 --> 00:52:07,200

irrespective of whether the number is a

1214

00:52:10,710 --> 00:52:08,720

tenth or a half

1215

00:52:12,950 --> 00:52:10,720

it's a significant fraction it means

1216

00:52:14,950 --> 00:52:12,960

that there is nothing special about what

1217

00:52:18,470 --> 00:52:14,960

we find in our backyard and

1218

00:52:20,150 --> 00:52:18,480

as a result you know expecting to find

1219

00:52:22,790 --> 00:52:20,160

things that we have here on earth

1220

00:52:24,710 --> 00:52:22,800

elsewhere is a very

1221

00:52:26,150 --> 00:52:24,720

natural thing you know we it should be a

1222

00:52:29,829 --> 00:52:26,160

matter of common sense

1223

00:52:31,190 --> 00:52:29,839

instead you know a lot of scientists

1224

00:52:33,270 --> 00:52:31,200

argue that you know we need

1225

00:52:35,589 --> 00:52:33,280

extraordinary evidence before we even

1226  
00:52:37,750 --> 00:52:35,599  
contemplate that possibility before

1227  
00:52:38,950 --> 00:52:37,760  
before we believe that there might have

1228  
00:52:41,190 --> 00:52:38,960  
been things like us

1229  
00:52:42,870 --> 00:52:41,200  
billions of years ago even though most

1230  
00:52:44,470 --> 00:52:42,880  
of the stars from billions of years

1231  
00:52:47,670 --> 00:52:44,480  
before the sun so

1232  
00:52:50,470 --> 00:52:47,680  
to me it all implies that

1233  
00:52:52,390 --> 00:52:50,480  
you know the uh the basic assumption we

1234  
00:52:54,630 --> 00:52:52,400  
should start from is

1235  
00:52:55,589 --> 00:52:54,640  
that there are many things similar to

1236  
00:52:58,309 --> 00:52:55,599  
what we find here

1237  
00:53:00,150 --> 00:52:58,319  
elsewhere what's the number that you're

1238  
00:53:03,349 --> 00:53:00,160

comfortable with when we're you know

1239

00:53:05,349 --> 00:53:03,359

if i say 20 billion earth-like planets

1240

00:53:08,470 --> 00:53:05,359

in our milky way which again

1241

00:53:09,430 --> 00:53:08,480

is a mind-blowingly big number what's

1242

00:53:12,549 --> 00:53:09,440

the number that

1243

00:53:15,349 --> 00:53:12,559

you're comfortable with no i mean

1244

00:53:16,470 --> 00:53:15,359

the number could be as high as hundreds

1245

00:53:24,790 --> 00:53:16,480

of

1246

00:53:28,470 --> 00:53:24,800

the question is which

1247

00:53:30,470 --> 00:53:28,480

fraction of those have life right them

1248

00:53:32,150 --> 00:53:30,480

and the second question which fraction

1249

00:53:35,510 --> 00:53:32,160

have intelligent life now

1250

00:53:37,270 --> 00:53:35,520

technological life um the issue with

1251

00:53:39,670 --> 00:53:37,280

technology is that

1252

00:53:40,710 --> 00:53:39,680

it often changes the environment in a

1253

00:53:43,030 --> 00:53:40,720

way that could

1254

00:53:45,670 --> 00:53:43,040

imply that it's short-lived you know we

1255

00:53:48,790 --> 00:53:45,680

are we are potentially changing

1256

00:53:50,470 --> 00:53:48,800

the climate on earth and uh we if we go

1257

00:53:51,589 --> 00:53:50,480

into a nuclear war we would kill

1258

00:53:54,069 --> 00:53:51,599

ourselves and

1259

00:53:55,430 --> 00:53:54,079

uh there could be a short window of

1260

00:53:57,190 --> 00:53:55,440

opportunity to

1261

00:53:58,630 --> 00:53:57,200

hear from other technological

1262

00:54:01,270 --> 00:53:58,640

civilizations and

1263

00:54:03,349 --> 00:54:01,280

but that doesn't mean that uh we should

1264

00:54:05,510 --> 00:54:03,359

not search because

1265

00:54:06,950 --> 00:54:05,520

i mean it means that we should not be

1266

00:54:10,069 --> 00:54:06,960

optimistic about having

1267

00:54:11,990 --> 00:54:10,079

a conversation just like uh

1268

00:54:13,910 --> 00:54:12,000

trying to have conversations with people

1269

00:54:16,470 --> 00:54:13,920

that are not around anymore you can't

1270

00:54:18,230 --> 00:54:16,480

have a fun conversation with them but on

1271

00:54:20,470 --> 00:54:18,240

the other hand you can search for things

1272

00:54:21,589 --> 00:54:20,480

they left behind that's what archaeology

1273

00:54:23,670 --> 00:54:21,599

is all about we

1274

00:54:26,150 --> 00:54:23,680

we look for relics that were left behind

1275

00:54:26,950 --> 00:54:26,160

by people that are not around anymore

1276

00:54:28,470 --> 00:54:26,960

and

1277

00:54:30,390 --> 00:54:28,480

the same we can do with other

1278

00:54:33,030 --> 00:54:30,400

civilizations out there and

1279

00:54:34,150 --> 00:54:33,040

i call it space archaeology basically

1280

00:54:36,309 --> 00:54:34,160

looking for

1281

00:54:37,990 --> 00:54:36,319

equipment that they launched into space

1282

00:54:40,630 --> 00:54:38,000

just like we launched the

1283

00:54:43,030 --> 00:54:40,640

voyager 1 voyager 2 new horizons you

1284

00:54:46,230 --> 00:54:43,040

know it could be filling up

1285

00:54:48,230 --> 00:54:46,240

the the space between stars

1286

00:54:49,270 --> 00:54:48,240

and there could be a lot of equipment

1287

00:54:52,150 --> 00:54:49,280

out there

1288

00:54:52,710 --> 00:54:52,160

uh in the in the short time uh that we

1289

00:54:55,589 --> 00:54:52,720

have

1290

00:54:56,549 --> 00:54:55,599

about two minutes uh before the break

1291

00:54:59,589 --> 00:54:56,559

when we

1292

00:55:01,030 --> 00:54:59,599

start to contemplate this doesn't it

1293

00:55:04,230 --> 00:55:01,040

come down to

1294

00:55:05,030 --> 00:55:04,240

just basic chemistry and particles and

1295

00:55:07,270 --> 00:55:05,040

atoms and

1296

00:55:09,430 --> 00:55:07,280

how things combine it's the same

1297

00:55:12,230 --> 00:55:09,440

chemistry everywhere in the universe

1298

00:55:12,630 --> 00:55:12,240

and we can't stop life here on earth

1299

00:55:15,670 --> 00:55:12,640

right

1300

00:55:17,670 --> 00:55:15,680

we can't it it's the same chemistry

1301

00:55:20,069 --> 00:55:17,680

and and the point to recognize is that

1302

00:55:23,510 --> 00:55:20,079

primitive life microbial life started

1303

00:55:26,950 --> 00:55:23,520

very early on earth as soon as that

1304

00:55:29,750 --> 00:55:26,960

the earth cooled to allow it uh

1305

00:55:31,190 --> 00:55:29,760

now the the question is whether

1306

00:55:33,990 --> 00:55:31,200

technological life

1307

00:55:34,789 --> 00:55:34,000

is much more complicated than perhaps

1308

00:55:37,829 --> 00:55:34,799

doesn't happen

1309

00:55:38,549 --> 00:55:37,839

many places that's a subject for debate

1310

00:55:41,190 --> 00:55:38,559

but

1311

00:55:41,990 --> 00:55:41,200

uh rather than assume or have a

1312

00:55:43,910 --> 00:55:42,000

prejudice

1313

00:55:45,190 --> 00:55:43,920

my point is simple why don't we just

1314

00:55:47,190 --> 00:55:45,200

search you know

1315

00:55:48,789 --> 00:55:47,200

we search for the dark matter we invest

1316

00:55:50,549 --> 00:55:48,799

hundreds of millions of dollars in the

1317

00:55:52,230 --> 00:55:50,559

search for dark matter

1318

00:55:53,750 --> 00:55:52,240

we should invest at least the same

1319

00:55:55,430 --> 00:55:53,760

amount of money in the search for

1320

00:55:57,430 --> 00:55:55,440

technological signatures of other

1321

00:55:59,589 --> 00:55:57,440

civilizations because

1322

00:56:01,829 --> 00:55:59,599

this question will will have huge impact

1323

00:56:02,710 --> 00:56:01,839

on society much more than the nature of

1324

00:56:05,510 --> 00:56:02,720

dark matter

1325

00:56:06,630 --> 00:56:05,520

i mean the private lives of people will

1326

00:56:09,030 --> 00:56:06,640

not be affected

1327

00:56:10,710 --> 00:56:09,040

much by the nature of dark matter but if

1328

00:56:12,150 --> 00:56:10,720

we do find that we are not the smartest

1329

00:56:15,270 --> 00:56:12,160

kid on the block

1330

00:56:17,270 --> 00:56:15,280

basically every human would

1331

00:56:18,549 --> 00:56:17,280

immediately uh think about the

1332

00:56:20,230 --> 00:56:18,559

implications

1333

00:56:21,750 --> 00:56:20,240

let's take our break right here i guess

1334

00:56:25,030 --> 00:56:21,760

tonight harvard's professor

1335

00:56:28,230 --> 00:56:25,040

avi loeb and i have called this

1336

00:56:30,150 --> 00:56:28,240

episode this broadcast taking

1337

00:56:32,230 --> 00:56:30,160

us to school we're having a full

1338

00:56:32,870 --> 00:56:32,240

discussion about the size and origins of

1339

00:56:35,190 --> 00:56:32,880

everything

1340

00:56:36,789 --> 00:56:35,200

all of that and much more when we come

1341

00:56:38,549 --> 00:56:36,799

back after this short break this is fade

1342

00:56:55,270 --> 00:56:38,559

to black i'm yours jimmy church

1343

00:56:59,829 --> 00:56:57,430

this is fade to black with jimmy church

1344

00:57:04,789 --> 00:56:59,839

on the game changer radio network

1345

00:57:07,270 --> 00:57:04,799

and kgra the global radio alliance

1346

00:57:08,309 --> 00:57:07,280

this is kgra digital broadcasting

1347

00:57:13,750 --> 00:57:08,319

station

1348

00:57:15,589 --> 00:57:13,760

salt lake city utah van buren arkansas

1349

00:57:17,270 --> 00:57:15,599

this is billy carson with forbidden

1350

00:57:20,150 --> 00:57:17,280

knowledge dot tv

1351  
00:57:21,670 --> 00:57:20,160  
forbidden knowledge tv has just reached

1352  
00:57:24,470 --> 00:57:21,680  
its one year anniversary

1353  
00:57:26,069 --> 00:57:24,480  
that's right one year and as a show of

1354  
00:57:29,030 --> 00:57:26,079  
appreciation we are giving

1355  
00:57:31,349 --> 00:57:29,040  
all new subscribers a free 30-day trial

1356  
00:57:34,549 --> 00:57:31,359  
of forbidden knowledge dot tv

1357  
00:57:35,349 --> 00:57:34,559  
that's 30 days to binge watch thousands

1358  
00:57:37,910 --> 00:57:35,359  
of movies

1359  
00:57:38,630 --> 00:57:37,920  
documentaries conferences workshops

1360  
00:57:41,349 --> 00:57:38,640  
lectures

1361  
00:57:42,069 --> 00:57:41,359  
yoga classes meditation courses and so

1362  
00:57:44,789 --> 00:57:42,079  
much more

1363  
00:57:46,710 --> 00:57:44,799

so log on to forbidden knowledge dot tv

1364

00:57:49,910 --> 00:57:46,720

from your computer or mobile device

1365

00:57:53,990 --> 00:57:49,920

or get the forbidden knowledge tv app on

1366

00:57:57,510 --> 00:57:54,000

apple tv roku amazon itunes or google

1367

00:57:58,230 --> 00:57:57,520

play today and use coupon code 30 days

1368

00:58:06,829 --> 00:57:58,240

free

1369

00:58:11,349 --> 00:58:08,150

today

1370

00:58:13,750 --> 00:58:11,359

listen i know and you know that you've

1371

00:58:15,990 --> 00:58:13,760

always wanted your first crystal skull

1372

00:58:18,150 --> 00:58:16,000

or maybe you're a collector just like me

1373

00:58:19,990 --> 00:58:18,160

but you just don't know where to go to

1374

00:58:23,230 --> 00:58:20,000

find the real thing

1375

00:58:24,630 --> 00:58:23,240

then i met carolyn ford over at

1376

00:58:27,030 --> 00:58:24,640

einsteinthecrystalskull.com

1377

00:58:29,030 --> 00:58:27,040

carolyn is the guardian of einstein one

1378

00:58:30,549 --> 00:58:29,040

of the most respected ancient crystal

1379

00:58:32,230 --> 00:58:30,559

skulls in the world

1380

00:58:34,470 --> 00:58:32,240

all of her unique skulls have been

1381

00:58:36,470 --> 00:58:34,480

imprinted sitting with einstein in his

1382

00:58:38,710 --> 00:58:36,480

sacred lodge and are carved from the

1383

00:58:40,870 --> 00:58:38,720

finest gemstone and materials

1384

00:58:43,430 --> 00:58:40,880

imprinting is the process of receiving

1385

00:58:43,750 --> 00:58:43,440

the ancient wisdom from the master skull

1386

00:58:46,789 --> 00:58:43,760

or

1387

00:58:49,190 --> 00:58:46,799

master computer einstein the ancient

1388

00:58:51,270 --> 00:58:49,200

crystal skull to see carolyn's current

1389

00:58:53,470 --> 00:58:51,280

collection of crystal skulls just visit

1390

00:58:55,190 --> 00:58:53,480

her store at

1391

00:58:57,109 --> 00:58:55,200

einsteinthecrystalskull.com or click on

1392

00:58:59,589 --> 00:58:57,119

the banner over on our site

1393

00:59:01,510 --> 00:58:59,599

don't forget to use the promo code jimmy

1394

00:59:04,069 --> 00:59:01,520

at checkout to receive 10

1395

00:59:04,789 --> 00:59:04,079

off of your order today that's promo

1396

00:59:07,349 --> 00:59:04,799

code

1397

00:59:08,710 --> 00:59:07,359

jimmy finding your first or next crystal

1398

00:59:14,150 --> 00:59:08,720

skull is easy

1399

00:59:18,950 --> 00:59:16,309

when you take the beans from central

1400

00:59:19,510 --> 00:59:18,960

america with dashes of indonesian and

1401  
00:59:21,670 --> 00:59:19,520  
african

1402  
00:59:23,829 --> 00:59:21,680  
mixed in and then roasted to the dark

1403  
00:59:27,030 --> 00:59:23,839  
side of fade to black

1404  
00:59:29,990 --> 00:59:27,040  
you create the ultimate brew of fringe

1405  
00:59:31,670 --> 00:59:30,000  
introducing the fade to black blend from

1406  
00:59:34,630 --> 00:59:31,680  
river moon coffee

1407  
00:59:36,789 --> 00:59:34,640  
yes river moon's darkest customized

1408  
00:59:39,910 --> 00:59:36,799  
roast was created for the love

1409  
00:59:42,789 --> 00:59:39,920  
of fade to black the alchemy of

1410  
00:59:46,069 --> 00:59:42,799  
masterful roasting and smoking the beans

1411  
00:59:49,670 --> 00:59:46,079  
is in every sip of this full-bodied dark

1412  
00:59:51,589 --> 00:59:49,680  
java i need my coffee doc deep

1413  
00:59:54,150 --> 00:59:51,599

with distinct bittersweet chocolate

1414

00:59:56,549 --> 00:59:54,160

highlights just like the bunker

1415

00:59:57,430 --> 00:59:56,559

leaning further into the darkness of the

1416

00:59:59,829 --> 00:59:57,440

roast is

1417

01:00:00,710 --> 00:59:59,839

fade to black blend from river moon

1418

01:00:02,430 --> 01:00:00,720

coffee

1419

01:00:04,470 --> 01:00:02,440

just click on the banner at

1420

01:00:04,870 --> 01:00:04,480

jimmychurchradio.com and use the promo

1421

01:00:13,270 --> 01:00:04,880

code

1422

01:00:13,280 --> 01:00:16,789

on today

1423

01:00:20,549 --> 01:00:18,710

hi this is ray sobs here repping the

1424

01:00:21,109 --> 01:00:20,559

planet and you're listening to my good

1425

01:00:24,069 --> 01:00:21,119

friend

1426  
01:00:26,710 --> 01:00:24,079  
jimmy church fade to black on the game

1427  
01:00:29,829 --> 01:00:26,720  
changer network and the kgra digital

1428  
01:00:32,910 --> 01:00:29,839  
broadcast station

1429  
01:00:34,069 --> 01:00:32,920  
this is toby kebbel you're listening to

1430  
01:00:37,109 --> 01:00:34,079  
jimmychurchradio.com

1431  
01:00:38,309 --> 01:00:37,119  
don't hurt me jimmy i'm only little hey

1432  
01:00:40,829 --> 01:00:38,319  
i'm adrian grenier

1433  
01:00:47,030 --> 01:00:40,839  
and this is ari gold we're the honey

1434  
01:00:50,710 --> 01:00:49,030  
we're the honey brothers and you're

1435  
01:00:53,510 --> 01:00:50,720  
listening to jimmy church

1436  
01:00:55,190 --> 01:00:53,520  
a revolution this is jimmy churchill

1437  
01:00:57,430 --> 01:00:55,200  
fade to black and you can become an

1438  
01:00:59,349 --> 01:00:57,440

official fate or not by just going to

1439

01:01:02,710 --> 01:00:59,359

our membership section

1440

01:01:04,710 --> 01:01:02,720

at jimmychurchradio.com

1441

01:01:06,230 --> 01:01:04,720

hello this is serena wright taylor from

1442

01:01:08,069 --> 01:01:06,240

conscious life expo

1443

01:01:10,309 --> 01:01:08,079

and you're listening to fade to black

1444

01:01:12,549 --> 01:01:10,319

with jimmy church who holds the lucky

1445

01:01:13,030 --> 01:01:12,559

pony record for the best astrological

1446

01:01:17,190 --> 01:01:13,040

chart

1447

01:01:19,030 --> 01:01:17,200

since 1963. true story

1448

01:01:20,630 --> 01:01:19,040

this is micah hanks of the great alien

1449

01:01:22,150 --> 01:01:20,640

report and you're listening to jimmy

1450

01:01:23,910 --> 01:01:22,160

church on fade to black

1451  
01:01:25,829 --> 01:01:23,920  
across the globe on the game changer

1452  
01:01:48,470 --> 01:01:25,839  
radio network and the one and only

1453  
01:01:52,309 --> 01:01:50,069  
all right welcome back fade to black i'm

1454  
01:01:53,349 --> 01:01:52,319  
your host jimmy church tonight professor

1455  
01:01:56,710 --> 01:01:53,359  
avi loeb is

1456  
01:01:58,549 --> 01:01:56,720  
with us tonight he's taking me to school

1457  
01:01:59,829 --> 01:01:58,559  
and i'm going to let everybody know at

1458  
01:02:02,870 --> 01:01:59,839  
the end of the night

1459  
01:02:03,829 --> 01:02:02,880  
pop quiz i'm just giving you guys the

1460  
01:02:08,789 --> 01:02:03,839  
warning

1461  
01:02:12,549 --> 01:02:08,799  
now avi okay yes the milky way is big

1462  
01:02:15,750 --> 01:02:12,559  
and inside of our universe

1463  
01:02:19,589 --> 01:02:15,760

are one trillion versions

1464

01:02:20,069 --> 01:02:19,599

of us and and even that number could be

1465

01:02:23,109 --> 01:02:20,079

double

1466

01:02:25,670 --> 01:02:23,119

triple or maybe infinitely as

1467

01:02:26,549 --> 01:02:25,680

large because we don't know what else is

1468

01:02:29,430 --> 01:02:26,559

out there

1469

01:02:29,910 --> 01:02:29,440

beyond the observable universe and and

1470

01:02:33,430 --> 01:02:29,920

what has

1471

01:02:37,990 --> 01:02:33,440

expanded outward now that's a whole show

1472

01:02:39,990 --> 01:02:38,000

in of itself but the debate today

1473

01:02:41,270 --> 01:02:40,000

what i think is going on and i'm really

1474

01:02:43,510 --> 01:02:41,280

enjoying it

1475

01:02:44,950 --> 01:02:43,520

is the beginning of everything and

1476

01:02:48,950 --> 01:02:44,960

whether the big bang

1477

01:02:51,349 --> 01:02:48,960

may have happened or not right and

1478

01:02:52,150 --> 01:02:51,359

before you answer that we've all been

1479

01:02:55,109 --> 01:02:52,160

raised

1480

01:02:57,589 --> 01:02:55,119

on big bang theory that's it that's our

1481

01:03:00,630 --> 01:02:57,599

you know the last three four generations

1482

01:03:01,510 --> 01:03:00,640

the big bang and there it is and it's

1483

01:03:03,910 --> 01:03:01,520

now

1484

01:03:05,829 --> 01:03:03,920

is dogma the right word can i can i use

1485

01:03:09,430 --> 01:03:05,839

dogma safely here

1486

01:03:13,589 --> 01:03:09,440

yeah you can okay so the document is

1487

01:03:16,630 --> 01:03:13,599

uh the big bang theory is what it is

1488

01:03:20,069 --> 01:03:16,640

let's go back to

1489

01:03:22,470 --> 01:03:20,079

the beginning of everything the math

1490

01:03:24,549 --> 01:03:22,480

that albert einstein presented to us

1491

01:03:27,589 --> 01:03:24,559

which goes back to a point

1492

01:03:30,069 --> 01:03:27,599

before it gets a little bit crazy but

1493

01:03:32,150 --> 01:03:30,079

if we go back to that point is the big

1494

01:03:33,270 --> 01:03:32,160

bang theory the way we understand it

1495

01:03:35,029 --> 01:03:33,280

today

1496

01:03:37,270 --> 01:03:35,039

is this something that we will continue

1497

01:03:39,349 --> 01:03:37,280

to count on

1498

01:03:40,870 --> 01:03:39,359

okay so first let me understand let me

1499

01:03:44,870 --> 01:03:40,880

explain what the big bang

1500

01:03:49,029 --> 01:03:44,880

is um we we see the universe expanding

1501  
01:03:49,829 --> 01:03:49,039  
so um uh we can uh reverse the movie

1502  
01:03:53,109 --> 01:03:49,839  
backward

1503  
01:03:55,670 --> 01:03:53,119  
in time and then the universe would be

1504  
01:03:59,349 --> 01:03:55,680  
contracting if you go back in time and

1505  
01:04:00,390 --> 01:03:59,359  
uh and we see that the conditions of the

1506  
01:04:03,270 --> 01:04:00,400  
expansion are

1507  
01:04:04,630 --> 01:04:03,280  
are similar across the universe on very

1508  
01:04:07,910 --> 01:04:04,640  
large scale so

1509  
01:04:10,549 --> 01:04:07,920  
in fact the matter will uh

1510  
01:04:13,349 --> 01:04:10,559  
reach infinite density at some point

1511  
01:04:16,549 --> 01:04:13,359  
back in time when all the matter will

1512  
01:04:19,829 --> 01:04:16,559  
you know will be crunched into

1513  
01:04:21,910 --> 01:04:19,839

infinite uh into a very small volume

1514

01:04:23,990 --> 01:04:21,920

uh and that would be true everywhere so

1515

01:04:26,950 --> 01:04:24,000

there is no center to the universe but

1516

01:04:27,910 --> 01:04:26,960

everywhere in space the density of

1517

01:04:30,230 --> 01:04:27,920

matter will be

1518

01:04:32,470 --> 01:04:30,240

infinite this is called the big bang

1519

01:04:33,190 --> 01:04:32,480

it's a point in time not a point in

1520

01:04:35,750 --> 01:04:33,200

space

1521

01:04:37,430 --> 01:04:35,760

the conditions appear to be similar in

1522

01:04:38,630 --> 01:04:37,440

many different places throughout the

1523

01:04:41,589 --> 01:04:38,640

universe and

1524

01:04:42,950 --> 01:04:41,599

so there was a point in time when this

1525

01:04:46,390 --> 01:04:42,960

expansion that we see

1526

01:04:49,029 --> 01:04:46,400

started and the the reason we can't

1527

01:04:51,109 --> 01:04:49,039

go beyond that point in time back is

1528

01:04:52,390 --> 01:04:51,119

because einstein's theory of gravity

1529

01:04:56,069 --> 01:04:52,400

breaks down

1530

01:04:58,230 --> 01:04:56,079

uh it's called the singularity basically

1531

01:05:00,230 --> 01:04:58,240

uh the curvature of space and time

1532

01:05:02,150 --> 01:05:00,240

becomes infinite at that point in time

1533

01:05:04,230 --> 01:05:02,160

simply because the density of matter

1534

01:05:06,870 --> 01:05:04,240

goes to infinity and

1535

01:05:07,990 --> 01:05:06,880

we just cannot predict what have

1536

01:05:10,549 --> 01:05:08,000

happened before that

1537

01:05:12,470 --> 01:05:10,559

time using einstein's equations now we

1538

01:05:13,589 --> 01:05:12,480

know what's wrong with einstein's

1539

01:05:15,829 --> 01:05:13,599

equations

1540

01:05:17,190 --> 01:05:15,839

they do not incorporate quantum

1541

01:05:19,510 --> 01:05:17,200

mechanics which is

1542

01:05:22,069 --> 01:05:19,520

another facet of modern physics that

1543

01:05:24,630 --> 01:05:22,079

deals with the microscopic world

1544

01:05:25,829 --> 01:05:24,640

and einstein's theory just did not

1545

01:05:27,990 --> 01:05:25,839

incorporate that

1546

01:05:30,069 --> 01:05:28,000

and so we know that when the density of

1547

01:05:31,910 --> 01:05:30,079

meta gets very high and

1548

01:05:33,990 --> 01:05:31,920

you know the temperature gets very high

1549

01:05:34,630 --> 01:05:34,000

then quantum mechanics comes into play

1550

01:05:40,150 --> 01:05:34,640

and

1551

01:05:43,430 --> 01:05:40,160

that unifies quantum mechanics

1552

01:05:45,510 --> 01:05:43,440

and gravity we would know what would

1553

01:05:47,990 --> 01:05:45,520

have happened before the big bang

1554

01:05:48,950 --> 01:05:48,000

and we call it the big bang just because

1555

01:05:51,349 --> 01:05:48,960

we have not

1556

01:05:52,549 --> 01:05:51,359

no better knowledge of but in fact

1557

01:05:54,549 --> 01:05:52,559

probably there was

1558

01:05:55,589 --> 01:05:54,559

something that preceded that and the

1559

01:05:58,710 --> 01:05:55,599

question is what

1560

01:06:00,069 --> 01:05:58,720

is it can we guess or and a lot of

1561

01:06:03,190 --> 01:06:00,079

people are trying to

1562

01:06:04,710 --> 01:06:03,200

find out what this universal theory but

1563

01:06:06,309 --> 01:06:04,720

the unified theory

1564

01:06:08,710 --> 01:06:06,319

that brings together quantum mechanics

1565

01:06:10,150 --> 01:06:08,720

and gravity is but we just don't have a

1566

01:06:12,069 --> 01:06:10,160

reliable theory that

1567

01:06:13,750 --> 01:06:12,079

that can make predictions about what

1568

01:06:17,430 --> 01:06:13,760

happened before the big bang

1569

01:06:20,630 --> 01:06:17,440

so there are various conjectures and um

1570

01:06:22,710 --> 01:06:20,640

one very popular theory is that you know

1571

01:06:26,789 --> 01:06:22,720

there was no singularity at all

1572

01:06:27,910 --> 01:06:26,799

and that in fact uh the universe started

1573

01:06:31,029 --> 01:06:27,920

from

1574

01:06:32,870 --> 01:06:31,039

a time when it was expanding very

1575

01:06:36,069 --> 01:06:32,880

rapidly where

1576

01:06:39,029 --> 01:06:36,079

you know the vacuum was dominating and

1577

01:06:39,750 --> 01:06:39,039

and everything was pushed away at the

1578

01:06:42,710 --> 01:06:39,760

speed

1579

01:06:43,510 --> 01:06:42,720

that is accelerating over time so in

1580

01:06:45,430 --> 01:06:43,520

fact

1581

01:06:46,950 --> 01:06:45,440

things that were in contact to start

1582

01:06:48,789 --> 01:06:46,960

with were separated and

1583

01:06:50,069 --> 01:06:48,799

got out of contact this is called the

1584

01:06:53,190 --> 01:06:50,079

the epoch of

1585

01:06:55,109 --> 01:06:53,200

cosmic inflation and everything was

1586

01:06:59,029 --> 01:06:55,119

expanding very rapidly and

1587

01:07:02,470 --> 01:06:59,039

uh and at some point that stopped and

1588

01:07:06,069 --> 01:07:02,480

and then that early time

1589

01:07:08,309 --> 01:07:06,079

uh seeded the universe with small uh

1590

01:07:10,309 --> 01:07:08,319

variations in the density of matter

1591

01:07:12,789 --> 01:07:10,319

which later grew to become

1592

01:07:15,190 --> 01:07:12,799

objects like the milky way galaxy uh as

1593

01:07:17,029 --> 01:07:15,200

a result of the fact that

1594

01:07:19,750 --> 01:07:17,039

regions that were slightly denser than

1595

01:07:21,910 --> 01:07:19,760

average collapsed upon themselves they

1596

01:07:24,230 --> 01:07:21,920

their own gravity made them collapse and

1597

01:07:27,430 --> 01:07:24,240

make galaxies like the milky way so

1598

01:07:31,670 --> 01:07:27,440

all of this started these seeds of

1599

01:07:33,910 --> 01:07:31,680

matter density fluctuations

1600

01:07:35,190 --> 01:07:33,920

those were created by quantum mechanics

1601  
01:07:38,549 --> 01:07:35,200  
early on

1602  
01:07:40,870 --> 01:07:38,559  
and inflation could have started

1603  
01:07:43,029 --> 01:07:40,880  
for example out of the vacuum out of

1604  
01:07:45,750 --> 01:07:43,039  
nothing and some people suggest maybe

1605  
01:07:48,309 --> 01:07:45,760  
the universe started out of nothing

1606  
01:07:48,789 --> 01:07:48,319  
then there is another version of what

1607  
01:07:51,510 --> 01:07:48,799  
happened

1608  
01:07:53,270 --> 01:07:51,520  
early which says oh no the universe was

1609  
01:07:56,150 --> 01:07:53,280  
initially contracting

1610  
01:07:56,789 --> 01:07:56,160  
collapsing and then there was a bounce

1611  
01:07:59,190 --> 01:07:56,799  
and it

1612  
01:08:00,390 --> 01:07:59,200  
started expanding like we see after the

1613  
01:08:03,430 --> 01:08:00,400

big bang

1614

01:08:04,870 --> 01:08:03,440

um and in both cases you avoid the big

1615

01:08:07,349 --> 01:08:04,880

bang in some way but

1616

01:08:09,029 --> 01:08:07,359

we don't know if either of these

1617

01:08:12,150 --> 01:08:09,039

versions is correct

1618

01:08:14,309 --> 01:08:12,160

i have my own alternative which is just

1619

01:08:17,430 --> 01:08:14,319

fun to think about

1620

01:08:19,669 --> 01:08:17,440

which is that you know maybe

1621

01:08:21,430 --> 01:08:19,679

as a civilization once we figure out

1622

01:08:22,950 --> 01:08:21,440

what the unifying theory of quantum

1623

01:08:25,110 --> 01:08:22,960

mechanics and gravity is

1624

01:08:26,149 --> 01:08:25,120

we will be able to create in our

1625

01:08:29,189 --> 01:08:26,159

laboratory

1626

01:08:31,349 --> 01:08:29,199

a baby universe we will know how to make

1627

01:08:32,950 --> 01:08:31,359

a baby universe that will become a whole

1628

01:08:35,829 --> 01:08:32,960

universe by itself

1629

01:08:37,749 --> 01:08:35,839

and if we do that then we can imagine

1630

01:08:40,070 --> 01:08:37,759

that our universe was created in the

1631

01:08:44,149 --> 01:08:40,080

laboratory of another civilization that

1632

01:08:46,550 --> 01:08:44,159

predated us and so you just have babies

1633

01:08:47,430 --> 01:08:46,560

uh baby universes being born are

1634

01:08:49,590 --> 01:08:47,440

incubating

1635

01:08:50,709 --> 01:08:49,600

yes and you know what's i just watched

1636

01:08:54,709 --> 01:08:50,719

you smile

1637

01:08:58,309 --> 01:08:54,719

as you uh suggested this

1638

01:09:00,630 --> 01:08:58,319

i don't think it's that far out of line

1639

01:09:02,470 --> 01:09:00,640

i have an open mind and everything i

1640

01:09:05,189 --> 01:09:02,480

listen to everything avi

1641

01:09:07,189 --> 01:09:05,199

but we just don't know do we we have to

1642

01:09:08,950 --> 01:09:07,199

put everything on the table

1643

01:09:10,870 --> 01:09:08,960

right we don't know and we don't know

1644

01:09:12,550 --> 01:09:10,880

where the umbilical cord of

1645

01:09:14,149 --> 01:09:12,560

our universe came from it could have

1646

01:09:15,030 --> 01:09:14,159

come from a laboratory of another

1647

01:09:18,470 --> 01:09:15,040

civilization

1648

01:09:22,550 --> 01:09:18,480

who knows now okay why

1649

01:09:23,910 --> 01:09:22,560

is there so much uh what's the word

1650

01:09:26,950 --> 01:09:23,920

angst

1651

01:09:30,709 --> 01:09:26,960

amongst uh the scientific community

1652

01:09:34,149 --> 01:09:30,719

when getting into this discussion i mean

1653

01:09:37,349 --> 01:09:34,159

lines in the sand have been drawn

1654

01:09:40,950 --> 01:09:37,359

yeah i mean i think it's

1655

01:09:45,030 --> 01:09:40,960

very common for humans to uh

1656

01:09:47,749 --> 01:09:45,040

get attached to their comfort zone and

1657

01:09:49,510 --> 01:09:47,759

ideas from the past and you can see that

1658

01:09:50,309 --> 01:09:49,520

throughout human history you know

1659

01:09:53,430 --> 01:09:50,319

socrates

1660

01:09:54,630 --> 01:09:53,440

was an ancient greek philosopher very

1661

01:09:56,550 --> 01:09:54,640

wise and

1662

01:09:58,149 --> 01:09:56,560

nowadays he's regarded as one of the

1663

01:10:02,310 --> 01:09:58,159

greatest philosophers that

1664

01:10:06,229 --> 01:10:02,320

ever lived but at the time he was uh

1665

01:10:09,430 --> 01:10:06,239

accused by the the members of

1666

01:10:13,270 --> 01:10:09,440

uh the city state of athens in

1667

01:10:16,310 --> 01:10:13,280

in greece uh as um

1668

01:10:19,669 --> 01:10:16,320

a dangerous person uh that

1669

01:10:21,830 --> 01:10:19,679

he's corrupting the the youth uh

1670

01:10:22,950 --> 01:10:21,840

with his views of being open-minded and

1671

01:10:26,149 --> 01:10:22,960

questioning

1672

01:10:29,350 --> 01:10:26,159

uh politicians at the time and other

1673

01:10:30,470 --> 01:10:29,360

people and as a result he was forced to

1674

01:10:34,550 --> 01:10:30,480

drink

1675

01:10:36,950 --> 01:10:34,560

poison and he did that and he died and

1676

01:10:39,110 --> 01:10:36,960

you know nowadays instead of drinking

1677

01:10:40,149 --> 01:10:39,120

poison they would cancel him on the

1678

01:10:42,310 --> 01:10:40,159

athenian

1679

01:10:43,990 --> 01:10:42,320

social media they would just cancel him

1680

01:10:47,750 --> 01:10:44,000

and that would be the equivalent

1681

01:10:49,510 --> 01:10:47,760

of poison uh but this you know goes back

1682

01:10:52,790 --> 01:10:49,520

to ancient greece and

1683

01:10:54,310 --> 01:10:52,800

and then you find the uh other people

1684

01:10:56,390 --> 01:10:54,320

like galileo that

1685

01:10:57,590 --> 01:10:56,400

simply argue that the earth is not at

1686

01:10:59,990 --> 01:10:57,600

the center

1687

01:11:00,630 --> 01:11:00,000

of of the world and as a result the

1688

01:11:02,790 --> 01:11:00,640

philosopher

1689

01:11:04,390 --> 01:11:02,800

you know the church at the time put him

1690

01:11:06,790 --> 01:11:04,400

in house arrest

1691

01:11:08,470 --> 01:11:06,800

and the philosophers refused to look

1692

01:11:08,870 --> 01:11:08,480

through his telescope because they knew

1693

01:11:12,070 --> 01:11:08,880

that

1694

01:11:15,350 --> 01:11:12,080

only prolonged

1695

01:11:17,430 --> 01:11:15,360

their ignorance and it didn't you know

1696

01:11:19,430 --> 01:11:17,440

it didn't the reality doesn't really

1697

01:11:21,750 --> 01:11:19,440

care whether we ignore it or not the

1698

01:11:25,030 --> 01:11:21,760

earth continued to move around the sun

1699

01:11:27,750 --> 01:11:25,040

and then you know there was another uh

1700

01:11:29,110 --> 01:11:27,760

person named jordano bruno that was

1701

01:11:31,510 --> 01:11:29,120

burnt on the stake

1702

01:11:34,149 --> 01:11:31,520

uh because he he argued that you know

1703

01:11:36,070 --> 01:11:34,159

other stars may be just like the sun and

1704

01:11:38,550 --> 01:11:36,080

they may have a planet like the earth

1705

01:11:41,669 --> 01:11:38,560

around them and there may be life

1706

01:11:44,229 --> 01:11:41,679

on those other planets and that

1707

01:11:45,030 --> 01:11:44,239

made some people quite upset because

1708

01:11:46,950 --> 01:11:45,040

they said

1709

01:11:48,149 --> 01:11:46,960

you know if there is life on those other

1710

01:11:50,790 --> 01:11:48,159

planets

1711

01:11:51,669 --> 01:11:50,800

and you believe in christianity then you

1712

01:11:54,630 --> 01:11:51,679

believe that

1713

01:11:57,270 --> 01:11:54,640

jesus should have visited those forms of

1714

01:11:59,189 --> 01:11:57,280

life to save them from their sins and

1715

01:12:00,709 --> 01:11:59,199

then you need a lot of copies for every

1716

01:12:03,750 --> 01:12:00,719

planet you need a copy of

1717

01:12:06,070 --> 01:12:03,760

of christ and uh that made people

1718

01:12:08,470 --> 01:12:06,080

say oh that's a ridiculous idea and they

1719

01:12:11,910 --> 01:12:08,480

burned him on the stake um

1720

01:12:13,750 --> 01:12:11,920

and so and you know these situations

1721

01:12:15,990 --> 01:12:13,760

come back again and again and

1722

01:12:17,350 --> 01:12:16,000

you see them throughout history and for

1723

01:12:19,350 --> 01:12:17,360

example

1724

01:12:20,790 --> 01:12:19,360

you know even in the arts you see people

1725

01:12:23,510 --> 01:12:20,800

like

1726

01:12:24,790 --> 01:12:23,520

vincent van gogh you know he he

1727

01:12:28,229 --> 01:12:24,800

innovated

1728

01:12:30,470 --> 01:12:28,239

in in paint in his paintings and uh

1729

01:12:31,270 --> 01:12:30,480

was pretty much regarded as a madman

1730

01:12:34,709 --> 01:12:31,280

during his

1731

01:12:37,910 --> 01:12:34,719

his life but then decades later

1732

01:12:41,430 --> 01:12:37,920

his painting style was adopted by

1733

01:12:43,390 --> 01:12:41,440

expressionists and and he was

1734

01:12:45,030 --> 01:12:43,400

regarded as a genius that was

1735

01:12:47,910 --> 01:12:45,040

unrecognized and

1736

01:12:48,870 --> 01:12:47,920

uh and you see those patterns come back

1737

01:12:52,149 --> 01:12:48,880

again and again

1738

01:12:55,189 --> 01:12:52,159

you know continental drift there was

1739

01:12:57,030 --> 01:12:55,199

uh the early suggestion that was ignored

1740

01:13:00,470 --> 01:12:57,040

and and ridiculed and then

1741

01:13:04,390 --> 01:13:00,480

it became popular and the same with uh

1742

01:13:07,669 --> 01:13:04,400

genetic heredity and then

1743

01:13:08,870 --> 01:13:07,679

the point is that one should be guided

1744

01:13:12,070 --> 01:13:08,880

by the evidence

1745

01:13:15,430 --> 01:13:12,080

not by the number of likes on twitter

1746

01:13:17,910 --> 01:13:15,440

and um you know it's a very common

1747

01:13:18,950 --> 01:13:17,920

thing for people to resist a change in

1748

01:13:21,110 --> 01:13:18,960

their beliefs

1749

01:13:23,430 --> 01:13:21,120

and you would think that by now

1750

01:13:25,189 --> 01:13:23,440

scientists will be more open-minded and

1751

01:13:27,030 --> 01:13:25,199

and just pay attention to evidence and

1752

01:13:28,870 --> 01:13:27,040

not to their comfort zone

1753

01:13:30,630 --> 01:13:28,880

but it's not the case apparently it's a

1754

01:13:32,870 --> 01:13:30,640

human nature to

1755

01:13:33,990 --> 01:13:32,880

get attached to all the ideas and not

1756

01:13:35,750 --> 01:13:34,000

consider them

1757

01:13:37,750 --> 01:13:35,760

and and in this case you know there is

1758

01:13:39,750 --> 01:13:37,760

one other thing i should mention is

1759

01:13:41,189 --> 01:13:39,760

that people like to think that we are

1760

01:13:44,390 --> 01:13:41,199

special unique that

1761

01:13:46,310 --> 01:13:44,400

because that flatters our ego and

1762

01:13:48,149 --> 01:13:46,320

if you come and say oh there might be

1763

01:13:49,590 --> 01:13:48,159

life elsewhere and it might be even

1764

01:13:52,870 --> 01:13:49,600

smarter than we are and

1765

01:13:54,950 --> 01:13:52,880

we are you know not very different from

1766

01:13:56,709 --> 01:13:54,960

uh ants on a sidewalk you know there are

1767

01:13:57,189 --> 01:13:56,719

many of them there used to be many of

1768

01:13:59,189 --> 01:13:57,199

them

1769

01:14:00,630 --> 01:13:59,199

there is nothing really special about us

1770

01:14:02,870 --> 01:14:00,640

that offends people

1771

01:14:03,830 --> 01:14:02,880

they prefer to think that we are special

1772

01:14:05,669 --> 01:14:03,840

and unique and

1773

01:14:08,149 --> 01:14:05,679

as long as the evidence is not in their

1774

01:14:09,030 --> 01:14:08,159

face they would just continue to believe

1775

01:14:12,550 --> 01:14:09,040

that

1776

01:14:16,070 --> 01:14:12,560

teach us

1777

01:14:19,910 --> 01:14:16,080

always have a drink tester you know

1778

01:14:21,669 --> 01:14:19,920

i always have a drink tester i do um

1779

01:14:23,270 --> 01:14:21,679

he was i should tell you that he was

1780

01:14:26,390 --> 01:14:23,280

offered by his

1781

01:14:29,430 --> 01:14:26,400

student an escape route

1782

01:14:32,630 --> 01:14:29,440

to escape from the prison and not get

1783

01:14:34,390 --> 01:14:32,640

uh according to the story but he refused

1784

01:14:38,709 --> 01:14:34,400

to take that he said

1785

01:14:40,390 --> 01:14:38,719

i deserve you know i i should follow my

1786

01:14:41,990 --> 01:14:40,400

inner compass and and take the

1787

01:14:45,270 --> 01:14:42,000

consequences and

1788

01:14:49,189 --> 01:14:45,280

uh so he was that according to plato

1789

01:14:53,189 --> 01:14:49,199

you know he he was a very special person

1790

01:14:55,510 --> 01:14:53,199

um now if there's one controversial one

1791

01:14:57,830 --> 01:14:55,520

thing that i can't wrap my head around

1792

01:14:59,270 --> 01:14:57,840

and it's always very controversial when

1793

01:15:02,870 --> 01:14:59,280

it's brought up

1794

01:15:05,830 --> 01:15:02,880

is time started

1795

01:15:06,790 --> 01:15:05,840

with there are those out there that

1796

01:15:08,470 --> 01:15:06,800

suggest

1797

01:15:10,310 --> 01:15:08,480

time started at the beginning of the big

1798

01:15:13,830 --> 01:15:10,320

bang that's it there was

1799

01:15:16,149 --> 01:15:13,840

nothing before i have a hard time

1800

01:15:18,390 --> 01:15:16,159

understanding that and i think that most

1801  
01:15:21,590 --> 01:15:18,400  
people do it just doesn't make any sense

1802  
01:15:22,870 --> 01:15:21,600  
time is forever no matter what direction

1803  
01:15:25,910 --> 01:15:22,880  
you're going in

1804  
01:15:27,030 --> 01:15:25,920  
it couldn't have started and ended at

1805  
01:15:30,070 --> 01:15:27,040  
the big bang or

1806  
01:15:31,030 --> 01:15:30,080  
am i just completely off base no i tend

1807  
01:15:33,030 --> 01:15:31,040  
to agree with you

1808  
01:15:34,149 --> 01:15:33,040  
um i think it's a matter of common sense

1809  
01:15:36,550 --> 01:15:34,159  
to say

1810  
01:15:38,550 --> 01:15:36,560  
what we see around us you know in terms

1811  
01:15:41,830 --> 01:15:38,560  
of the expanding universe

1812  
01:15:45,110 --> 01:15:41,840  
is just one phase in

1813  
01:15:46,790 --> 01:15:45,120

the history of whatever reality is and

1814

01:15:49,110 --> 01:15:46,800

and there is no reason why we would

1815

01:15:51,350 --> 01:15:49,120

assume that just because we can't

1816

01:15:53,110 --> 01:15:51,360

calculate what happened at the big bang

1817

01:15:56,790 --> 01:15:53,120

that things started then

1818

01:15:57,830 --> 01:15:56,800

you know the fact that einstein's theory

1819

01:15:59,990 --> 01:15:57,840

does not apply

1820

01:16:00,870 --> 01:16:00,000

to what happened before the big bang

1821

01:16:03,430 --> 01:16:00,880

doesn't mean that

1822

01:16:04,709 --> 01:16:03,440

nature doesn't you know it doesn't have

1823

01:16:05,189 --> 01:16:04,719

something that happened before the

1824

01:16:06,870 --> 01:16:05,199

beginning

1825

01:16:08,390 --> 01:16:06,880

just means that we can't calculate with

1826

01:16:10,310 --> 01:16:08,400

the einstein's theory

1827

01:16:12,470 --> 01:16:10,320

uh you know the same thing happens at

1828

01:16:14,630 --> 01:16:12,480

the center of a black hole

1829

01:16:15,750 --> 01:16:14,640

there is the so-called singularity there

1830

01:16:17,590 --> 01:16:15,760

all the matter gets

1831

01:16:18,870 --> 01:16:17,600

drained into a black hole it's the

1832

01:16:21,510 --> 01:16:18,880

ultimate prison

1833

01:16:22,550 --> 01:16:21,520

you can't escape from a black hole but

1834

01:16:25,590 --> 01:16:22,560

the questions

1835

01:16:26,870 --> 01:16:25,600

of as to what happens to this matter is

1836

01:16:28,950 --> 01:16:26,880

still unsolved

1837

01:16:29,910 --> 01:16:28,960

uh according again einstein's theory

1838

01:16:31,830 --> 01:16:29,920

breaks down

1839

01:16:34,070 --> 01:16:31,840

at a singularity at the center of a

1840

01:16:35,510 --> 01:16:34,080

black hole and we don't know really what

1841

01:16:37,189 --> 01:16:35,520

happens it just says

1842

01:16:38,950 --> 01:16:37,199

you know einstein's theory cannot

1843

01:16:40,790 --> 01:16:38,960

predict what happens but we need to

1844

01:16:41,830 --> 01:16:40,800

supplement it with quantum mechanics and

1845

01:16:43,510 --> 01:16:41,840

then we will know

1846

01:16:45,350 --> 01:16:43,520

and you know it's possible that there is

1847

01:16:48,070 --> 01:16:45,360

an object that forms there

1848

01:16:49,510 --> 01:16:48,080

that has a very high density just like a

1849

01:16:51,990 --> 01:16:49,520

star or something

1850

01:16:52,870 --> 01:16:52,000

or it's possible that the matter gets

1851

01:16:54,870 --> 01:16:52,880

channeled into

1852

01:16:55,910 --> 01:16:54,880

something else like another universe or

1853

01:16:57,990 --> 01:16:55,920

maybe

1854

01:16:59,030 --> 01:16:58,000

you know we that we just don't know and

1855

01:17:02,709 --> 01:16:59,040

my point is

1856

01:17:04,630 --> 01:17:02,719

that our inability to

1857

01:17:06,870 --> 01:17:04,640

calculate what happens under some

1858

01:17:07,270 --> 01:17:06,880

circumstances is just a reflection of

1859

01:17:09,189 --> 01:17:07,280

our

1860

01:17:10,630 --> 01:17:09,199

limitation it's not a reflection of

1861

01:17:12,310 --> 01:17:10,640

nature nature

1862

01:17:14,709 --> 01:17:12,320

probably had something before the big

1863

01:17:17,990 --> 01:17:14,719

bang we just have to figure it out

1864

01:17:20,550 --> 01:17:18,000

now i i don't want to go too sideways uh

1865

01:17:21,270 --> 01:17:20,560

with black holes because again that's a

1866

01:17:25,910 --> 01:17:21,280

whole

1867

01:17:29,110 --> 01:17:25,920

show in of itself but since we're here

1868

01:17:30,709 --> 01:17:29,120

what happens to information

1869

01:17:32,149 --> 01:17:30,719

that's the question that i have what

1870

01:17:35,430 --> 01:17:32,159

happens

1871

01:17:36,550 --> 01:17:35,440

to information you pass through a black

1872

01:17:40,470 --> 01:17:36,560

hole you're on the other

1873

01:17:42,550 --> 01:17:40,480

what where does the information go

1874

01:17:44,070 --> 01:17:42,560

that's a very good that you know that's

1875

01:17:46,550 --> 01:17:44,080

a very uh fundamental

1876

01:17:47,430 --> 01:17:46,560

answer of the problem in physics right

1877

01:17:50,550 --> 01:17:47,440

now

1878

01:17:52,390 --> 01:17:50,560

that matter

1879

01:17:54,470 --> 01:17:52,400

falls into a black hole and doesn't come

1880

01:17:54,950 --> 01:17:54,480

back that by itself is not a problem

1881

01:17:56,790 --> 01:17:54,960

because

1882

01:17:58,790 --> 01:17:56,800

if you look at the cat you know and the

1883

01:18:00,790 --> 01:17:58,800

cat walks behind the building

1884

01:18:02,630 --> 01:18:00,800

you don't see the cat anymore that

1885

01:18:03,910 --> 01:18:02,640

doesn't mean the cat doesn't exist and

1886

01:18:05,510 --> 01:18:03,920

information was lost

1887

01:18:07,910 --> 01:18:05,520

i mean it only means that you can't see

1888

01:18:09,750 --> 01:18:07,920

it so when matter falls into a black

1889

01:18:12,470 --> 01:18:09,760

hole by itself that's not

1890

01:18:14,470 --> 01:18:12,480

a paradox that's nothing unusual because

1891

01:18:15,669 --> 01:18:14,480

just like the cat going behind the wall

1892

01:18:17,510 --> 01:18:15,679

so you can't see it

1893

01:18:19,350 --> 01:18:17,520

so the matter fell into the black hole

1894

01:18:20,070 --> 01:18:19,360

you can't see it but it's still out

1895

01:18:23,910 --> 01:18:20,080

there

1896

01:18:30,790 --> 01:18:23,920

problem

1897

01:18:32,870 --> 01:18:30,800

um the realization that black holes do

1898

01:18:36,550 --> 01:18:32,880

not exist forever and in fact the

1899

01:18:40,149 --> 01:18:36,560

stephen hawking realized that about them

1900

01:18:41,350 --> 01:18:40,159

uh 50 years ago that the black holes

1901

01:18:44,390 --> 01:18:41,360

evaporate

1902

01:18:47,590 --> 01:18:44,400

that in fact there is some

1903

01:18:50,310 --> 01:18:47,600

radiation emitted from them uh

1904

01:18:51,990 --> 01:18:50,320

that because you can't confine radiation

1905

01:18:53,910 --> 01:18:52,000

which has a wavelength

1906

01:18:55,910 --> 01:18:53,920

larger than the size of the black hole

1907

01:18:57,830 --> 01:18:55,920

so that radiation leaks out

1908

01:18:59,430 --> 01:18:57,840

it's not the ultimate prison for

1909

01:19:01,510 --> 01:18:59,440

everything it you know

1910

01:19:03,110 --> 01:19:01,520

things that cannot be localized within

1911

01:19:03,750 --> 01:19:03,120

the black hole like radiation with a

1912

01:19:05,910 --> 01:19:03,760

wavelength

1913

01:19:08,070 --> 01:19:05,920

bigger than the black that cannot be

1914

01:19:09,990 --> 01:19:08,080

trapped inside this prison and

1915

01:19:11,189 --> 01:19:10,000

and so it escapes and the black hole

1916

01:19:13,189 --> 01:19:11,199

leaks out

1917

01:19:15,030 --> 01:19:13,199

radiation all the time with a wavelength

1918

01:19:18,390 --> 01:19:15,040

comparable to its size

1919

01:19:19,990 --> 01:19:18,400

and that evaporation process leads to

1920

01:19:22,870 --> 01:19:20,000

the black hole disappearing

1921

01:19:24,310 --> 01:19:22,880

eventually and if the black hole

1922

01:19:27,830 --> 01:19:24,320

disappears

1923

01:19:30,630 --> 01:19:27,840

there is nothing but radiation which

1924

01:19:31,830 --> 01:19:30,640

hawking calculated to carry very little

1925

01:19:34,390 --> 01:19:31,840

information

1926

01:19:36,229 --> 01:19:34,400

uh and then the question is where did

1927

01:19:37,750 --> 01:19:36,239

the information that went into the black

1928

01:19:39,750 --> 01:19:37,760

hole where did it go if the black hole

1929

01:19:41,350 --> 01:19:39,760

evaporates and there is very little

1930

01:19:42,790 --> 01:19:41,360

information in the radiation that it

1931

01:19:45,189 --> 01:19:42,800

emits

1932

01:19:46,390 --> 01:19:45,199

where where is the information where did

1933

01:19:49,189 --> 01:19:46,400

it go

1934

01:19:51,189 --> 01:19:49,199

and that is a big paradox in physics

1935

01:19:53,910 --> 01:19:51,199

right now and

1936

01:19:55,430 --> 01:19:53,920

the physicists are arguing about it you

1937

01:19:58,630 --> 01:19:55,440

know for 50 years since

1938

01:20:00,709 --> 01:19:58,640

uh since uh that the hawking radiation

1939

01:20:04,070 --> 01:20:00,719

was first uh

1940

01:20:05,430 --> 01:20:04,080

recognized and and so uh it's an

1941

01:20:08,149 --> 01:20:05,440

unsolved problem

1942

01:20:09,030 --> 01:20:08,159

now uh man i've got so many black hole

1943

01:20:12,070 --> 01:20:09,040

questions okay

1944

01:20:14,950 --> 01:20:12,080

one more and then we move on

1945

01:20:15,990 --> 01:20:14,960

black holes i mean there's got to be a

1946

01:20:17,430 --> 01:20:16,000

drain

1947

01:20:19,669 --> 01:20:17,440

right there's got to be a garbage

1948

01:20:22,950 --> 01:20:19,679

disposal but what is the

1949

01:20:24,870 --> 01:20:22,960

shape of a black hole we always

1950

01:20:25,990 --> 01:20:24,880

you know the imaging that we see it's

1951

01:20:29,110 --> 01:20:26,000

always from the front

1952

01:20:32,470 --> 01:20:29,120

almost 2d what's on the back side

1953

01:20:33,350 --> 01:20:32,480

is is are is it circular is it flat like

1954

01:20:36,629 --> 01:20:33,360

a disc

1955

01:20:37,430 --> 01:20:36,639

and when it swallows a star i know that

1956

01:20:39,990 --> 01:20:37,440

the

1957

01:20:40,950 --> 01:20:40,000

diameter increases right okay we know

1958

01:20:44,470 --> 01:20:40,960

that right

1959

01:20:47,990 --> 01:20:44,480

but what happens with everything else

1960

01:20:49,910 --> 01:20:48,000

yeah so so a black hole um is um

1961

01:20:52,070 --> 01:20:49,920

you know if it doesn't spin it's it's

1962

01:20:53,750 --> 01:20:52,080

basically a spherical region

1963

01:20:55,430 --> 01:20:53,760

a region that looks like a sphere that

1964

01:20:57,189 --> 01:20:55,440

if you enter into it

1965

01:20:58,830 --> 01:20:57,199

and there is the so-called the boundary

1966

01:21:00,229 --> 01:20:58,840

of that region is called the event

1967

01:21:02,149 --> 01:21:00,239

horizon

1968

01:21:03,669 --> 01:21:02,159

nothing can escape that enters that

1969

01:21:05,990 --> 01:21:03,679

region you know and

1970

01:21:07,510 --> 01:21:06,000

even light cannot escape that's the the

1971

01:21:10,070 --> 01:21:07,520

definition of the black hole there is

1972

01:21:12,390 --> 01:21:10,080

this event horizon surrounding it

1973

01:21:13,990 --> 01:21:12,400

and the size of this event horizon uh

1974

01:21:16,950 --> 01:21:14,000

you know for

1975

01:21:18,310 --> 01:21:16,960

the sun for example is of the order of

1976

01:21:24,390 --> 01:21:18,320

um

1977

01:21:25,910 --> 01:21:24,400

uh it's about three kilometers or a

1978

01:21:28,149 --> 01:21:25,920

couple of miles

1979

01:21:29,510 --> 01:21:28,159

uh but the the bigger the more massive

1980

01:21:32,070 --> 01:21:29,520

the black hole is

1981

01:21:33,910 --> 01:21:32,080

and we see black holes up to 10 billion

1982

01:21:36,310 --> 01:21:33,920

times the mass of the sun

1983

01:21:37,750 --> 01:21:36,320

the the more massive the black hole the

1984

01:21:39,669 --> 01:21:37,760

bigger is the

1985

01:21:41,990 --> 01:21:39,679

the size of the event horizons it's it's

1986

01:21:44,390 --> 01:21:42,000

just proportional to its mass

1987

01:21:45,990 --> 01:21:44,400

and then then the question is okay

1988

01:21:48,229 --> 01:21:46,000

suppose

1989

01:21:49,669 --> 01:21:48,239

you enter the black hole region you know

1990

01:21:53,750 --> 01:21:49,679

the event horizon

1991

01:21:57,270 --> 01:21:53,760

what happens to you and i

1992

01:22:00,550 --> 01:21:57,280

thought about this question um when

1993

01:22:03,270 --> 01:22:00,560

the basement in my house at my home

1994

01:22:04,629 --> 01:22:03,280

uh got flooded because you know at some

1995

01:22:07,430 --> 01:22:04,639

point

1996

01:22:08,950 --> 01:22:07,440

i noticed that it was flooded and i

1997

01:22:09,430 --> 01:22:08,960

called the plumber and we found that

1998

01:22:12,629 --> 01:22:09,440

there were

1999

01:22:13,270 --> 01:22:12,639

tree roots blocking the sewer and that

2000

01:22:15,350 --> 01:22:13,280

led me

2001  
01:22:17,270 --> 01:22:15,360  
to think uh while i was helping the

2002  
01:22:20,629 --> 01:22:17,280  
plumber to solve the problem

2003  
01:22:24,070 --> 01:22:20,639  
to think um that in fact you know

2004  
01:22:27,189 --> 01:22:24,080  
prior to this i always you know imagine

2005  
01:22:27,990 --> 01:22:27,199  
the water coming down going down the

2006  
01:22:31,590 --> 01:22:28,000  
drain but

2007  
01:22:33,510 --> 01:22:31,600  
never thought where it's going to and um

2008  
01:22:35,750 --> 01:22:33,520  
and so the question is what happens to

2009  
01:22:36,149 --> 01:22:35,760  
the matter that falls into a black hole

2010  
01:22:37,910 --> 01:22:36,159  
that's

2011  
01:22:39,669 --> 01:22:37,920  
another thing that not many people think

2012  
01:22:41,510 --> 01:22:39,679  
about and

2013  
01:22:42,870 --> 01:22:41,520

you know in the case of the water going

2014

01:22:46,229 --> 01:22:42,880

down the sewer

2015

01:22:49,030 --> 01:22:46,239

it goes to some collection facility

2016

01:22:50,629 --> 01:22:49,040

uh that the town has and in the case of

2017

01:22:52,310 --> 01:22:50,639

a black hole we don't know where it's

2018

01:22:53,669 --> 01:22:52,320

going it has to do with the nature of

2019

01:22:56,790 --> 01:22:53,679

that singularity and

2020

01:22:57,430 --> 01:22:56,800

it could be a an object you know it

2021

01:23:00,149 --> 01:22:57,440

could be

2022

01:23:02,070 --> 01:23:00,159

a matter at some very high density the

2023

01:23:04,390 --> 01:23:02,080

highest density we can imagine

2024

01:23:06,149 --> 01:23:04,400

uh where quantum mechanics and gravity

2025

01:23:09,350 --> 01:23:06,159

uh play

2026

01:23:12,070 --> 01:23:09,360

important roles and or it could be that

2027

01:23:13,590 --> 01:23:12,080

you know the matter exists to some other

2028

01:23:15,590 --> 01:23:13,600

universe somewhere and

2029

01:23:17,270 --> 01:23:15,600

we just don't know because we don't have

2030

01:23:19,510 --> 01:23:17,280

a theory that unifies

2031

01:23:20,790 --> 01:23:19,520

gravity with quantum mechanics we would

2032

01:23:24,870 --> 01:23:20,800

have to

2033

01:23:27,270 --> 01:23:24,880

capture an image of a galaxy

2034

01:23:28,629 --> 01:23:27,280

sideways right where you would look at

2035

01:23:31,590 --> 01:23:28,639

the flat side

2036

01:23:33,030 --> 01:23:31,600

so you could see the the possibility of

2037

01:23:33,510 --> 01:23:33,040

what is on the other side of that black

2038

01:23:36,709 --> 01:23:33,520

hole

2039

01:23:39,189 --> 01:23:36,719

i've always pictured like a tornado

2040

01:23:41,030 --> 01:23:39,199

maybe some kind of vortex if it is

2041

01:23:44,550 --> 01:23:41,040

spiraling from the front

2042

01:23:48,550 --> 01:23:44,560

maybe on the back it's some kind of

2043

01:23:49,270 --> 01:23:48,560

conical shaped vortex well uh we have an

2044

01:23:52,870 --> 01:23:49,280

image

2045

01:23:54,870 --> 01:23:52,880

of a black hole it was derived actually

2046

01:23:58,070 --> 01:23:54,880

in the conference room of the

2047

01:24:00,070 --> 01:23:58,080

black hole center that that i uh founded

2048

01:24:02,950 --> 01:24:00,080

at harvard university i'm the

2049

01:24:03,669 --> 01:24:02,960

founding director of that um and and

2050

01:24:06,390 --> 01:24:03,679

what we see

2051  
01:24:08,709 --> 01:24:06,400  
is a shadow uh you know we we just see

2052  
01:24:10,950 --> 01:24:08,719  
no light coming from the inside of a

2053  
01:24:13,189 --> 01:24:10,960  
black hole we just see a dark shadow

2054  
01:24:17,189 --> 01:24:13,199  
this is the black hole at the center of

2055  
01:24:20,709 --> 01:24:17,199  
uh a giant galaxy called the m87

2056  
01:24:23,350 --> 01:24:20,719  
and that black hole it has 6

2057  
01:24:25,110 --> 01:24:23,360  
billion times the mass of the sun it's a

2058  
01:24:27,430 --> 01:24:25,120  
very big one and we can see it we can

2059  
01:24:29,669 --> 01:24:27,440  
resolve the shadow

2060  
01:24:31,510 --> 01:24:29,679  
but that tells us nothing about what

2061  
01:24:34,550 --> 01:24:31,520  
happens inside

2062  
01:24:35,430 --> 01:24:34,560  
uh and as i as i said there is no way

2063  
01:24:38,950 --> 01:24:35,440

for light

2064

01:24:39,669 --> 01:24:38,960

to escape from the inside so you really

2065

01:24:41,590 --> 01:24:39,679

need to get

2066

01:24:44,229 --> 01:24:41,600

in to get sucked into a black hole in

2067

01:24:45,990 --> 01:24:44,239

order to see what happens inside and

2068

01:24:47,990 --> 01:24:46,000

i wouldn't recommend that even to my

2069

01:24:50,629 --> 01:24:48,000

best friends now i i

2070

01:24:51,270 --> 01:24:50,639

often wonder you know one day who's

2071

01:24:55,910 --> 01:24:51,280

who's

2072

01:24:58,629 --> 01:24:55,920

that trip

2073

01:25:00,310 --> 01:24:58,639

well i actually okay so i i told my

2074

01:25:00,950 --> 01:25:00,320

class at harvard i asked them two

2075

01:25:05,110 --> 01:25:00,960

questions

2076

01:25:08,709 --> 01:25:05,120

and one if you if there was a spaceship

2077

01:25:11,030 --> 01:25:08,719

landing uh on earth and uh

2078

01:25:11,990 --> 01:25:11,040

and the aliens would ask you to come go

2079

01:25:15,510 --> 01:25:12,000

on board would you

2080

01:25:19,110 --> 01:25:15,520

do it and the all the students said yes

2081

01:25:21,189 --> 01:25:19,120

happily as long as they're allowed to uh

2082

01:25:22,950 --> 01:25:21,199

share their experience on social media

2083

01:25:24,629 --> 01:25:22,960

so they had one precondition that

2084

01:25:25,430 --> 01:25:24,639

they'll be able to communicate take

2085

01:25:27,510 --> 01:25:25,440

photographs

2086

01:25:29,510 --> 01:25:27,520

take selfies with the aliens and so

2087

01:25:32,310 --> 01:25:29,520

forth live stream

2088

01:25:33,110 --> 01:25:32,320

i i was surprised by this because for me

2089

01:25:36,149 --> 01:25:33,120

you know just

2090

01:25:38,709 --> 01:25:36,159

if i go on an adventurous trip let's say

2091

01:25:40,550 --> 01:25:38,719

climbing the himalayyas or somewhere i

2092

01:25:42,310 --> 01:25:40,560

would care less about sharing it with

2093

01:25:44,310 --> 01:25:42,320

anyone i would enjoy

2094

01:25:46,070 --> 01:25:44,320

just you know the thrill of doing

2095

01:25:48,070 --> 01:25:46,080

something unusual i mean i

2096

01:25:49,270 --> 01:25:48,080

i wouldn't care whether other people are

2097

01:25:51,430 --> 01:25:49,280

sharing it with me

2098

01:25:52,470 --> 01:25:51,440

now abby well hold on hold on before the

2099

01:25:55,750 --> 01:25:52,480

break i

2100

01:25:58,550 --> 01:25:55,760

i have to throw that at you then the

2101  
01:25:59,189 --> 01:25:58,560  
you know the ship lands right the ship

2102  
01:26:01,910 --> 01:25:59,199  
lands

2103  
01:26:03,110 --> 01:26:01,920  
and they say javi come on let's go do

2104  
01:26:06,070 --> 01:26:03,120  
you go

2105  
01:26:07,350 --> 01:26:06,080  
oh definitely my wife says if they land

2106  
01:26:10,229 --> 01:26:07,360  
in our backyard

2107  
01:26:12,070 --> 01:26:10,239  
i should make sure that of two things

2108  
01:26:13,189 --> 01:26:12,080  
one that they leave the car keys with

2109  
01:26:16,470 --> 01:26:13,199  
her

2110  
01:26:19,510 --> 01:26:16,480  
second that they will not ruin the loan

2111  
01:26:21,990 --> 01:26:19,520  
uh when they take off fair enough

2112  
01:26:22,709 --> 01:26:22,000  
our guest tonight professor avilo from

2113  
01:26:26,070 --> 01:26:22,719

harvard

2114

01:26:28,310 --> 01:26:26,080

we've got lots to do tonight like i said

2115

01:26:29,830 --> 01:26:28,320

i'm going to school there'll be a pop

2116

01:26:31,590 --> 01:26:29,840

quiz later on tonight

2117

01:26:33,669 --> 01:26:31,600

this is fade to black i am your host

2118

01:26:34,950 --> 01:26:33,679

jimmy church more with professor loeb

2119

01:26:50,950 --> 01:26:34,960

after this short break

2120

01:26:57,189 --> 01:26:54,149

way out here we listen to jimmy church

2121

01:26:59,110 --> 01:26:57,199

you're listening to fade to black

2122

01:27:00,229 --> 01:26:59,120

always on the edge of the hottest

2123

01:27:16,830 --> 01:27:00,239

alternative talk

2124

01:27:21,189 --> 01:27:19,110

kgraradio.com

2125

01:27:23,189 --> 01:27:21,199

do you want to be an official fate or

2126

01:27:25,189 --> 01:27:23,199

not of course you do

2127

01:27:27,189 --> 01:27:25,199

this is jimmy church of fade to black

2128

01:27:30,470 --> 01:27:27,199

just go to our membership section

2129

01:27:32,709 --> 01:27:30,480

at jimmychurchradio.com

2130

01:27:35,270 --> 01:27:32,719

this is jimmy church and i'll be at the

2131

01:27:37,030 --> 01:27:35,280

ufo megacon this june 6th through the

2132

01:27:39,669 --> 01:27:37,040

12th 2021

2133

01:27:40,470 --> 01:27:39,679

in laughlin nevada the laughlin ufo

2134

01:27:43,189 --> 01:27:40,480

megacon

2135

01:27:44,229 --> 01:27:43,199

is unique it's seven days of education

2136

01:27:47,510 --> 01:27:44,239

and disclosure

2137

01:27:49,510 --> 01:27:47,520

it's unlike all other ufo conferences

2138

01:27:52,149 --> 01:27:49,520

the laughlin ufo mega conference

2139

01:27:54,709 --> 01:27:52,159

specializes in bringing you new people

2140

01:27:56,709 --> 01:27:54,719

offering new information and disclosure

2141

01:27:59,350 --> 01:27:56,719

all of this is offered at prices so

2142

01:28:00,629 --> 01:27:59,360

low you can actually afford to be there

2143

01:28:03,110 --> 01:28:00,639

for instance

2144

01:28:05,910 --> 01:28:03,120

seven night hotel packages one or two

2145

01:28:08,709 --> 01:28:05,920

people start at just 320

2146

01:28:10,709 --> 01:28:08,719

inclusive education and disclosure is

2147

01:28:11,350 --> 01:28:10,719

why the laughlin ufo mega conference

2148

01:28:13,510 --> 01:28:11,360

exists

2149

01:28:15,189 --> 01:28:13,520

join us for all seven days or a half a

2150

01:28:18,510 --> 01:28:15,199

week or just a day or two

2151

01:28:19,750 --> 01:28:18,520

but join us go to

2152

01:28:22,550 --> 01:28:19,760

laughlinufomegaconference.com

2153

01:28:23,910 --> 01:28:22,560

register now the only thing keeping you

2154

01:28:27,629 --> 01:28:23,920

from being with all of us

2155

01:28:35,270 --> 01:28:27,639

is you just go to laughlin ufo

2156

01:28:39,110 --> 01:28:37,270

vader knots when you think about the

2157

01:28:41,030 --> 01:28:39,120

future of our country and where we're

2158

01:28:42,310 --> 01:28:41,040

headed do you wonder about the food

2159

01:28:44,790 --> 01:28:42,320

supply i

2160

01:28:46,070 --> 01:28:44,800

do disruptions in the food supply chain

2161

01:28:48,229 --> 01:28:46,080

could be disastrous

2162

01:28:50,470 --> 01:28:48,239

and they usually occur with little

2163

01:28:51,510 --> 01:28:50,480

warning that's why the smartest thing

2164

01:28:54,709 --> 01:28:51,520

you can do today

2165

01:28:57,030 --> 01:28:54,719

is to stockpile emergency food water

2166

01:28:58,149 --> 01:28:57,040

and other essentials i personally

2167

01:29:00,310 --> 01:28:58,159

recommend my

2168

01:29:02,790 --> 01:29:00,320

patriot supply they're the nation's

2169

01:29:05,110 --> 01:29:02,800

largest emergency preparedness company

2170

01:29:06,229 --> 01:29:05,120

serving millions of customers for more

2171

01:29:08,550 --> 01:29:06,239

than a decade

2172

01:29:11,270 --> 01:29:08,560

in fact they're the only source my

2173

01:29:14,390 --> 01:29:11,280

family trust for our preparedness plan

2174

01:29:16,950 --> 01:29:14,400

you should too right now save 20

2175

01:29:17,990 --> 01:29:16,960

off a full four week supply of delicious

2176

01:29:21,270 --> 01:29:18,000

meals that provide

2177

01:29:24,390 --> 01:29:21,280

2 000 calories a day saving 20

2178

01:29:27,189 --> 01:29:24,400

helps too doesn't it especially now so

2179

01:29:27,830 --> 01:29:27,199

go to prepare with jimmy.com and get

2180

01:29:31,189 --> 01:29:27,840

ready

2181

01:29:32,470 --> 01:29:31,199

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

2182

01:29:35,750 --> 01:29:32,480

time to lose

2183

01:29:39,070 --> 01:29:35,760

do it now so you

2184

01:29:40,310 --> 01:29:39,080

love talk radio then you'll love

2185

01:29:43,430 --> 01:29:40,320

talkstreamlive.com

2186

01:29:45,110 --> 01:29:43,440

talk stream live is always on 24 7 with

2187

01:29:47,189 --> 01:29:45,120

the best streaming talk shows

2188

01:29:48,709 --> 01:29:47,199

find your favorite talkers and discover

2189

01:29:51,350 --> 01:29:48,719

some new ones it's free

2190

01:29:53,110 --> 01:29:51,360

readily available online or on mobile

2191

01:29:55,189 --> 01:29:53,120

with any smartphone or tablet

2192

01:29:57,830 --> 01:29:55,199

finding your favorite talk shows all in

2193

01:30:00,709 --> 01:29:57,840

one place has gotten a whole lot easier

2194

01:30:02,870 --> 01:30:00,719

just go to [talkstreamlive.com](http://talkstreamlive.com) be sure to

2195

01:30:06,310 --> 01:30:02,880

download the free apps from google play

2196

01:30:09,510 --> 01:30:06,320

or the itunes app store

2197

01:30:15,790 --> 01:30:09,520

you listen to us and we listen to you

2198

01:30:15,800 --> 01:30:19,510

[kgraradio.com](http://kgraradio.com)

2199

01:30:26,390 --> 01:30:21,590

you are listening to fate to black with

2200

01:30:29,990 --> 01:30:28,870

hi i'm rhys evans you're listening to

2201

01:30:33,110 --> 01:30:30,000

jimmy church

2202

01:30:34,390 --> 01:30:33,120

this is revolution the revolution will

2203

01:30:46,830 --> 01:30:34,400

not be televised

2204

01:30:46,840 --> 01:31:21,590

ciao

2205

01:31:25,669 --> 01:31:23,270

okay welcome back fade to black i'm

2206

01:31:26,709 --> 01:31:25,679

yours jimmy church tonight professor avi

2207

01:31:29,990 --> 01:31:26,719

loeb is with us

2208

01:31:33,030 --> 01:31:30,000

i am going to school which means you are

2209

01:31:34,629 --> 01:31:33,040

too we've got lots to cover tonight and

2210

01:31:36,470 --> 01:31:34,639

uh now professor lopez this is where i

2211

01:31:39,350 --> 01:31:36,480

want to go now

2212

01:31:39,750 --> 01:31:39,360

yes the milky way is a big place yes it

2213

01:31:42,950 --> 01:31:39,760

is

2214

01:31:45,590 --> 01:31:42,960

old we don't know about the big bang

2215

01:31:46,790 --> 01:31:45,600

and what happened before one day we'll

2216

01:31:50,149 --> 01:31:46,800

find out

2217

01:31:51,270 --> 01:31:50,159

but where we are today um one of the

2218

01:31:53,590 --> 01:31:51,280

things that i

2219

01:31:54,709 --> 01:31:53,600

i did last week on the show and you'll

2220

01:31:56,229 --> 01:31:54,719

enjoy this

2221

01:31:57,750 --> 01:31:56,239

the last half hour of the show instead

2222

01:32:01,350 --> 01:31:57,760

of taking calls

2223

01:32:05,030 --> 01:32:01,360

i went off on my soap box

2224

01:32:08,149 --> 01:32:05,040

about how big the universe is

2225

01:32:11,110 --> 01:32:08,159

and i don't think when i when i throw

2226

01:32:13,510 --> 01:32:11,120

these numbers out and i'm not a phd

2227

01:32:15,510 --> 01:32:13,520

but when i throw these numbers out and

2228

01:32:16,470 --> 01:32:15,520

people really start to contemplate the

2229

01:32:19,669 --> 01:32:16,480

totality

2230

01:32:20,629 --> 01:32:19,679

of what i am saying then they start to

2231

01:32:23,830 --> 01:32:20,639

understand how big

2232

01:32:27,110 --> 01:32:23,840

it is but right now the

2233

01:32:29,270 --> 01:32:27,120

latest number you know 95 billion

2234

01:32:32,790 --> 01:32:29,280

light years across in the observable

2235

01:32:36,070 --> 01:32:32,800

universe that's insanity to me

2236

01:32:41,189 --> 01:32:36,080

right um so the light that we can see

2237

01:32:44,950 --> 01:32:41,199

since the big bang went um

2238

01:32:45,510 --> 01:32:44,960

on a journey that lasted 13.8 billion

2239

01:32:48,629 --> 01:32:45,520

years

2240

01:32:50,470 --> 01:32:48,639

to reach us so the big bang was 13.8

2241

01:32:51,270 --> 01:32:50,480

billion years ago the way we can find

2242

01:32:54,950 --> 01:32:51,280

out

2243

01:32:57,830 --> 01:32:54,960

what it is is if you measure the

2244

01:32:59,510 --> 01:32:57,840

recession speed of galaxies away from us

2245

01:33:00,149 --> 01:32:59,520

we see how the universe is expanding you

2246

01:33:02,390 --> 01:33:00,159

take the

2247

01:33:04,149 --> 01:33:02,400

recession speed and you know the

2248

01:33:05,910 --> 01:33:04,159

distances to those galaxies if you take

2249

01:33:06,870 --> 01:33:05,920

the distance divide by the recession

2250

01:33:09,030 --> 01:33:06,880

speed you know

2251  
01:33:10,709 --> 01:33:09,040  
how long ago were these galaxies on top

2252  
01:33:14,310 --> 01:33:10,719  
of each other the big bang

2253  
01:33:17,110 --> 01:33:14,320  
and that happened to be about 13.8

2254  
01:33:18,229 --> 01:33:17,120  
billion years ago so all the light that

2255  
01:33:21,430 --> 01:33:18,239  
we see

2256  
01:33:22,350 --> 01:33:21,440  
uh traversed the vast distances of the

2257  
01:33:25,910 --> 01:33:22,360  
universe for

2258  
01:33:27,669 --> 01:33:25,920  
13.8 billion years but uh in principle

2259  
01:33:28,070 --> 01:33:27,679  
the universe can be much bigger than

2260  
01:33:30,950 --> 01:33:28,080  
that

2261  
01:33:31,750 --> 01:33:30,960  
because there is light emitted from more

2262  
01:33:34,709 --> 01:33:31,760  
distant

2263  
01:33:35,189 --> 01:33:34,719

larger distances that haven't reached us

2264

01:33:38,149 --> 01:33:35,199

yet

2265

01:33:39,189 --> 01:33:38,159

or maybe will never reach us so as far

2266

01:33:41,750 --> 01:33:39,199

as we can tell

2267

01:33:43,189 --> 01:33:41,760

the conditions are very similar on very

2268

01:33:45,350 --> 01:33:43,199

large scale so

2269

01:33:47,270 --> 01:33:45,360

if i had to guess i would say the

2270

01:33:48,790 --> 01:33:47,280

conditions we find in the observable

2271

01:33:52,390 --> 01:33:48,800

volume around us

2272

01:33:55,189 --> 01:33:52,400

are probably replicated uh in a much

2273

01:33:58,709 --> 01:33:55,199

bigger volume than we can see

2274

01:34:03,189 --> 01:33:58,719

if if that is the case and

2275

01:34:04,709 --> 01:34:03,199

the current uh estimates are 1 trillion

2276

01:34:08,790 --> 01:34:04,719

galaxies

2277

01:34:12,310 --> 01:34:08,800

trillion

2278

01:34:15,430 --> 01:34:12,320

each one of those has somewhere between

2279

01:34:18,149 --> 01:34:15,440

50 billion and a trillion stars each and

2280

01:34:19,830 --> 01:34:18,159

each one of those theoretically should

2281

01:34:22,870 --> 01:34:19,840

have a planet

2282

01:34:25,830 --> 01:34:22,880

now we are talking about numbers that we

2283

01:34:26,229 --> 01:34:25,840

is impossible to wrap your head around

2284

01:34:29,350 --> 01:34:26,239

yeah

2285

01:34:32,470 --> 01:34:29,360

we are talking about the one with 21

2286

01:34:33,030 --> 01:34:32,480

zeros after it the 10 to the power 21 or

2287

01:34:35,590 --> 01:34:33,040

so of

2288

01:34:36,950 --> 01:34:35,600

habitable planets just in the observable

2289

01:34:39,830 --> 01:34:36,960

volume of the universe

2290

01:34:41,750 --> 01:34:39,840

and there could be many more outside and

2291

01:34:42,310 --> 01:34:41,760

it's more than the number of grains of

2292

01:34:45,030 --> 01:34:42,320

sand

2293

01:34:45,990 --> 01:34:45,040

on all beaches on earth so if you think

2294

01:34:48,310 --> 01:34:46,000

about an emperor

2295

01:34:49,669 --> 01:34:48,320

or a king that they conquered a piece of

2296

01:34:51,910 --> 01:34:49,679

land here on earth

2297

01:34:53,910 --> 01:34:51,920

you know people tend to feel very proud

2298

01:34:57,750 --> 01:34:53,920

of themselves when they do that but

2299

01:34:59,990 --> 01:34:57,760

that's just like an ant hugging a single

2300

01:35:02,709 --> 01:35:00,000

grain of sand on the landscape of a huge

2301

01:35:03,830 --> 01:35:02,719

beach it's not very impressive no it's

2302

01:35:09,189 --> 01:35:03,840

not

2303

01:35:11,270 --> 01:35:09,199

now um uh the size of everything

2304

01:35:13,430 --> 01:35:11,280

where we are talking about the

2305

01:35:14,070 --> 01:35:13,440

observable universe i think this is

2306

01:35:16,870 --> 01:35:14,080

where people

2307

01:35:18,870 --> 01:35:16,880

start to get a little bit confused well

2308

01:35:21,830 --> 01:35:18,880

we're talking about 90 95 billion light

2309

01:35:23,910 --> 01:35:21,840

years across but yet it's only 13.8

2310

01:35:25,990 --> 01:35:23,920

billion years old those numbers don't

2311

01:35:29,030 --> 01:35:26,000

match up in most people's minds

2312

01:35:29,669 --> 01:35:29,040

right and i can explain that so um the

2313

01:35:32,470 --> 01:35:29,679

point is

2314

01:35:35,270 --> 01:35:32,480

light traveled since the big bang for

2315

01:35:38,390 --> 01:35:35,280

13.8 billion years so

2316

01:35:41,430 --> 01:35:38,400

um what we see um

2317

01:35:41,990 --> 01:35:41,440

is light that went the distance for that

2318

01:35:45,030 --> 01:35:42,000

amount of

2319

01:35:47,830 --> 01:35:45,040

time but if you ask right now

2320

01:35:50,470 --> 01:35:47,840

where is the point that emitted that

2321

01:35:51,350 --> 01:35:50,480

light 13.8 billion years ago so that

2322

01:35:53,430 --> 01:35:51,360

point

2323

01:35:55,270 --> 01:35:53,440

is much farther out because the universe

2324

01:35:58,629 --> 01:35:55,280

expanded since then

2325

01:36:01,990 --> 01:35:58,639

so the point is that 13.8 billion years

2326  
01:36:04,070 --> 01:36:02,000  
is the amount of time that elapsed for

2327  
01:36:06,950 --> 01:36:04,080  
you know since the big bang but but the

2328  
01:36:09,990 --> 01:36:06,960  
point that emitted the light that we see

2329  
01:36:13,189 --> 01:36:10,000  
went much farther than 13.8 billion

2330  
01:36:15,270 --> 01:36:13,199  
light years away because in during the

2331  
01:36:15,750 --> 01:36:15,280  
time that the light was coming towards

2332  
01:36:18,790 --> 01:36:15,760  
us

2333  
01:36:21,030 --> 01:36:18,800  
and they were

2334  
01:36:22,870 --> 01:36:21,040  
going a larger distance so right now if

2335  
01:36:25,270 --> 01:36:22,880  
you were to make a snapshot

2336  
01:36:27,189 --> 01:36:25,280  
those points that emitted the light are

2337  
01:36:29,990 --> 01:36:27,199  
much farther out

2338  
01:36:32,790 --> 01:36:30,000

so what is it that okay when we talk

2339

01:36:38,070 --> 01:36:32,800

about the observable universe

2340

01:36:39,669 --> 01:36:38,080

what is it that we can see if it's 95.95

2341

01:36:42,390 --> 01:36:39,679

billion light years across that means

2342

01:36:46,070 --> 01:36:42,400

half of it is about 40

2343

01:36:48,390 --> 01:36:46,080

right 45 uh billion light years

2344

01:36:50,629 --> 01:36:48,400

that's half of if you put ourselves

2345

01:36:53,910 --> 01:36:50,639

theoretically at the center

2346

01:36:55,030 --> 01:36:53,920

then how is it that we would be able to

2347

01:36:58,550 --> 01:36:55,040

observe

2348

01:36:58,950 --> 01:36:58,560

that far out or or can we because that

2349

01:37:02,310 --> 01:36:58,960

light

2350

01:37:03,750 --> 01:37:02,320

would have taken 13.8 billion years it

2351  
01:37:05,189 --> 01:37:03,760  
seems to me

2352  
01:37:07,350 --> 01:37:05,199  
that we're only seeing a third of the

2353  
01:37:10,629 --> 01:37:07,360  
way out no no

2354  
01:37:13,350 --> 01:37:10,639  
so we are seeing light that was emitted

2355  
01:37:14,790 --> 01:37:13,360  
13.8 billion years ago and in fact we do

2356  
01:37:16,550 --> 01:37:14,800  
see that light

2357  
01:37:18,870 --> 01:37:16,560  
it's called the cosmic microwave

2358  
01:37:20,310 --> 01:37:18,880  
background it's radiation that filled up

2359  
01:37:27,750 --> 01:37:20,320  
the universe

2360  
01:37:29,910 --> 01:37:27,760  
and then at some point in time about 400

2361  
01:37:31,430 --> 01:37:29,920  
000 years after the big bang a very

2362  
01:37:34,629 --> 01:37:31,440  
short amount of time 400

2363  
01:37:35,910 --> 01:37:34,639

000 years at that point the universe

2364

01:37:39,430 --> 01:37:35,920

became transparent

2365

01:37:42,550 --> 01:37:39,440

and that light was able to travel

2366

01:37:43,350 --> 01:37:42,560

freely throughout the universe so what

2367

01:37:47,270 --> 01:37:43,360

we see

2368

01:37:47,990 --> 01:37:47,280

as the radiation came from about 400 000

2369

01:37:50,070 --> 01:37:48,000

years after

2370

01:37:51,910 --> 01:37:50,080

the big bang and it's pretty much the

2371

01:37:52,550 --> 01:37:51,920

same as coming from the big bang itself

2372

01:37:55,910 --> 01:37:52,560

because

2373

01:37:57,910 --> 01:37:55,920

13.8 billion years later you know that

2374

01:37:59,750 --> 01:37:57,920

it looks like as if it started at the

2375

01:38:02,950 --> 01:37:59,760

beginning and

2376

01:38:04,390 --> 01:38:02,960

the point is that we see that light and

2377

01:38:07,910 --> 01:38:04,400

that light

2378

01:38:09,109 --> 01:38:07,920

came to us from a spherical region

2379

01:38:13,350 --> 01:38:09,119

around us

2380

01:38:14,229 --> 01:38:13,360

and and and it went for 13.8 billion

2381

01:38:17,430 --> 01:38:14,239

years

2382

01:38:19,430 --> 01:38:17,440

to get to us and that's what we see now

2383

01:38:20,709 --> 01:38:19,440

what we see is a snapshot of how the

2384

01:38:24,070 --> 01:38:20,719

universe looked like

2385

01:38:26,470 --> 01:38:24,080

at that point in time very early on 400

2386

01:38:27,830 --> 01:38:26,480

000 years after the big bang we see how

2387

01:38:30,229 --> 01:38:27,840

the universe looked like

2388

01:38:30,950 --> 01:38:30,239

we can actually see it and we have an

2389

01:38:33,030 --> 01:38:30,960

image of that

2390

01:38:34,550 --> 01:38:33,040

it's it's the image of the cosmic

2391

01:38:36,629 --> 01:38:34,560

microwave background and

2392

01:38:37,590 --> 01:38:36,639

we have that image to an exquisite

2393

01:38:40,149 --> 01:38:37,600

precision

2394

01:38:41,990 --> 01:38:40,159

and we can see variations in the

2395

01:38:47,189 --> 01:38:42,000

brightness of the light

2396

01:38:54,310 --> 01:38:50,229

a million or or 10 million

2397

01:38:56,229 --> 01:38:54,320

uh we can see the variations are

2398

01:38:58,149 --> 01:38:56,239

typically as large as one part in a

2399

01:39:00,310 --> 01:38:58,159

hundred thousand but we have a very high

2400

01:39:00,629 --> 01:39:00,320

precision of measuring those variations

2401

01:39:06,070 --> 01:39:00,639

and

2402

01:39:09,350 --> 01:39:06,080

all the objects we see nowadays these

2403

01:39:12,070 --> 01:39:09,360

initially as i said there were small

2404

01:39:14,149 --> 01:39:12,080

variations in the density of matter and

2405

01:39:16,149 --> 01:39:14,159

then they grew over time where

2406

01:39:17,830 --> 01:39:16,159

regions that were denser than average

2407

01:39:19,270 --> 01:39:17,840

collapsed upon themselves to make

2408

01:39:21,590 --> 01:39:19,280

galaxies like the milky way

2409

01:39:23,270 --> 01:39:21,600

so we can see the early seeds of those

2410

01:39:24,870 --> 01:39:23,280

variations and

2411

01:39:26,629 --> 01:39:24,880

we see it in the cosmic microwave

2412

01:39:29,669 --> 01:39:26,639

background

2413

01:39:33,270 --> 01:39:29,679

image and we see

2414

01:39:34,790 --> 01:39:33,280

light that was generated 400 000 years

2415

01:39:36,629 --> 01:39:34,800

after the big bang and we see everything

2416

01:39:39,109 --> 01:39:36,639

in between

2417

01:39:39,669 --> 01:39:39,119

so that's the observable region of the

2418

01:39:42,709 --> 01:39:39,679

universe

2419

01:39:45,590 --> 01:39:42,719

now stars continue to be

2420

01:39:46,950 --> 01:39:45,600

created star systems continue to be

2421

01:39:49,430 --> 01:39:46,960

created

2422

01:39:51,030 --> 01:39:49,440

we can observe that we can see the the

2423

01:39:53,910 --> 01:39:51,040

rings of dust around

2424

01:39:55,030 --> 01:39:53,920

new stars and the formations does that

2425

01:39:58,390 --> 01:39:55,040

indicate

2426

01:40:00,870 --> 01:39:58,400

this is a very fundamental question

2427

01:40:01,430 --> 01:40:00,880

does that mean that galaxies are still

2428

01:40:07,830 --> 01:40:01,440

in

2429

01:40:10,470 --> 01:40:07,840

the process started about

2430

01:40:13,030 --> 01:40:10,480

50 million years after the big bang

2431

01:40:15,830 --> 01:40:13,040

that's when the very first stars

2432

01:40:20,229 --> 01:40:15,840

started to form and about somewhere

2433

01:40:23,590 --> 01:40:22,629

000 years after the big bang the very

2434

01:40:27,109 --> 01:40:23,600

first stars

2435

01:40:31,510 --> 01:40:27,119

formed um and the then

2436

01:40:31,990 --> 01:40:31,520

uh the the bigger and bigger galaxies

2437

01:40:35,189 --> 01:40:32,000

formed

2438

01:40:35,510 --> 01:40:35,199

afterwards and then they merged to to

2439

01:40:37,590 --> 01:40:35,520

make

2440

01:40:39,270 --> 01:40:37,600

eventually galaxies as big as the milky

2441

01:40:43,030 --> 01:40:39,280

way or even bigger

2442

01:40:43,990 --> 01:40:43,040

um we can we haven't yet seen the very

2443

01:40:46,790 --> 01:40:44,000

first

2444

01:40:48,470 --> 01:40:46,800

uh galaxies that formed in the universe

2445

01:40:52,229 --> 01:40:48,480

we can see back to

2446

01:40:54,950 --> 01:40:52,239

about a billion

2447

01:40:56,870 --> 01:40:54,960

years after the big bang or maybe 500

2448

01:40:59,750 --> 01:40:56,880

million years after the big bang

2449

01:41:00,790 --> 01:40:59,760

but we can't really see all the way back

2450

01:41:03,750 --> 01:41:00,800

to when the first

2451

01:41:03,990 --> 01:41:03,760

galaxies formed by the way if you go

2452

01:41:06,629 --> 01:41:04,000

back

2453

01:41:08,870 --> 01:41:06,639

in time one interesting point is that 15

2454

01:41:11,590 --> 01:41:08,880

million years after the big bang

2455

01:41:12,310 --> 01:41:11,600

uh is when the entire universe was

2456

01:41:15,830 --> 01:41:12,320

roughly

2457

01:41:17,590 --> 01:41:15,840

room temperature uh and so

2458

01:41:20,149 --> 01:41:17,600

that's an interesting time you didn't

2459

01:41:22,070 --> 01:41:20,159

need to be close to a star

2460

01:41:23,510 --> 01:41:22,080

like the sun in order to keep yourself

2461

01:41:25,590 --> 01:41:23,520

warm if you lived

2462

01:41:28,550 --> 01:41:25,600

15 million years after the big bang the

2463

01:41:31,350 --> 01:41:28,560

entire universe was room temperature

2464

01:41:32,310 --> 01:41:31,360

it wasn't minus 400 or whatever it is

2465

01:41:37,270 --> 01:41:32,320

today

2466

01:41:37,990 --> 01:41:37,280

about 2.7 degrees above the absolute

2467

01:41:40,790 --> 01:41:38,000

zero

2468

01:41:41,830 --> 01:41:40,800

back then it was a hundred times bigger

2469

01:41:43,750 --> 01:41:41,840

and then

2470

01:41:46,070 --> 01:41:43,760

it's it was roughly room temperature and

2471

01:41:48,149 --> 01:41:46,080

that lasted for a few million years

2472

01:41:50,070 --> 01:41:48,159

but there were no planets back then as i

2473

01:41:52,950 --> 01:41:50,080

said the first stars

2474

01:41:54,790 --> 01:41:52,960

formed about 70 million years after the

2475

01:41:55,189 --> 01:41:54,800

big bang about 50 million years after

2476

01:41:58,790 --> 01:41:55,199

those

2477

01:42:01,350 --> 01:41:58,800

that time that i mentioned and so

2478

01:42:02,310 --> 01:42:01,360

after that life could have started then

2479

01:42:05,270 --> 01:42:02,320

galaxies

2480

01:42:05,669 --> 01:42:05,280

started building up and then ended up

2481

01:42:07,990 --> 01:42:05,679

and

2482

01:42:09,430 --> 01:42:08,000

the process is not finished uh so

2483

01:42:12,629 --> 01:42:09,440

nowadays you still

2484

01:42:13,830 --> 01:42:12,639

see stars forming and galaxies is being

2485

01:42:15,830 --> 01:42:13,840

made

2486

01:42:17,430 --> 01:42:15,840

most of the stars formed billions of

2487

01:42:20,310 --> 01:42:17,440

years before the sun

2488

01:42:21,350 --> 01:42:20,320

so the sun is a relative latecomer and

2489

01:42:23,669 --> 01:42:21,360

that means that

2490

01:42:25,830 --> 01:42:23,679

you know if other stars had the

2491

01:42:29,270 --> 01:42:25,840

civilizations like ours

2492

01:42:31,189 --> 01:42:29,280

they predated us by billions of years it

2493

01:42:32,070 --> 01:42:31,199

has to be the math that says that the

2494

01:42:35,270 --> 01:42:32,080

base you know

2495

01:42:37,750 --> 01:42:35,280

13.8 billion our sun is 5 billion years

2496

01:42:38,550 --> 01:42:37,760

well there you go it doesn't take much

2497

01:42:42,229 --> 01:42:38,560

to

2498

01:42:45,910 --> 01:42:42,239

years of

2499

01:42:50,229 --> 01:42:45,920

creation before we came along exactly

2500

01:42:53,910 --> 01:42:50,239

and and that means that we are really

2501

01:42:55,990 --> 01:42:53,920

not likely to be the first

2502

01:42:58,149 --> 01:42:56,000

form of technological life in the

2503

01:43:00,470 --> 01:42:58,159

universe that

2504

01:43:01,270 --> 01:43:00,480

in fact there may be a lot of debris

2505

01:43:04,629 --> 01:43:01,280

around us

2506

01:43:07,830 --> 01:43:04,639

in space that indicates much older

2507

01:43:10,470 --> 01:43:07,840

civilizations than we are now uh

2508

01:43:14,470 --> 01:43:10,480

before we get to the break this is one

2509

01:43:17,669 --> 01:43:14,480

of my favorite things to contemplate avi

2510

01:43:21,270 --> 01:43:17,679

the edge of the universe

2511

01:43:24,149 --> 01:43:21,280

there are galaxies

2512

01:43:25,270 --> 01:43:24,159

an infinite amount that are dropping off

2513

01:43:28,310 --> 01:43:25,280

the edge of the cliff

2514

01:43:30,470 --> 01:43:28,320

every single day that will never be seen

2515

01:43:33,430 --> 01:43:30,480

will never be discovered will never be

2516

01:43:36,709 --> 01:43:33,440

known that's a heavy thought

2517

01:43:37,990 --> 01:43:36,719

yeah well i should say that's the result

2518

01:43:40,950 --> 01:43:38,000

of the fact that the universe

2519

01:43:42,950 --> 01:43:40,960

is not just expanding but its expansion

2520

01:43:44,790 --> 01:43:42,960

is accelerating in time

2521

01:43:45,990 --> 01:43:44,800

and that means that when you look at the

2522

01:43:48,229 --> 01:43:46,000

galaxy it's

2523

01:43:49,030 --> 01:43:48,239

receding away from us at some speed

2524

01:43:51,270 --> 01:43:49,040

today

2525

01:43:52,310 --> 01:43:51,280

but in the future the speed will get

2526

01:43:54,229 --> 01:43:52,320

bigger and bigger

2527

01:43:55,669 --> 01:43:54,239

and eventually will exceed the speed of

2528

01:43:57,669 --> 01:43:55,679

light so

2529

01:43:59,750 --> 01:43:57,679

that galaxy will not be visible to us

2530

01:44:02,310 --> 01:43:59,760

the light that is emitted from it

2531

01:44:03,510 --> 01:44:02,320

beyond a certain point in time will not

2532

01:44:05,910 --> 01:44:03,520

be able to bridge

2533

01:44:07,109 --> 01:44:05,920

the gap that is being opened between the

2534

01:44:10,070 --> 01:44:07,119

galaxy and us

2535

01:44:11,590 --> 01:44:10,080

so that is because of the accelerated

2536

01:44:12,870 --> 01:44:11,600

expansion of the universe that was

2537

01:44:16,390 --> 01:44:12,880

discovered

2538

01:44:19,270 --> 01:44:16,400

uh about a couple of decades ago

2539

01:44:20,870 --> 01:44:19,280

and then if not for that then we would

2540

01:44:24,390 --> 01:44:20,880

be able to continue to

2541

01:44:25,910 --> 01:44:24,400

to see what happens for every galaxy

2542

01:44:27,990 --> 01:44:25,920

that we see right now but

2543

01:44:29,270 --> 01:44:28,000

but because of the accelerated expansion

2544

01:44:32,550 --> 01:44:29,280

we will be eventually

2545

01:44:35,030 --> 01:44:32,560

left in the dark and the the future of

2546

01:44:37,669 --> 01:44:35,040

astronomy is very gloomy you know we

2547

01:44:38,790 --> 01:44:37,679

so i call it social distancing on a

2548

01:44:41,510 --> 01:44:38,800

cosmic scale

2549

01:44:43,189 --> 01:44:41,520

you know right and i don't feel bad

2550

01:44:45,189 --> 01:44:43,199

about it you know that we will be

2551  
01:44:46,870 --> 01:44:45,199  
surrounded in darkness and vacuum i

2552  
01:44:50,070 --> 01:44:46,880  
don't feel bad because

2553  
01:44:52,709 --> 01:44:50,080  
i'm a loner you know i i enjoy being

2554  
01:44:54,149 --> 01:44:52,719  
not you know i i prefer to have a lot of

2555  
01:44:57,590 --> 01:44:54,159  
space available to me

2556  
01:45:01,669 --> 01:44:57,600  
now how much how much

2557  
01:45:04,310 --> 01:45:01,679  
has left right if we if

2558  
01:45:05,030 --> 01:45:04,320  
we're sitting at say a trillion galaxies

2559  
01:45:08,149 --> 01:45:05,040  
right now

2560  
01:45:11,669 --> 01:45:08,159  
in the universe is there another

2561  
01:45:14,070 --> 01:45:11,679  
five trillion galaxies that

2562  
01:45:16,070 --> 01:45:14,080  
have have left at the speed of light

2563  
01:45:17,590 --> 01:45:16,080

that will never be seen again

2564

01:45:19,430 --> 01:45:17,600

you know what i mean what's the number

2565

01:45:21,350 --> 01:45:19,440

right yeah so so what

2566

01:45:23,109 --> 01:45:21,360

what is important to keep in mind is

2567

01:45:26,870 --> 01:45:23,119

once the universe ages

2568

01:45:27,669 --> 01:45:26,880

by about a factor of 10 once it becomes

2569

01:45:31,669 --> 01:45:27,679

10 times

2570

01:45:34,229 --> 01:45:31,679

older than it is right now at that point

2571

01:45:34,709 --> 01:45:34,239

the only galaxy that we would see is

2572

01:45:38,070 --> 01:45:34,719

that this

2573

01:45:40,629 --> 01:45:38,080

region is ours yes it's crazy

2574

01:45:43,109 --> 01:45:40,639

now okay okay okay okay pump the brakes

2575

01:45:46,550 --> 01:45:43,119

right there

2576

01:45:47,830 --> 01:45:46,560

if that is the case and we are

2577

01:45:49,990 --> 01:45:47,840

you know there's going to be no

2578

01:45:51,350 --> 01:45:50,000

andromeda all of the you know the 50

2579

01:45:52,550 --> 01:45:51,360

galaxies that are in our little

2580

01:45:55,430 --> 01:45:52,560

neighborhood right now

2581

01:45:56,870 --> 01:45:55,440

all expanded and gone no no these these

2582

01:45:59,669 --> 01:45:56,880

will be the only ones that will

2583

01:46:01,350 --> 01:45:59,679

merge once near us like andromeda will

2584

01:46:02,470 --> 01:46:01,360

merge with the milky way because it's on

2585

01:46:04,470 --> 01:46:02,480

a collision course

2586

01:46:06,390 --> 01:46:04,480

right it's not expanding relative to us

2587

01:46:07,430 --> 01:46:06,400

but everything beyond our immediate

2588

01:46:10,390 --> 01:46:07,440

neighborhood beyond

2589

01:46:11,590 --> 01:46:10,400

andromeda and the milky way gone all of

2590

01:46:15,990 --> 01:46:11,600

that will be gone

2591

01:46:19,109 --> 01:46:16,000

now will the forces of gravity

2592

01:46:20,790 --> 01:46:19,119

uh with expansion and and and

2593

01:46:23,270 --> 01:46:20,800

and dark energy whatever you want to

2594

01:46:27,189 --> 01:46:23,280

call it will they start to

2595

01:46:31,030 --> 01:46:27,199

fight each other where our galaxy itself

2596

01:46:34,950 --> 01:46:31,040

that gravity will will be overtaken

2597

01:46:37,270 --> 01:46:34,960

and our galaxy rips apart no

2598

01:46:38,229 --> 01:46:37,280

the way we think about i mean the

2599

01:46:40,790 --> 01:46:38,239

simplest

2600

01:46:41,990 --> 01:46:40,800

version of dark energy is simply that

2601

01:46:45,430 --> 01:46:42,000

the vacuum has

2602

01:46:47,590 --> 01:46:45,440

some mass density some energy density to

2603

01:46:49,430 --> 01:46:47,600

it which is not changing in time it's

2604

01:46:52,149 --> 01:46:49,440

constant it's a constant of nature

2605

01:46:54,470 --> 01:46:52,159

you know and the vacuum if that is the

2606

01:46:57,350 --> 01:46:54,480

case if it will maintain its

2607

01:46:57,910 --> 01:46:57,360

energy density it's a constant and the

2608

01:47:00,310 --> 01:46:57,920

rest of

2609

01:47:01,669 --> 01:47:00,320

matter is being diluted as the universe

2610

01:47:03,910 --> 01:47:01,679

expands

2611

01:47:05,189 --> 01:47:03,920

and therefore you know the vacuum

2612

01:47:08,149 --> 01:47:05,199

continues to dominate

2613

01:47:08,629 --> 01:47:08,159

indefinitely if that's the case but as

2614

01:47:11,270 --> 01:47:08,639

long as

2615

01:47:12,870 --> 01:47:11,280

you have an object that is much denser

2616

01:47:14,550 --> 01:47:12,880

than the vacuum in terms of how much

2617

01:47:16,950 --> 01:47:14,560

mass it has per volume

2618

01:47:18,229 --> 01:47:16,960

like the milky way you know is much

2619

01:47:19,830 --> 01:47:18,239

denser than the back

2620

01:47:21,669 --> 01:47:19,840

it doesn't really care about the vacuum

2621

01:47:23,590 --> 01:47:21,679

because the vacuum provides a very small

2622

01:47:24,470 --> 01:47:23,600

contribution to the mass budget of this

2623

01:47:26,550 --> 01:47:24,480

object

2624

01:47:27,990 --> 01:47:26,560

so for us the vacuum doesn't matter much

2625

01:47:31,030 --> 01:47:28,000

for the milky way

2626

01:47:32,870 --> 01:47:31,040

it follows its own dynamics just like

2627

01:47:34,709 --> 01:47:32,880

an atom you know that you have for

2628

01:47:37,030 --> 01:47:34,719

example a hydrogen atom the

2629

01:47:38,070 --> 01:47:37,040

electron is bound very tightly to the

2630

01:47:39,510 --> 01:47:38,080

proton

2631

01:47:41,430 --> 01:47:39,520

it doesn't care about the fact that the

2632

01:47:42,870 --> 01:47:41,440

universe at large is expanding because

2633

01:47:44,550 --> 01:47:42,880

there is a force

2634

01:47:46,070 --> 01:47:44,560

that binds the electron to the proton

2635

01:47:49,270 --> 01:47:46,080

that is much stronger

2636

01:47:50,470 --> 01:47:49,280

than the cosmic force so so any system

2637

01:47:54,470 --> 01:47:50,480

that is

2638

01:47:57,350 --> 01:47:54,480

uh very tightly bound doesn't care about

2639

01:47:57,830 --> 01:47:57,360

the cosmic expansion and the our galaxy

2640

01:48:07,270 --> 01:47:57,840

will

2641

01:48:10,310 --> 01:48:07,280

so i can be comforted knowing that

2642

01:48:14,149 --> 01:48:10,320

the force that binds an

2643

01:48:17,270 --> 01:48:14,159

atom my body right my body

2644

01:48:20,629 --> 01:48:17,280

is not going to be rip ripped apart

2645

01:48:22,950 --> 01:48:20,639

eventually exactly and what i said is in

2646

01:48:25,189 --> 01:48:22,960

the context of the model that

2647

01:48:25,990 --> 01:48:25,199

we believe describes the universe very

2648

01:48:29,350 --> 01:48:26,000

accurately

2649

01:48:30,870 --> 01:48:29,360

where the vacuum maintains a constant

2650

01:48:32,950 --> 01:48:30,880

value and that is called the

2651

01:48:36,709 --> 01:48:32,960

cosmological constant

2652

01:48:38,870 --> 01:48:36,719

there are some uh speculations maybe the

2653

01:48:40,790 --> 01:48:38,880

vacuum energy will go up

2654

01:48:43,430 --> 01:48:40,800

and then everything will be ripped apart

2655

01:48:45,669 --> 01:48:43,440

and that would lead to some big rip

2656

01:48:47,030 --> 01:48:45,679

but this is a complete speculation you

2657

01:48:49,270 --> 01:48:47,040

know the most

2658

01:48:51,910 --> 01:48:49,280

uh i mean the model that agrees with all

2659

01:48:54,709 --> 01:48:51,920

the data that we have is that the vacuum

2660

01:48:57,189 --> 01:48:54,719

stays the same now we were talking uh

2661

01:48:59,669 --> 01:48:57,199

right before the show about the big rip

2662

01:49:01,669 --> 01:48:59,679

um and this is a good place to take a

2663

01:49:03,590 --> 01:49:01,679

break because when we come back

2664

01:49:06,550 --> 01:49:03,600

i want to follow up on that we can't let

2665

01:49:08,070 --> 01:49:06,560

this go we can't let the big rib go avi

2666

01:49:09,590 --> 01:49:08,080

i'm your host jimmy church our guest

2667

01:49:12,390 --> 01:49:09,600

tonight professor

2668

01:49:15,030 --> 01:49:12,400

javi loeb from harvard did i say how

2669

01:49:15,589 --> 01:49:15,040

harvard's professor avila by mural jimmy

2670

01:49:17,510 --> 01:49:15,599

church

2671

01:49:28,629 --> 01:49:17,520

this is fade to black more with avi

2672

01:49:29,990 --> 01:49:28,639

after this short break stay with us

2673

01:49:36,229 --> 01:49:30,000

hi everybody this is rob halpert the

2674

01:49:39,750 --> 01:49:38,709

this is kgra digital broadcasting

2675

01:49:43,430 --> 01:49:39,760

station

2676

01:49:45,270 --> 01:49:43,440

salt lake city utah van buren arkansas

2677

01:49:47,270 --> 01:49:45,280

why is it we're not very good with our

2678

01:49:49,109 --> 01:49:47,280

health regiment until it's too late

2679

01:49:50,950 --> 01:49:49,119

we don't put oil in the car until the

2680

01:49:51,750 --> 01:49:50,960

engine blows up when the body's out of

2681

01:49:53,830 --> 01:49:51,760

balance

2682

01:49:55,030 --> 01:49:53,840

your health is not so good give your

2683

01:49:57,430 --> 01:49:55,040

body some love

2684

01:49:58,310 --> 01:49:57,440

log on to get the tea dot com that's get

2685

01:50:00,550 --> 01:49:58,320

the tea

2686

01:50:02,950 --> 01:50:00,560

dot com try our life change tea which

2687

01:50:05,109 --> 01:50:02,960

cleanses you from harmful intruders

2688

01:50:06,629 --> 01:50:05,119

a clean colon is one of the ways to

2689

01:50:08,550 --> 01:50:06,639

bring the body in balance

2690

01:50:09,990 --> 01:50:08,560

we also carry organic supplements to

2691

01:50:12,709 --> 01:50:10,000

help you get where you

2692

01:50:15,950 --> 01:50:12,719

need to go so do your body a favor log

2693

01:50:17,270 --> 01:50:15,960

on to get the tea.com that's get the

2694

01:50:19,510 --> 01:50:17,280

ttea.com

2695

01:50:20,709 --> 01:50:19,520

you can even visit our sales page to

2696

01:50:23,030 --> 01:50:20,719

save some dough

2697

01:50:24,709 --> 01:50:23,040

does anybody call money dough anymore

2698

01:50:25,990 --> 01:50:24,719

anyway if you're looking for short

2699

01:50:28,390 --> 01:50:26,000

helpful health tips

2700

01:50:29,750 --> 01:50:28,400

go to youtube and punch in health

2701  
01:50:36,870 --> 01:50:29,760  
matters now

2702  
01:50:37,510 --> 01:50:36,880  
log on to get the tea.com shop get

2703  
01:50:39,830 --> 01:50:37,520  
balanced

2704  
01:50:40,550 --> 01:50:39,840  
then learn some cool tips at health

2705  
01:50:42,550 --> 01:50:40,560  
matters

2706  
01:50:44,950 --> 01:50:42,560  
now you'll be glad you did that's get

2707  
01:50:46,950 --> 01:50:44,960  
the tea dot com

2708  
01:50:50,830 --> 01:50:46,960  
your contact for current news and

2709  
01:50:54,229 --> 01:50:51,990  
kgraradio.com

2710  
01:50:55,430 --> 01:50:54,239  
is jimmy church of fade to black and i

2711  
01:50:58,550 --> 01:50:55,440  
only drink

2712  
01:50:59,270 --> 01:50:58,560  
fade to black blend coffee from river

2713  
01:51:03,589 --> 01:50:59,280

moon

2714

01:51:07,589 --> 01:51:03,599

banner at jimmychurchradio.com

2715

01:51:10,709 --> 01:51:07,599

promo code f2b blend

2716

01:51:18,830 --> 01:51:10,719

this is the only way forward this

2717

01:51:18,840 --> 01:51:22,070

kgraradio.com

2718

01:51:25,270 --> 01:51:23,910

when you're in the house for longer

2719

01:51:27,589 --> 01:51:25,280

periods of time

2720

01:51:29,350 --> 01:51:27,599

you can see them flying or running

2721

01:51:33,030 --> 01:51:29,360

across the floor

2722

01:51:34,390 --> 01:51:33,040

ooh yuck they're unhealthy gross and

2723

01:51:37,430 --> 01:51:34,400

disgusting

2724

01:51:39,830 --> 01:51:37,440

bugs i loathe bugs we

2725

01:51:40,870 --> 01:51:39,840

keep a clean home but occasionally bugs

2726

01:51:43,589 --> 01:51:40,880

show up

2727

01:51:44,629 --> 01:51:43,599

well i found something that is tougher

2728

01:51:48,070 --> 01:51:44,639

than bugs

2729

01:51:51,830 --> 01:51:48,080

orange guard on contact it kills hidden

2730

01:51:54,550 --> 01:51:51,840

bugs including ants roaches and fleas

2731

01:51:55,669 --> 01:51:54,560

plus orange guard is a residual

2732

01:51:57,750 --> 01:51:55,679

repellent

2733

01:52:00,390 --> 01:51:57,760

all of the ingredients of orange guard

2734

01:52:01,589 --> 01:52:00,400

are on the fda generally recognized as

2735

01:52:03,910 --> 01:52:01,599

safe list

2736

01:52:04,629 --> 01:52:03,920

orange guard may be used around food

2737

01:52:07,990 --> 01:52:04,639

humans

2738

01:52:09,669 --> 01:52:08,000

and pets it comes with a 30 day money

2739

01:52:12,270 --> 01:52:09,679

back guarantee

2740

01:52:13,750 --> 01:52:12,280

orange guard available at

2741

01:52:17,430 --> 01:52:13,760

orangeguard.com

2742

01:52:20,709 --> 01:52:17,440

whole foods and ace hardware

2743

01:52:21,510 --> 01:52:20,719

gold loves chaos uncertainty and

2744

01:52:23,669 --> 01:52:21,520

disarray

2745

01:52:24,870 --> 01:52:23,679

history shows us what gold does when

2746

01:52:26,390 --> 01:52:24,880

people aren't sure

2747

01:52:28,070 --> 01:52:26,400

aren't sure about the government the

2748

01:52:30,870 --> 01:52:28,080

stock market their jobs

2749

01:52:31,510 --> 01:52:30,880

or their retirement savings our national

2750

01:52:33,510 --> 01:52:31,520

debt is

2751  
01:52:35,430 --> 01:52:33,520  
skyrocketing gold and other precious

2752  
01:52:36,149 --> 01:52:35,440  
metals are a defense measure against

2753  
01:52:38,790 --> 01:52:36,159  
inflation

2754  
01:52:40,629 --> 01:52:38,800  
and a stock market that might take years

2755  
01:52:42,790 --> 01:52:40,639  
to recover so what can you do

2756  
01:52:44,870 --> 01:52:42,800  
right now to protect yourself call

2757  
01:52:46,950 --> 01:52:44,880  
united gold group we offer gold and

2758  
01:52:48,470 --> 01:52:46,960  
other precious metals delivered securely

2759  
01:52:50,070 --> 01:52:48,480  
within 72

2760  
01:52:52,149 --> 01:52:50,080  
hours are you worried about the stock

2761  
01:52:52,629 --> 01:52:52,159  
market we can also help you set up a

2762  
01:52:56,149 --> 01:52:52,639  
real

2763  
01:52:58,870 --> 01:52:56,159

gold or silver ira or a 401k

2764

01:53:00,470 --> 01:52:58,880

safe and secure united gold group makes

2765

01:53:02,390 --> 01:53:00,480

gold ownership affordable

2766

01:53:04,709 --> 01:53:02,400

call now and get up to twenty five

2767

01:53:06,470 --> 01:53:04,719

hundred dollars in free gold or silver

2768

01:53:10,950 --> 01:53:06,480

with a qualified ira

2769

01:53:24,830 --> 01:53:13,030

eight hundred 800-753-8534 five three

2770

01:53:29,750 --> 01:53:26,629

unitedgoldgroup.com

2771

01:53:33,589 --> 01:53:29,760

you want to know a secret i love

2772

01:53:35,669 --> 01:53:33,599

ponies i really love ponies i'm serious

2773

01:53:37,189 --> 01:53:35,679

i couldn't stay sane without pawn needs

2774

01:53:40,390 --> 01:53:37,199

to brush

2775

01:53:41,350 --> 01:53:40,400

why fade to black because you never got

2776

01:53:45,750 --> 01:53:41,360

that pony

2777

01:53:50,229 --> 01:53:47,910

this is fade to black with jimmy church

2778

01:54:07,750 --> 01:53:50,239

on the game changer radio network

2779

01:54:11,430 --> 01:54:09,189

all right welcome back fade to black i'm

2780

01:54:13,990 --> 01:54:11,440

your host jimmy church tonight professor

2781

01:54:15,830 --> 01:54:14,000

javi loeb from harvard taking me to

2782

01:54:17,030 --> 01:54:15,840

school i'm letting everybody know pop

2783

01:54:20,310 --> 01:54:17,040

quiz tonight

2784

01:54:24,229 --> 01:54:20,320

pop quiz now uh professor lowe

2785

01:54:27,270 --> 01:54:24,239

we just started to jump into the big rip

2786

01:54:29,030 --> 01:54:27,280

when we look at the scales of time

2787

01:54:31,350 --> 01:54:29,040

and these the numbers of time that we

2788

01:54:34,390 --> 01:54:31,360

were talking about are it's a big

2789

01:54:34,870 --> 01:54:34,400

it's a really big number of time but the

2790

01:54:38,709 --> 01:54:34,880

big

2791

01:54:41,510 --> 01:54:38,719

rip conversation is actually

2792

01:54:42,950 --> 01:54:41,520

a shorter amount of time where this

2793

01:54:45,109 --> 01:54:42,960

could happen

2794

01:54:46,390 --> 01:54:45,119

in well in the cosmic scale like

2795

01:54:48,709 --> 01:54:46,400

tomorrow

2796

01:54:49,750 --> 01:54:48,719

this is this is something much more

2797

01:54:51,430 --> 01:54:49,760

immediate

2798

01:54:53,990 --> 01:54:51,440

and that the big rip and everything

2799

01:54:56,470 --> 01:54:54,000

could uh fall apart we're talking about

2800

01:54:58,550 --> 01:54:56,480

in in 100 billion years 50 billion years

2801  
01:55:00,550 --> 01:54:58,560  
has been suggested

2802  
01:55:01,990 --> 01:55:00,560  
yeah but that's i should say that's a

2803  
01:55:05,109 --> 01:55:02,000  
speculation that

2804  
01:55:07,990 --> 01:55:05,119  
maybe the vacuum itself will blow up and

2805  
01:55:09,109 --> 01:55:08,000  
rip everything apart and uh i don't

2806  
01:55:11,189 --> 01:55:09,119  
think we should lose

2807  
01:55:13,750 --> 01:55:11,199  
sleep over that because there is no

2808  
01:55:15,910 --> 01:55:13,760  
evidence that this is indeed

2809  
01:55:17,430 --> 01:55:15,920  
a viable possibility i mean the most

2810  
01:55:20,870 --> 01:55:17,440  
likely possibility that

2811  
01:55:21,589 --> 01:55:20,880  
everyone thinks about is that the vacuum

2812  
01:55:24,629 --> 01:55:21,599  
has some

2813  
01:55:27,510 --> 01:55:24,639

fixed energy or

2814

01:55:29,189 --> 01:55:27,520

mass per unit volume and it's just a

2815

01:55:31,109 --> 01:55:29,199

constant of nature you know just like

2816

01:55:33,109 --> 01:55:31,119

the mass of the electron there is

2817

01:55:35,109 --> 01:55:33,119

a constant that is the vacuum mass

2818

01:55:38,229 --> 01:55:35,119

density and in that case

2819

01:55:39,750 --> 01:55:38,239

no big grip we will continue uh

2820

01:55:41,510 --> 01:55:39,760

i mean the universe will continue to

2821

01:55:43,750 --> 01:55:41,520

expand we will be left

2822

01:55:45,910 --> 01:55:43,760

in the dark because there will be

2823

01:55:47,270 --> 01:55:45,920

nothing around us except for our own

2824

01:55:49,430 --> 01:55:47,280

galaxy

2825

01:55:52,709 --> 01:55:49,440

and if you want to get ripped apart you

2826  
01:55:56,629 --> 01:55:52,719  
can still do it by entering a black hole

2827  
01:56:00,790 --> 01:55:56,639  
now um okay

2828  
01:56:03,910 --> 01:56:00,800  
this is where i want to take things if

2829  
01:56:05,430 --> 01:56:03,920  
we have about 10 billion years from

2830  
01:56:09,030 --> 01:56:05,440  
beginning to end with our

2831  
01:56:12,470 --> 01:56:09,040  
son and we're 5 billion years

2832  
01:56:15,589 --> 01:56:12,480  
into it and if we have theoretically 5

2833  
01:56:17,589 --> 01:56:15,599  
billion years left at the end of five

2834  
01:56:20,470 --> 01:56:17,599  
billion years no matter what

2835  
01:56:21,990 --> 01:56:20,480  
we can't be here right that's it we we

2836  
01:56:24,070 --> 01:56:22,000  
can't be on planet earth but if

2837  
01:56:26,709 --> 01:56:24,080  
it's actually sheltered that's where i'm

2838  
01:56:30,350 --> 01:56:26,719

going but that's the extreme right

2839

01:56:33,270 --> 01:56:30,360

but it's actually shorter the the

2840

01:56:36,070 --> 01:56:33,280

instability of things that are

2841

01:56:36,790 --> 01:56:36,080

going to start to happen with the core

2842

01:56:38,870 --> 01:56:36,800

at our

2843

01:56:39,990 --> 01:56:38,880

at the center of our sun that

2844

01:56:42,390 --> 01:56:40,000

instability

2845

01:56:43,430 --> 01:56:42,400

is going to make things really bad here

2846

01:56:46,550 --> 01:56:43,440

on earth

2847

01:56:49,669 --> 01:56:46,560

way before that five billion years is up

2848

01:56:53,270 --> 01:56:49,679

right there are some calculations that

2849

01:56:57,270 --> 01:56:53,280

the sun will start expanding long before

2850

01:56:59,109 --> 01:56:57,280

it will die and within a billion years

2851  
01:57:01,990 --> 01:56:59,119  
just one billion years

2852  
01:57:02,790 --> 01:57:02,000  
it will boil off the oceans on earth

2853  
01:57:05,990 --> 01:57:02,800  
because of

2854  
01:57:06,709 --> 01:57:06,000  
a greenhouse effect and just like what

2855  
01:57:11,030 --> 01:57:06,719  
happened on

2856  
01:57:14,390 --> 01:57:11,040  
on venus you know we know that currently

2857  
01:57:16,390 --> 01:57:14,400  
the ground on venus is too hot for

2858  
01:57:18,870 --> 01:57:16,400  
liquid water to be there

2859  
01:57:19,669 --> 01:57:18,880  
and it went through a greenhouse effect

2860  
01:57:23,589 --> 01:57:19,679  
and

2861  
01:57:26,629 --> 01:57:23,599  
earth we would lose

2862  
01:57:28,629 --> 01:57:26,639  
all the liquid water on the surface and

2863  
01:57:29,669 --> 01:57:28,639

then life as we know it would not be

2864

01:57:32,070 --> 01:57:29,679

able to

2865

01:57:32,950 --> 01:57:32,080

continue and we will have to go

2866

01:57:35,030 --> 01:57:32,960

elsewhere

2867

01:57:36,070 --> 01:57:35,040

but of course it could happen even

2868

01:57:39,510 --> 01:57:36,080

earlier if

2869

01:57:40,149 --> 01:57:39,520

a big asteroid a big rock will hit the

2870

01:57:42,709 --> 01:57:40,159

earth

2871

01:57:43,750 --> 01:57:42,719

just like it happened 66 million years

2872

01:57:46,070 --> 01:57:43,760

ago when

2873

01:57:47,750 --> 01:57:46,080

the dinosaurs were very happy they were

2874

01:57:49,430 --> 01:57:47,760

proud of themselves and

2875

01:57:51,350 --> 01:57:49,440

they were dominating their their

2876

01:57:53,669 --> 01:57:51,360

environment they ate grass and

2877

01:57:56,229 --> 01:57:53,679

didn't even check the sky and then a

2878

01:57:58,790 --> 01:57:56,239

giant rock the size of manhattan island

2879

01:58:01,270 --> 01:57:58,800

showed up and when it hit the ground

2880

01:58:03,990 --> 01:58:01,280

their ego trip was tarnished

2881

01:58:05,589 --> 01:58:04,000

abruptly and uh three quarters of all

2882

01:58:08,790 --> 01:58:05,599

life forms on earth

2883

01:58:11,109 --> 01:58:08,800

were went extinct and

2884

01:58:12,870 --> 01:58:11,119

we came to exist after that but it could

2885

01:58:15,270 --> 01:58:12,880

happen again in the future and

2886

01:58:17,270 --> 01:58:15,280

there are other risks you know that

2887

01:58:17,910 --> 01:58:17,280

there could be self-inflicted wounds

2888

01:58:22,070 --> 01:58:17,920

that we

2889

01:58:24,950 --> 01:58:22,080

in a way that

2890

01:58:25,910 --> 01:58:24,960

will kill us and therefore my point is

2891

01:58:28,950 --> 01:58:25,920

simple we

2892

01:58:31,270 --> 01:58:28,960

we really need not to keep all our eggs

2893

01:58:33,589 --> 01:58:31,280

in one basket we need to distribute

2894

01:58:34,709 --> 01:58:33,599

everything we care about to other

2895

01:58:36,709 --> 01:58:34,719

locations so that

2896

01:58:38,310 --> 01:58:36,719

a single point catastrophe would not

2897

01:58:40,229 --> 01:58:38,320

destroy everything

2898

01:58:41,669 --> 01:58:40,239

and the way to do that is by going to

2899

01:58:45,350 --> 01:58:41,679

space

2900

01:58:50,870 --> 01:58:48,149

be comforted in knowing that that is our

2901

01:58:53,830 --> 01:58:50,880

future we don't have a choice

2902

01:58:54,790 --> 01:58:53,840

that we should start to think about this

2903

01:58:59,589 --> 01:58:54,800

now

2904

01:59:02,950 --> 01:58:59,599

the discussion

2905

01:59:05,270 --> 01:59:02,960

that we need to have now not later

2906

01:59:06,870 --> 01:59:05,280

definitely i do think because we don't

2907

01:59:08,870 --> 01:59:06,880

know how much longer

2908

01:59:11,030 --> 01:59:08,880

our technological civilization would

2909

01:59:14,950 --> 01:59:11,040

last i was asked that

2910

01:59:17,350 --> 01:59:14,960

at a forum of harvard alumni

2911

01:59:19,189 --> 01:59:17,360

a few weeks ago they asked me how much

2912

01:59:21,109 --> 01:59:19,199

longer do i think that our

2913

01:59:22,550 --> 01:59:21,119

technological civilization would last

2914

01:59:25,750 --> 01:59:22,560

and i said you know

2915

01:59:26,870 --> 01:59:25,760

uh if you look at yourself as a human uh

2916

01:59:28,709 --> 01:59:26,880

you can ask

2917

01:59:31,350 --> 01:59:28,719

what's the likelihood that you're on

2918

01:59:34,229 --> 01:59:31,360

your first day after being born

2919

01:59:35,589 --> 01:59:34,239

and the likelihood for that is uh tens

2920

01:59:38,070 --> 01:59:35,599

of thousands of times

2921

01:59:39,189 --> 01:59:38,080

smaller than finding yourself as an

2922

01:59:40,950 --> 01:59:39,199

adult

2923

01:59:42,950 --> 01:59:40,960

the reason is simple there are tens of

2924

01:59:43,830 --> 01:59:42,960

thousands of days in the life of an

2925

01:59:46,550 --> 01:59:43,840

adult

2926

01:59:47,030 --> 01:59:46,560

compared to the first day after being

2927

01:59:49,350 --> 01:59:47,040

born

2928

01:59:51,189 --> 01:59:49,360

you know so so that if you just choose a

2929

01:59:53,189 --> 01:59:51,199

random day

2930

01:59:54,310 --> 01:59:53,199

you are most likely to find yourself as

2931

01:59:58,390 --> 01:59:54,320

an adult

2932

01:59:59,830 --> 01:59:58,400

now um we find ourselves today a hundred

2933

02:00:02,229 --> 01:59:59,840

years after the

2934

02:00:05,270 --> 02:00:02,239

technological revolution you know so our

2935

02:00:08,229 --> 02:00:05,280

technologies existed for about a century

2936

02:00:09,030 --> 02:00:08,239

and you can ask well it's most likely

2937

02:00:11,589 --> 02:00:09,040

that

2938

02:00:13,030 --> 02:00:11,599

you know we are in our adulthood as a

2939

02:00:15,430 --> 02:00:13,040

technological civilization

2940

02:00:16,870 --> 02:00:15,440

what does that mean uh that means that

2941

02:00:19,750 --> 02:00:16,880

we maybe have

2942

02:00:20,950 --> 02:00:19,760

a few centuries left it's very unlikely

2943

02:00:23,189 --> 02:00:20,960

that we will

2944

02:00:25,350 --> 02:00:23,199

survive for millions of years because

2945

02:00:29,189 --> 02:00:25,360

that's tens of thousands of times

2946

02:00:31,270 --> 02:00:29,199

longer than our our lifetime as a

2947

02:00:33,030 --> 02:00:31,280

technological civilization so

2948

02:00:34,390 --> 02:00:33,040

for the same reason that it's unlikely

2949

02:00:37,430 --> 02:00:34,400

to find yourself as an

2950

02:00:38,470 --> 02:00:37,440

infant uh it's also unlikely for us to

2951  
02:00:41,109 --> 02:00:38,480  
be

2952  
02:00:41,669 --> 02:00:41,119  
uh to live for millions of years from

2953  
02:00:43,350 --> 02:00:41,679  
now and

2954  
02:00:44,709 --> 02:00:43,360  
if that's the case we don't have a lot

2955  
02:00:47,189 --> 02:00:44,719  
of time you know we

2956  
02:00:49,189 --> 02:00:47,199  
uh and i believe in the human spirit i

2957  
02:00:52,070 --> 02:00:49,199  
believe that we can

2958  
02:00:52,629 --> 02:00:52,080  
outlast any statistical verdict that we

2959  
02:00:58,709 --> 02:00:52,639  
can be

2960  
02:00:59,510 --> 02:00:58,719  
wing of the distribution statistically

2961  
02:01:02,709 --> 02:00:59,520  
and

2962  
02:01:05,270 --> 02:01:02,719  
we can uh save ourselves uh by

2963  
02:01:05,990 --> 02:01:05,280

the human spirit and go elsewhere you

2964

02:01:09,189 --> 02:01:06,000

know and

2965

02:01:09,589 --> 02:01:09,199

um and we should start thinking about it

2966

02:01:12,629 --> 02:01:09,599

now

2967

02:01:13,990 --> 02:01:12,639

and i think space is an inspiration to

2968

02:01:16,310 --> 02:01:14,000

many people but

2969

02:01:18,390 --> 02:01:16,320

uh other people argue that we should

2970

02:01:19,910 --> 02:01:18,400

worry all the time about what happens

2971

02:01:22,629 --> 02:01:19,920

here on earth

2972

02:01:23,189 --> 02:01:22,639

and then i i'm always reminded by what

2973

02:01:25,990 --> 02:01:23,199

oscar

2974

02:01:26,709 --> 02:01:26,000

wilde said he said all of us are in the

2975

02:01:29,430 --> 02:01:26,719

gutter

2976

02:01:30,629 --> 02:01:29,440

but some of us are thinking about this

2977

02:01:34,229 --> 02:01:30,639

the stars

2978

02:01:35,990 --> 02:01:34,239

now if we are able to

2979

02:01:37,270 --> 02:01:36,000

like you said in the last hundred years

2980

02:01:41,109 --> 02:01:37,280

right in this

2981

02:01:44,149 --> 02:01:41,119

now we're in the technical side science

2982

02:01:46,390 --> 02:01:44,159

we can say 300 400 years old

2983

02:01:48,070 --> 02:01:46,400

technology that's a hundred years old

2984

02:01:51,910 --> 02:01:48,080

that's it

2985

02:01:53,669 --> 02:01:51,920

et any etc any extraterrestrial

2986

02:01:56,390 --> 02:01:53,679

civilization out there

2987

02:01:58,550 --> 02:01:56,400

has to have gone through what we are

2988

02:02:02,390 --> 02:01:58,560

going through now

2989

02:02:05,910 --> 02:02:02,400

and they have probably left their planet

2990

02:02:08,310 --> 02:02:05,920

because they have a star that became

2991

02:02:10,470 --> 02:02:08,320

unstable as well right i mean there

2992

02:02:13,910 --> 02:02:10,480

isn't it's a numbers game

2993

02:02:18,790 --> 02:02:13,920

right now the question is whether

2994

02:02:21,910 --> 02:02:18,800

living creatures uh are indeed the

2995

02:02:24,550 --> 02:02:21,920

are able to survive very long or maybe

2996

02:02:27,510 --> 02:02:24,560

they create equipment that outlasts

2997

02:02:28,950 --> 02:02:27,520

them and that would mean you know most

2998

02:02:32,470 --> 02:02:28,960

likely we will find the

2999

02:02:34,870 --> 02:02:32,480

equipment in space that

3000

02:02:36,870 --> 02:02:34,880

represents the relics from those living

3001  
02:02:39,189 --> 02:02:36,880  
creatures that existed a long time ago

3002  
02:02:40,709 --> 02:02:39,199  
just like we sent voyager 1 voyager 2

3003  
02:02:42,229 --> 02:02:40,719  
new horizons into space

3004  
02:02:43,750 --> 02:02:42,239  
you know we would find equipment out

3005  
02:02:47,430 --> 02:02:43,760  
there uh and

3006  
02:02:49,510 --> 02:02:47,440  
actually if you think about it equipment

3007  
02:02:51,430 --> 02:02:49,520  
is much more likely to survive the long

3008  
02:02:54,870 --> 02:02:51,440  
journeys between stars

3009  
02:02:56,870 --> 02:02:54,880  
and however i should say

3010  
02:02:58,470 --> 02:02:56,880  
i wrote a scientific american essay

3011  
02:03:01,430 --> 02:02:58,480  
talking about

3012  
02:03:03,430 --> 02:03:01,440  
what i call a norix spaceship uh you

3013  
02:03:05,030 --> 02:03:03,440

know there is this biblical story in the

3014

02:03:08,470 --> 02:03:05,040

old testament about noah

3015

02:03:11,589 --> 02:03:08,480

that was worried about the great flood

3016

02:03:12,709 --> 02:03:11,599

and they wanted to save the animals from

3017

02:03:15,830 --> 02:03:12,719

that flood and

3018

02:03:16,629 --> 02:03:15,840

built an ark it's called noah's ark where

3019

02:03:19,830 --> 02:03:16,639

he put

3020

02:03:23,510 --> 02:03:19,840

animals and save them we can do the same

3021

02:03:26,149 --> 02:03:23,520

by not placing you know elephants and

3022

02:03:28,950 --> 02:03:26,159

whales and birds on on a spacecraft but

3023

02:03:33,350 --> 02:03:31,589

keeping storing all of the information

3024

02:03:35,510 --> 02:03:33,360

about their dna

3025

02:03:38,070 --> 02:03:35,520

on a big computer system that we can put

3026

02:03:40,629 --> 02:03:38,080

on a cubesat a very small spacecraft

3027

02:03:42,709 --> 02:03:40,639

and if we have if we understand how to

3028

02:03:45,750 --> 02:03:42,719

create synthetic life

3029

02:03:48,390 --> 02:03:45,760

we can send a 3d printer together with

3030

02:03:49,109 --> 02:03:48,400

this computer system to other planets

3031

02:03:52,069 --> 02:03:49,119

and

3032

02:03:52,709 --> 02:03:52,079

recreate the synthetically the life that

3033

02:03:54,950 --> 02:03:52,719

we have

3034

02:03:57,430 --> 02:03:54,960

here on earth instead of bringing it

3035

02:03:59,109 --> 02:03:57,440

along just creating it because

3036

02:04:01,350 --> 02:03:59,119

you know if we understand how to make

3037

02:04:02,069 --> 02:04:01,360

synthetic life we should be able to do

3038

02:04:09,270 --> 02:04:02,079

it

3039

02:04:12,470 --> 02:04:09,280

that same scenario playing out here

3040

02:04:14,149 --> 02:04:12,480

on earth three billion years ago well

3041

02:04:16,310 --> 02:04:14,159

it's possible

3042

02:04:19,109 --> 02:04:16,320

we don't know what predated us i should

3043

02:04:21,189 --> 02:04:19,119

say i have a colleague at harvard that

3044

02:04:22,709 --> 02:04:21,199

is trying to produce synthetic life in

3045

02:04:25,270 --> 02:04:22,719

the laboratory his name is

3046

02:04:27,669 --> 02:04:25,280

jack shostak and he already won one

3047

02:04:30,870 --> 02:04:27,679

nobel prize he's working on the second

3048

02:04:33,510 --> 02:04:30,880

and he's getting close to it and he said

3049

02:04:34,629 --> 02:04:33,520

to me that a decade ago when he started

3050

02:04:36,790 --> 02:04:34,639

the project

3051

02:04:37,990 --> 02:04:36,800

he thought that it's very difficult it's

3052

02:04:41,350 --> 02:04:38,000

difficult to understand how

3053

02:04:42,870 --> 02:04:41,360

life started on earth out of random

3054

02:04:45,669 --> 02:04:42,880

processes of chemicals

3055

02:04:47,109 --> 02:04:45,679

coming together but now after working on

3056

02:04:49,830 --> 02:04:47,119

it for a decade

3057

02:04:51,669 --> 02:04:49,840

it looks to him like it's quite possible

3058

02:04:54,709 --> 02:04:51,679

that it happened at random

3059

02:04:57,109 --> 02:04:54,719

because he he finds that

3060

02:04:57,750 --> 02:04:57,119

he can make he's getting close to making

3061

02:05:01,350 --> 02:04:57,760

life

3062

02:05:03,589 --> 02:05:01,360

in the laboratory and uh so it really is

3063

02:05:07,189 --> 02:05:03,599

an interesting question uh

3064

02:05:09,270 --> 02:05:07,199

whether indeed life came out naturally

3065

02:05:09,990 --> 02:05:09,280

out of random processes or maybe it was

3066

02:05:12,950 --> 02:05:10,000

planted

3067

02:05:14,390 --> 02:05:12,960

on on on earth we really don't know the

3068

02:05:17,030 --> 02:05:14,400

answer

3069

02:05:17,589 --> 02:05:17,040

would it surprise you i mean would you

3070

02:05:20,229 --> 02:05:17,599

just sit

3071

02:05:20,790 --> 02:05:20,239

back and go well i didn't think of that

3072

02:05:23,350 --> 02:05:20,800

well

3073

02:05:24,790 --> 02:05:23,360

no it will not surprise me but then the

3074

02:05:27,589 --> 02:05:24,800

question arises okay

3075

02:05:29,430 --> 02:05:27,599

suppose life was planted on earth and by

3076

02:05:31,430 --> 02:05:29,440

the way that's called the panspermia

3077

02:05:34,709 --> 02:05:31,440

when life is being

3078

02:05:36,470 --> 02:05:34,719

brought to a planet from another place

3079

02:05:38,229 --> 02:05:36,480

uh and and you know it's quite possible

3080

02:05:39,109 --> 02:05:38,239

that it came from mars for example

3081

02:05:41,510 --> 02:05:39,119

because life

3082

02:05:44,069 --> 02:05:41,520

could have existed on early mars uh the

3083

02:05:47,350 --> 02:05:44,079

perseverance rover may find it

3084

02:05:49,430 --> 02:05:47,360

um and then it was brought to earth by

3085

02:05:50,629 --> 02:05:49,440

rocks that carried it that that's quite

3086

02:05:52,229 --> 02:05:50,639

a possible scenario

3087

02:05:54,550 --> 02:05:52,239

but you you should always ask the

3088

02:05:55,189 --> 02:05:54,560

question okay it came from another place

3089

02:05:57,510 --> 02:05:55,199

but

3090

02:05:59,109 --> 02:05:57,520

how did it form there right so it

3091

02:06:01,030 --> 02:05:59,119

doesn't alleviate the

3092

02:06:03,910 --> 02:06:01,040

the issue of how life started it just

3093

02:06:06,149 --> 02:06:03,920

says well if it started at one point

3094

02:06:07,430 --> 02:06:06,159

you know it could have then spread to

3095

02:06:10,950 --> 02:06:07,440

many other places

3096

02:06:12,470 --> 02:06:10,960

when uh it it's uh something that i

3097

02:06:13,270 --> 02:06:12,480

discussed a couple of years ago on the

3098

02:06:15,589 --> 02:06:13,280

show

3099

02:06:17,669 --> 02:06:15,599

when meteorites have been discovered

3100

02:06:20,310 --> 02:06:17,679

with fundamental sugars

3101

02:06:22,629 --> 02:06:20,320

you know that are for the creation of

3102

02:06:25,109 --> 02:06:22,639

amino acids therefore

3103

02:06:27,510 --> 02:06:25,119

you know rna therefore you know these

3104

02:06:31,430 --> 02:06:27,520

things are suggested right there

3105

02:06:34,709 --> 02:06:31,440

that it's surviving the vacuum of space

3106

02:06:35,350 --> 02:06:34,719

that's that's fascinating yeah and and

3107

02:06:37,589 --> 02:06:35,360

even

3108

02:06:38,550 --> 02:06:37,599

creatures that are called the todody

3109

02:06:42,149 --> 02:06:38,560

grades

3110

02:06:45,510 --> 02:06:42,159

you know they are very resilient uh and

3111

02:06:49,109 --> 02:06:45,520

they were taken uh for a week into space

3112

02:06:50,790 --> 02:06:49,119

uh and dehydrated being exposed to

3113

02:06:54,069 --> 02:06:50,800

cosmic rays

3114

02:06:56,709 --> 02:06:54,079  
to x-rays from the sun and uh

3115

02:06:58,390 --> 02:06:56,719  
when they were brought back to earth a

3116

02:06:59,030 --> 02:06:58,400  
significant fraction of them were able

3117

02:07:02,149 --> 02:06:59,040  
to produce

3118

02:07:03,030 --> 02:07:02,159  
healthy embryos and uh so you can

3119

02:07:06,069 --> 02:07:03,040  
imagine

3120

02:07:08,870 --> 02:07:06,079  
a microbes or surviving for

3121

02:07:09,430 --> 02:07:08,880  
maybe up to a million years in space and

3122

02:07:12,870 --> 02:07:09,440  
and

3123

02:07:13,750 --> 02:07:12,880  
maybe transferring life from one planet

3124

02:07:15,589 --> 02:07:13,760  
to another that

3125

02:07:17,750 --> 02:07:15,599  
that's quite possible yeah the

3126

02:07:20,550 --> 02:07:17,760

tardigrades laughed it off

3127

02:07:23,030 --> 02:07:20,560

they did they laughed it off is that the

3128

02:07:27,030 --> 02:07:23,040

best you got

3129

02:07:29,910 --> 02:07:27,040

handsome little devils too

3130

02:07:30,550 --> 02:07:29,920

uh it's interesting to study them

3131

02:07:33,109 --> 02:07:30,560

because

3132

02:07:34,550 --> 02:07:33,119

their dna repairs itself when it's

3133

02:07:37,669 --> 02:07:34,560

damaged and

3134

02:07:40,310 --> 02:07:37,679

that could help us cure diseases

3135

02:07:41,830 --> 02:07:40,320

for humans you know make humans that

3136

02:07:45,189 --> 02:07:41,840

survive

3137

02:07:47,430 --> 02:07:45,199

much longer than we can

3138

02:07:48,550 --> 02:07:47,440

if you manage to understand how dna can

3139

02:07:51,669 --> 02:07:48,560

repair itself

3140

02:07:55,510 --> 02:07:51,679

now are we suggesting that

3141

02:07:59,910 --> 02:07:55,520

in in the next few hundred years

3142

02:08:03,270 --> 02:07:59,920

that we have to build ships

3143

02:08:03,910 --> 02:08:03,280

that will survive not only thousands of

3144

02:08:06,950 --> 02:08:03,920

years but

3145

02:08:09,990 --> 02:08:06,960

generational starships and just

3146

02:08:12,790 --> 02:08:10,000

head off in a direction and and that's

3147

02:08:13,270 --> 02:08:12,800

that's the best plan well that's one

3148

02:08:18,310 --> 02:08:13,280

plan

3149

02:08:22,069 --> 02:08:18,320

direction another is to

3150

02:08:23,990 --> 02:08:22,079

uh go to targets to destinations like

3151  
02:08:26,470 --> 02:08:24,000  
first go to the moon and then learn how

3152  
02:08:28,390 --> 02:08:26,480  
to survive there and then go to mars

3153  
02:08:30,870 --> 02:08:28,400  
learn how to survive there and then go

3154  
02:08:33,189 --> 02:08:30,880  
to a planet outside the solar system

3155  
02:08:33,990 --> 02:08:33,199  
next to another star maybe the nearest

3156  
02:08:36,229 --> 02:08:34,000  
star

3157  
02:08:38,550 --> 02:08:36,239  
it has a habitable planet the proxima

3158  
02:08:41,830 --> 02:08:38,560  
centauri has proxima b

3159  
02:08:44,470 --> 02:08:41,840  
and we can move on from there now

3160  
02:08:46,310 --> 02:08:44,480  
as i said we don't need to send humans

3161  
02:08:48,870 --> 02:08:46,320  
to those places

3162  
02:08:50,629 --> 02:08:48,880  
we can send equipment if we understand

3163  
02:08:53,589 --> 02:08:50,639

how to produce life

3164

02:08:54,870 --> 02:08:53,599

out of the raw materials there i should

3165

02:08:56,470 --> 02:08:54,880

say that um

3166

02:08:58,229 --> 02:08:56,480

you know some of these ideas i

3167

02:09:01,910 --> 02:08:58,239

summarized in my

3168

02:09:05,270 --> 02:09:01,920

latest book extraterrestrial uh

3169

02:09:07,910 --> 02:09:05,280

which came out a few months ago but uh

3170

02:09:09,750 --> 02:09:07,920

i'm also about to have a textbook of

3171

02:09:12,310 --> 02:09:09,760

more than a thousand pages long

3172

02:09:13,510 --> 02:09:12,320

with that written with my former postdoc

3173

02:09:16,310 --> 02:09:13,520

manas willingham

3174

02:09:19,030 --> 02:09:16,320

that will come out by by harvard

3175

02:09:19,430 --> 02:09:19,040

university press in at the end of june

3176

02:09:23,189 --> 02:09:19,440

and

3177

02:09:24,229 --> 02:09:23,199

it basically uh surveys uh this entire

3178

02:09:26,790 --> 02:09:24,239

subject of

3179

02:09:28,069 --> 02:09:26,800

how to search for life both microbial

3180

02:09:31,270 --> 02:09:28,079

and technological

3181

02:09:31,990 --> 02:09:31,280

and also how life could have moved from

3182

02:09:35,030 --> 02:09:32,000

one place to

3183

02:09:36,550 --> 02:09:35,040

another have you been following uh in

3184

02:09:38,069 --> 02:09:36,560

the short time we have left we have

3185

02:09:41,109 --> 02:09:38,079

about 10 minutes left

3186

02:09:45,430 --> 02:09:41,119

have you been following

3187

02:09:47,589 --> 02:09:45,440

the ufo uap

3188

02:09:48,629 --> 02:09:47,599

news in the media uh between the

3189

02:09:50,870 --> 02:09:48,639

pentagon

3190

02:09:52,390 --> 02:09:50,880

the senate intelligence committee this

3191

02:09:55,510 --> 02:09:52,400

report that is supposed to be

3192

02:09:56,709 --> 02:09:55,520

written up uh by the dia and presented

3193

02:09:59,669 --> 02:09:56,719

to marco rubio

3194

02:10:01,510 --> 02:09:59,679

sometime next month in june about the

3195

02:10:03,430 --> 02:10:01,520

phenomenon that's going on with

3196

02:10:05,669 --> 02:10:03,440

you know our military forces and things

3197

02:10:08,069 --> 02:10:05,679

that have been captured on video and

3198

02:10:10,629 --> 02:10:08,079

and military personnel testifying about

3199

02:10:12,950 --> 02:10:10,639

what has been happening in the skies

3200

02:10:14,149 --> 02:10:12,960

which all of this would suggest an

3201

02:10:17,669 --> 02:10:14,159  
extraterrestrial

3202

02:10:21,030 --> 02:10:17,679  
component to it well in fact the

3203

02:10:23,350 --> 02:10:21,040  
op ed the editor of the hill uh

3204

02:10:24,149 --> 02:10:23,360  
asked me a couple of days ago to write

3205

02:10:26,629 --> 02:10:24,159  
an op-ed

3206

02:10:27,510 --> 02:10:26,639  
on this subject and i invite you to

3207

02:10:30,870 --> 02:10:27,520  
check it out

3208

02:10:32,870 --> 02:10:30,880  
um and my general point is you know it

3209

02:10:33,669 --> 02:10:32,880  
it's interesting to see what these

3210

02:10:35,669 --> 02:10:33,679  
reports

3211

02:10:37,430 --> 02:10:35,679  
from military personnel that you know

3212

02:10:39,669 --> 02:10:37,440  
are quite trustworthy

3213

02:10:41,910 --> 02:10:39,679

what they say but at the same time you

3214

02:10:43,830 --> 02:10:41,920

know these these people did not have the

3215

02:10:47,350 --> 02:10:43,840

best instrumentation so

3216

02:10:47,990 --> 02:10:47,360

my take is that we should use really the

3217

02:10:50,870 --> 02:10:48,000

best

3218

02:10:52,629 --> 02:10:50,880

state-of-the-art cameras and audio

3219

02:10:55,270 --> 02:10:52,639

sensors that we have

3220

02:10:56,149 --> 02:10:55,280

uh and deploy them at the same locations

3221

02:10:59,910 --> 02:10:56,159

and

3222

02:11:02,310 --> 02:10:59,920

make a scientific research

3223

02:11:04,229 --> 02:11:02,320

program out of this and figure out if

3224

02:11:05,669 --> 02:11:04,239

there is anything unusual because

3225

02:11:07,910 --> 02:11:05,679

you know science is about

3226

02:11:08,709 --> 02:11:07,920

reproducibility of results it's not

3227

02:11:11,750 --> 02:11:08,719

about

3228

02:11:15,430 --> 02:11:11,760

eyewitness testimonies we want to use

3229

02:11:18,470 --> 02:11:15,440

instruments that record the data with

3230

02:11:18,870 --> 02:11:18,480

uh the best precision we can and and see

3231

02:11:21,910 --> 02:11:18,880

that

3232

02:11:26,069 --> 02:11:21,920

reproduced and

3233

02:11:29,669 --> 02:11:26,079

it can be done we just need to

3234

02:11:29,990 --> 02:11:29,679

deploy those sensors and in an optimal

3235

02:11:32,709 --> 02:11:30,000

way

3236

02:11:34,790 --> 02:11:32,719

such that you know they they will tell

3237

02:11:39,030 --> 02:11:34,800

us if there is anything unusual

3238

02:11:41,589 --> 02:11:39,040

do you do you think that uh this report

3239

02:11:43,750 --> 02:11:41,599

if it does happen yeah you know it it

3240

02:11:45,109 --> 02:11:43,760

may not or may get delayed

3241

02:11:47,030 --> 02:11:45,119

but do you think that there would

3242

02:11:50,310 --> 02:11:47,040

actually be a mention

3243

02:11:51,750 --> 02:11:50,320

of e.t or little green men something not

3244

02:11:54,709 --> 02:11:51,760

of this earth

3245

02:11:57,430 --> 02:11:54,719

in a defense intelligence agency report

3246

02:11:58,950 --> 02:11:57,440

to the senate intelligence committee

3247

02:12:00,709 --> 02:11:58,960

well i think the interest of the

3248

02:12:03,750 --> 02:12:00,719

government in those

3249

02:12:04,629 --> 02:12:03,760

reports is is obvious and it was

3250

02:12:08,069 --> 02:12:04,639

originally

3251

02:12:11,109 --> 02:12:08,079

because of the possibility that

3252

02:12:13,109 --> 02:12:11,119

it may be technological equipment from

3253

02:12:15,189 --> 02:12:13,119

other nations spying on us

3254

02:12:17,830 --> 02:12:15,199

you see so it's a matter of national

3255

02:12:20,470 --> 02:12:17,840

security to figure out what these

3256

02:12:21,350 --> 02:12:20,480

reports are all about but once you

3257

02:12:26,069 --> 02:12:21,360

conclude

3258

02:12:28,550 --> 02:12:26,079

human-made technology that it

3259

02:12:29,350 --> 02:12:28,560

cannot be related to the chinese or the

3260

02:12:32,470 --> 02:12:29,360

russians

3261

02:12:35,830 --> 02:12:32,480

or someone else then

3262

02:12:38,709 --> 02:12:35,840

it's of less importance

3263

02:12:40,470 --> 02:12:38,719

in the national con context but it's of

3264

02:12:42,069 --> 02:12:40,480

bigger importance in the scientific

3265

02:12:45,030 --> 02:12:42,079

context and

3266

02:12:45,669 --> 02:12:45,040

for that i would say you know if indeed

3267

02:12:48,629 --> 02:12:45,679

there is

3268

02:12:49,270 --> 02:12:48,639

intriguing evidence to be released that

3269

02:12:51,589 --> 02:12:49,280

we should

3270

02:12:53,350 --> 02:12:51,599

try to reproduce that evidence with

3271

02:12:56,149 --> 02:12:53,360

scientific instruments and

3272

02:12:56,950 --> 02:12:56,159

try to see if we can identify anything

3273

02:13:00,069 --> 02:12:56,960

unusual

3274

02:13:02,870 --> 02:13:00,079

in the same locations and

3275

02:13:04,149 --> 02:13:02,880

that would be part of a scientific

3276

02:13:06,310 --> 02:13:04,159

expedition

3277

02:13:07,910 --> 02:13:06,320

you know that will be open to the public

3278

02:13:10,950 --> 02:13:07,920

not classified

3279

02:13:11,990 --> 02:13:10,960

and we should just check it out uh i

3280

02:13:15,109 --> 02:13:12,000

always bring this

3281

02:13:19,109 --> 02:13:15,119

example of you know the biblical story

3282

02:13:22,069 --> 02:13:19,119

from the old testament of abraham that

3283

02:13:23,990 --> 02:13:22,079

there is this story about abraham

3284

02:13:27,030 --> 02:13:24,000

hearing the voice of god and

3285

02:13:30,229 --> 02:13:27,040

telling him to sacrifice his only son

3286

02:13:31,589 --> 02:13:30,239

isaac and if abraham had a cell phone

3287

02:13:33,750 --> 02:13:31,599

with the voice memo

3288

02:13:35,750 --> 02:13:33,760

up he could have pressed the button and

3289

02:13:38,390 --> 02:13:35,760

recorded the voice of god and

3290

02:13:40,149 --> 02:13:38,400

then we would all believe the story but

3291

02:13:41,990 --> 02:13:40,159

he didn't have a cell phone so

3292

02:13:43,510 --> 02:13:42,000

we have to decide if we believe the

3293

02:13:46,470 --> 02:13:43,520

story or not

3294

02:13:48,310 --> 02:13:46,480

and the point is that having scientific

3295

02:13:51,430 --> 02:13:48,320

instruments

3296

02:13:52,629 --> 02:13:51,440

measuring things uh would make everyone

3297

02:13:53,669 --> 02:13:52,639

convinced that there is something

3298

02:13:56,149 --> 02:13:53,679

unusual so we

3299

02:13:57,430 --> 02:13:56,159

we just need to do that is the world

3300

02:14:00,870 --> 02:13:57,440

ready

3301  
02:14:01,550 --> 02:14:00,880  
and wait before you answer that your

3302  
02:14:03,669 --> 02:14:01,560  
book

3303  
02:14:05,350 --> 02:14:03,679  
extraterrestrial tremendous read

3304  
02:14:07,910 --> 02:14:05,360  
excellent read i've i've

3305  
02:14:09,910 --> 02:14:07,920  
read it eight or ten times now and

3306  
02:14:12,790 --> 02:14:09,920  
that's not an exaggeration

3307  
02:14:13,830 --> 02:14:12,800  
but that book went out into popular

3308  
02:14:17,109 --> 02:14:13,840  
culture

3309  
02:14:19,109 --> 02:14:17,119  
and was read around the world

3310  
02:14:20,950 --> 02:14:19,119  
you have to almost brace yourself with

3311  
02:14:21,990 --> 02:14:20,960  
the effect that that is going to have on

3312  
02:14:25,510 --> 02:14:22,000  
people

3313  
02:14:26,709 --> 02:14:25,520

right that omaha extraterrestrial

3314

02:14:29,030 --> 02:14:26,719

something out of this

3315

02:14:31,030 --> 02:14:29,040

you know interstellar well that's where

3316

02:14:33,350 --> 02:14:31,040

we are today

3317

02:14:35,669 --> 02:14:33,360

and if that's where the department of

3318

02:14:38,470 --> 02:14:35,679

defense is going to start leaning

3319

02:14:40,149 --> 02:14:38,480

can the world handle it well that's an

3320

02:14:43,270 --> 02:14:40,159

excellent question the the book

3321

02:14:46,310 --> 02:14:43,280

my book is coming out in 28

3322

02:14:47,669 --> 02:14:46,320

editions in 25 languages and it had a

3323

02:14:49,430 --> 02:14:47,679

huge reception

3324

02:14:51,669 --> 02:14:49,440

from the public the public is really

3325

02:14:52,069 --> 02:14:51,679

starved for scientific discussion on

3326

02:14:54,470 --> 02:14:52,079

this

3327

02:14:56,310 --> 02:14:54,480

issue and it's a subject of great

3328

02:14:58,069 --> 02:14:56,320

interest to the public

3329

02:14:59,669 --> 02:14:58,079

and then of course as i said before the

3330

02:15:02,229 --> 02:14:59,679

government

3331

02:15:04,069 --> 02:15:02,239

is looking at the reports that indicate

3332

02:15:05,990 --> 02:15:04,079

unusual things

3333

02:15:07,270 --> 02:15:06,000

the scientific community is not really

3334

02:15:10,149 --> 02:15:07,280

ready to discuss

3335

02:15:11,589 --> 02:15:10,159

any of the unusual phenomena in the

3336

02:15:13,430 --> 02:15:11,599

context of

3337

02:15:14,950 --> 02:15:13,440

technological civilizations out there

3338

02:15:16,390 --> 02:15:14,960

and there is a lot of resistance and

3339

02:15:19,669 --> 02:15:16,400

pushback

3340

02:15:21,350 --> 02:15:19,679

but you know as a you know our progress

3341

02:15:24,790 --> 02:15:21,360

depends on evidence not on

3342

02:15:28,229 --> 02:15:24,800

how many likes an idea gets on twitter

3343

02:15:28,629 --> 02:15:28,239

as we discussed at the beginning so i do

3344

02:15:30,870 --> 02:15:28,639

hope

3345

02:15:31,990 --> 02:15:30,880

that eventually there will be so much

3346

02:15:34,229 --> 02:15:32,000

evidence that

3347

02:15:35,189 --> 02:15:34,239

it will become a main topic for

3348

02:15:38,310 --> 02:15:35,199

discussion and

3349

02:15:39,750 --> 02:15:38,320

gathering of more evidence my hope is in

3350

02:15:42,069 --> 02:15:39,760

the context of

3351

02:15:44,229 --> 02:15:42,079

this first interstellar object that we

3352

02:15:44,709 --> 02:15:44,239

will find many more in the coming years

3353

02:15:47,830 --> 02:15:44,719

and

3354

02:15:50,229 --> 02:15:47,840

as a result we will have a

3355

02:15:51,750 --> 02:15:50,239

spacecraft taking a close-up photograph

3356

02:15:54,390 --> 02:15:51,760

of one of them and

3357

02:15:55,109 --> 02:15:54,400

and then we could see directly from the

3358

02:15:56,950 --> 02:15:55,119

image

3359

02:15:59,350 --> 02:15:56,960

whether it's a natural or an

3360

02:16:01,350 --> 02:15:59,360

artificially made object and

3361

02:16:03,750 --> 02:16:01,360

you know a picture is worth a thousand

3362

02:16:06,629 --> 02:16:03,760

words in my case a picture is worth

3363

02:16:07,510 --> 02:16:06,639

66 000 words the number of words in my

3364

02:16:10,629 --> 02:16:07,520

book

3365

02:16:13,750 --> 02:16:10,639

had a photograph

3366

02:16:17,030 --> 02:16:13,760

the that's such a great point

3367

02:16:18,709 --> 02:16:17,040

um we have uh now we've got james webb

3368

02:16:20,069 --> 02:16:18,719

we have tess well you know of course

3369

02:16:21,669 --> 02:16:20,079

kepler

3370

02:16:23,189 --> 02:16:21,679

we have everything in chile and

3371

02:16:26,390 --> 02:16:23,199

argentina and hawaii

3372

02:16:27,270 --> 02:16:26,400

and these great telescopes all around

3373

02:16:29,350 --> 02:16:27,280

the world

3374

02:16:31,109 --> 02:16:29,360

that's what we have in our stage of

3375

02:16:33,910 --> 02:16:31,119

development right now

3376

02:16:34,709 --> 02:16:33,920

surely an extraterrestrial civilization

3377

02:16:37,750 --> 02:16:34,719

out there

3378

02:16:40,790 --> 02:16:37,760

has got that same technology and

3379

02:16:43,589 --> 02:16:40,800

much more and their ability to detect

3380

02:16:47,190 --> 02:16:43,599

planets habitable planets atmospheres

3381

02:16:48,230 --> 02:16:47,200

um uh trump's hours so they must know

3382

02:16:51,349 --> 02:16:48,240

it's a numbers game

3383

02:16:53,270 --> 02:16:51,359

right avi they know about planet earth

3384

02:16:54,629 --> 02:16:53,280

yeah i mean we also were not very

3385

02:16:57,990 --> 02:16:54,639

careful you know when you go

3386

02:16:59,270 --> 02:16:58,000

in the wilderness it's a good idea to to

3387

02:17:02,629 --> 02:16:59,280

stay quiet

3388

02:17:03,990 --> 02:17:02,639

and first listen rather than speak out

3389

02:17:06,230 --> 02:17:04,000

because you never know whether there are

3390

02:17:08,389 --> 02:17:06,240

predators out there but we have been

3391

02:17:09,030 --> 02:17:08,399

broadcasting radio waves for more than a

3392

02:17:11,270 --> 02:17:09,040

century

3393

02:17:13,669 --> 02:17:11,280

and if there are any civilizations with

3394

02:17:15,509 --> 02:17:13,679

the radio telescope similar to ours

3395

02:17:18,389 --> 02:17:15,519

within a hundred light years

3396

02:17:19,589 --> 02:17:18,399

away from us they already know about us

3397

02:17:22,389 --> 02:17:19,599

my guess is

3398

02:17:24,070 --> 02:17:22,399

you know one of two things uh either we

3399

02:17:25,190 --> 02:17:24,080

are not particularly interesting you

3400

02:17:27,190 --> 02:17:25,200

know we are

3401

02:17:28,950 --> 02:17:27,200

we developed our technologies only a 100

3402

02:17:29,349 --> 02:17:28,960

years ago we are not developed and we

3403

02:17:31,349 --> 02:17:29,359

are not

3404

02:17:33,509 --> 02:17:31,359

posing any threat and nobody cares about

3405

02:17:38,070 --> 02:17:33,519

us because things like us

3406

02:17:40,309 --> 02:17:38,080

existed many times before and

3407

02:17:41,509 --> 02:17:40,319

predated us and just like ants on a

3408

02:17:43,190 --> 02:17:41,519

sidewalk you know

3409

02:17:45,509 --> 02:17:43,200

that do not attract any special

3410

02:17:47,669 --> 02:17:45,519

attention another possibility is that an

3411

02:17:49,990 --> 02:17:47,679

advanced civilization that is

3412

02:17:51,509 --> 02:17:50,000

highly developed would decide to not

3413

02:17:53,509 --> 02:17:51,519

even interact with

3414

02:17:54,709 --> 02:17:53,519

lesser civilizations because it would

3415

02:17:57,830 --> 02:17:54,719

lower

3416

02:17:59,110 --> 02:17:57,840

its quality of life and i call it social

3417

02:18:01,669 --> 02:17:59,120

distancing

3418

02:18:03,509 --> 02:18:01,679

uh on a course on a galactic scale uh

3419

02:18:04,230 --> 02:18:03,519

they would prefer to close themselves in

3420

02:18:07,270 --> 02:18:04,240

a cocoon

3421

02:18:09,270 --> 02:18:07,280

and just uh ignore us

3422

02:18:10,309 --> 02:18:09,280

and that doesn't mean that we cannot

3423

02:18:12,309 --> 02:18:10,319

find about

3424

02:18:14,629 --> 02:18:12,319

their existence because they still have

3425

02:18:17,190 --> 02:18:14,639

to throw some trash out

3426

02:18:19,349 --> 02:18:17,200

and just like those investigative

3427

02:18:20,870 --> 02:18:19,359

journalists that go to the trash cans of

3428

02:18:22,790 --> 02:18:20,880

celebrities in hollywood

3429

02:18:24,309 --> 02:18:22,800

you know we can learn about their

3430

02:18:26,309 --> 02:18:24,319

private lives by

3431

02:18:27,830 --> 02:18:26,319

finding the trash that they dispose in

3432

02:18:31,830 --> 02:18:27,840

space

3433

02:18:34,629 --> 02:18:31,840

now if if

3434

02:18:36,709 --> 02:18:34,639

and again back to the numbers game if

3435

02:18:39,030 --> 02:18:36,719

our planet is what it is

3436

02:18:40,709 --> 02:18:39,040

it's beautiful the temperature's right

3437

02:18:43,110 --> 02:18:40,719

it's a beautiful blue gem

3438

02:18:44,230 --> 02:18:43,120

water action we've got everything going

3439

02:18:47,750 --> 02:18:44,240

on here

3440

02:18:51,110 --> 02:18:47,760

but there must be billions

3441

02:18:52,070 --> 02:18:51,120

of planets like earth that don't have a

3442

02:18:54,790 --> 02:18:52,080

crazy

3443

02:18:55,990 --> 02:18:54,800

human population on it that are not fun

3444

02:18:58,950 --> 02:18:56,000

and that would be

3445

02:18:59,589 --> 02:18:58,960

probably more attractive to et than a

3446

02:19:01,669 --> 02:18:59,599

planet

3447

02:19:03,030 --> 02:19:01,679

that is at this stage where we got a

3448

02:19:05,349 --> 02:19:03,040

bunch of crazies

3449

02:19:08,070 --> 02:19:05,359

wouldn't they want to go there yeah

3450

02:19:10,709 --> 02:19:08,080

that's that's a good point you know um

3451  
02:19:12,629 --> 02:19:10,719  
there is this famous fermi paradox from

3452  
02:19:14,150 --> 02:19:12,639  
seven years ago where enrico fermi a

3453  
02:19:16,629 --> 02:19:14,160  
famous physicist asked

3454  
02:19:18,070 --> 02:19:16,639  
where is everybody and to me that is

3455  
02:19:21,270 --> 02:19:18,080  
very presumptuous

3456  
02:19:23,669 --> 02:19:21,280  
it reminds me of the friends of my wife

3457  
02:19:25,110 --> 02:19:23,679  
when i met her she had a lot of friends

3458  
02:19:27,349 --> 02:19:25,120  
that were waiting for

3459  
02:19:29,509 --> 02:19:27,359  
prince charming on a white horse to show

3460  
02:19:31,509 --> 02:19:29,519  
up and make them a marriage proposal

3461  
02:19:32,709 --> 02:19:31,519  
and that never came and so they had to

3462  
02:19:34,230 --> 02:19:32,719  
compromise and

3463  
02:19:36,469 --> 02:19:34,240

why would we think that we are

3464

02:19:38,549 --> 02:19:36,479

interesting uh enough

3465

02:19:39,990 --> 02:19:38,559

for anyone to come and have a party in

3466

02:19:42,790 --> 02:19:40,000

our backyard

3467

02:19:44,389 --> 02:19:42,800

i don't think so i i don't think we are

3468

02:19:46,870 --> 02:19:44,399

attractive or interesting or

3469

02:19:48,469 --> 02:19:46,880

or you know we should assume that we are

3470

02:19:51,110 --> 02:19:48,479

average or less

3471

02:19:52,790 --> 02:19:51,120

and as a result nobody cares about us

3472

02:19:54,309 --> 02:19:52,800

and then

3473

02:19:56,790 --> 02:19:54,319

therefore you know even if they know

3474

02:19:59,270 --> 02:19:56,800

that we exist we might not

3475

02:20:01,030 --> 02:19:59,280

marry the visit and the other part of

3476

02:20:03,990 --> 02:20:01,040

the fermi paradox

3477

02:20:05,030 --> 02:20:04,000

um which is the paradox of the fermi

3478

02:20:07,429 --> 02:20:05,040

paradox

3479

02:20:09,670 --> 02:20:07,439

is that we're seeing stuff all the time

3480

02:20:11,750 --> 02:20:09,680

right we're seeing what may be probes

3481

02:20:13,750 --> 02:20:11,760

we're seeing things in the night sky

3482

02:20:14,870 --> 02:20:13,760

i've seen crazy things that i can't

3483

02:20:18,150 --> 02:20:14,880

explain

3484

02:20:18,870 --> 02:20:18,160

and we're getting visited absolutely all

3485

02:20:22,389 --> 02:20:18,880

the time they

3486

02:20:23,190 --> 02:20:22,399

they are here well that's a possibility

3487

02:20:26,630 --> 02:20:23,200

that we are

3488

02:20:28,710 --> 02:20:26,640

uh basically blind to be based on our

3489

02:20:31,990 --> 02:20:28,720

convictions you know and there were many

3490

02:20:33,590 --> 02:20:32,000

instances like that in the past

3491

02:20:35,270 --> 02:20:33,600

just to give you an example well i can

3492

02:20:38,870 --> 02:20:35,280

give you two examples one

3493

02:20:41,670 --> 02:20:38,880

relatively recently um when i was

3494

02:20:43,110 --> 02:20:41,680

about 30 years ago when i started the

3495

02:20:46,150 --> 02:20:43,120

astrophysics

3496

02:20:49,110 --> 02:20:46,160

uh i remember the the the

3497

02:20:51,190 --> 02:20:49,120

looking in the library at all the uh

3498

02:20:52,309 --> 02:20:51,200

editions of the astrophysical journal

3499

02:20:54,790 --> 02:20:52,319

which had the

3500

02:20:56,870 --> 02:20:54,800

photographs of clusters of galaxies

3501

02:21:00,550 --> 02:20:56,880

these are groups of galaxies

3502

02:21:03,830 --> 02:21:00,560

with giant arcs of light around them and

3503

02:21:05,750 --> 02:21:03,840

everyone ignored those arcs uh simply

3504

02:21:05,990 --> 02:21:05,760

because nobody had a good explanation

3505

02:21:09,030 --> 02:21:06,000

and

3506

02:21:11,990 --> 02:21:09,040

mid

3507

02:21:14,469 --> 02:21:12,000

1980s the subject of gravitational

3508

02:21:17,110 --> 02:21:14,479

lensing became popular and then

3509

02:21:18,309 --> 02:21:17,120

people found out that actually these

3510

02:21:20,469 --> 02:21:18,319

arcs are

3511

02:21:22,150 --> 02:21:20,479

images of background galaxies that are

3512

02:21:24,550 --> 02:21:22,160

getting

3513

02:21:26,389 --> 02:21:24,560

length gravitationally length by by the

3514

02:21:27,510 --> 02:21:26,399

force of gravity of the cluster of

3515

02:21:30,710 --> 02:21:27,520

galaxies so

3516

02:21:33,110 --> 02:21:30,720

just like a big giant lens a magnifying

3517

02:21:35,030 --> 02:21:33,120

background image and and stretching it

3518

02:21:39,349 --> 02:21:35,040

across the sky to a giant

3519

02:21:41,750 --> 02:21:39,359

arc and so that's an example of you know

3520

02:21:43,270 --> 02:21:41,760

these arcs appeared in images but nobody

3521

02:21:46,389 --> 02:21:43,280

paid attention to them

3522

02:21:47,510 --> 02:21:46,399

and another example is when i visited

3523

02:21:49,590 --> 02:21:47,520

the mexico

3524

02:21:50,710 --> 02:21:49,600

uh we went to chichen itza which

3525

02:21:52,469 --> 02:21:50,720

happened to be

3526

02:21:54,150 --> 02:21:52,479

one of the prominent cities of the

3527

02:21:56,790 --> 02:21:54,160

mayans and the

3528

02:21:59,270 --> 02:21:56,800

the the tour guide was bragging that you

3529

02:22:02,870 --> 02:21:59,280

know the mayans had the

3530

02:22:04,150 --> 02:22:02,880

astronomers in their culture that were

3531

02:22:06,870 --> 02:22:04,160

at the highest

3532

02:22:07,590 --> 02:22:06,880

societal status and the reason for that

3533

02:22:10,790 --> 02:22:07,600

was

3534

02:22:11,429 --> 02:22:10,800

they collected data about the sky uh for

3535

02:22:14,070 --> 02:22:11,439

you know

3536

02:22:15,910 --> 02:22:14,080

uh thousands of years because

3537

02:22:18,389 --> 02:22:15,920

politicians

3538

02:22:20,550 --> 02:22:18,399

thought that they can forecast the

3539

02:22:23,190 --> 02:22:20,560

outcome of force they can forecast the

3540

02:22:25,750 --> 02:22:23,200

future based on the motion of planets or

3541

02:22:27,190 --> 02:22:25,760

or stars on the sky so they collected a

3542

02:22:29,990 --> 02:22:27,200

lot of data but

3543

02:22:31,030 --> 02:22:30,000

it was used for the wrong purpose we we

3544

02:22:34,150 --> 02:22:31,040

now know that

3545

02:22:35,030 --> 02:22:34,160

the outcome of wars is not dictated by

3546

02:22:38,309 --> 02:22:35,040

where

3547

02:22:40,070 --> 02:22:38,319

mars or jupiter are has nothing to do

3548

02:22:41,990 --> 02:22:40,080

with the outcome of wars

3549

02:22:43,670 --> 02:22:42,000

but back then they thought maybe it has

3550

02:22:45,349 --> 02:22:43,680

and that's why they needed astronomers

3551  
02:22:48,230 --> 02:22:45,359  
to guide the politicians

3552  
02:22:50,230 --> 02:22:48,240  
so what i'm saying is sometimes you even

3553  
02:22:52,630 --> 02:22:50,240  
collect a lot of data

3554  
02:22:54,230 --> 02:22:52,640  
but you have the wrong ideas about how

3555  
02:22:56,389 --> 02:22:54,240  
to interpret it

3556  
02:22:58,309 --> 02:22:56,399  
all that data collected didn't help them

3557  
02:23:00,070 --> 02:22:58,319  
when the spanish arrived

3558  
02:23:01,670 --> 02:23:00,080  
that's all i got to say about that

3559  
02:23:03,349 --> 02:23:01,680  
that's a separate that's a separate

3560  
02:23:04,070 --> 02:23:03,359  
discussion that's a separate discussion

3561  
02:23:05,990 --> 02:23:04,080  
that's the reason

3562  
02:23:08,309 --> 02:23:06,000  
a reason for us to be worried about

3563  
02:23:10,070 --> 02:23:08,319

predators from outer space

3564

02:23:12,150 --> 02:23:10,080

thank you so much avi what a great

3565

02:23:14,870 --> 02:23:12,160

conversation and uh

3566

02:23:16,710 --> 02:23:14,880

where can do you do you connect much on

3567

02:23:18,150 --> 02:23:16,720

social media and if somebody wants to

3568

02:23:20,469 --> 02:23:18,160

ask you a question

3569

02:23:21,270 --> 02:23:20,479

can they do that they can send me an

3570

02:23:23,510 --> 02:23:21,280

email uh

3571

02:23:25,190 --> 02:23:23,520

i promised my wife when we got married

3572

02:23:26,309 --> 02:23:25,200

that i will not have any footprint on

3573

02:23:28,469 --> 02:23:26,319

social media

3574

02:23:29,750 --> 02:23:28,479

and you know it it offers the advantage

3575

02:23:32,790 --> 02:23:29,760

of uh

3576

02:23:35,190 --> 02:23:32,800

not not caring about the other people's

3577

02:23:38,230 --> 02:23:35,200

views and and having my own independent

3578

02:23:39,670 --> 02:23:38,240

opinions and uh it also saves me a lot

3579

02:23:42,070 --> 02:23:39,680

of time so i can

3580

02:23:43,510 --> 02:23:42,080

write the articles uh scientific papers

3581

02:23:46,630 --> 02:23:43,520

and and books

3582

02:23:49,349 --> 02:23:46,640

and your website is uh

3583

02:23:50,150 --> 02:23:49,359

if you put my name in google avilobe you

3584

02:23:52,630 --> 02:23:50,160

will find

3585

02:23:53,270 --> 02:23:52,640

there is a main website that is my own

3586

02:23:56,230 --> 02:23:53,280

that

3587

02:23:57,990 --> 02:23:56,240

features all my publications all my

3588

02:23:59,990 --> 02:23:58,000

scientific american articles that i

3589

02:24:03,110 --> 02:24:00,000

write every week

3590

02:24:04,870 --> 02:24:03,120

some of the videos of news broadcast

3591

02:24:07,270 --> 02:24:04,880

that i took part in and

3592

02:24:08,150 --> 02:24:07,280

basically everything that i create is

3593

02:24:11,190 --> 02:24:08,160

out there

3594

02:24:13,910 --> 02:24:11,200

and of course we have the links for

3595

02:24:14,309 --> 02:24:13,920

his book extraterrestrial right there

3596

02:24:17,830 --> 02:24:14,319

over

3597

02:24:19,270 --> 02:24:17,840

at jimmychurchradio.com professor loeb

3598

02:24:21,670 --> 02:24:19,280

another great conversation

3599

02:24:23,990 --> 02:24:21,680

thank you so much thanks for having me

3600

02:24:25,670 --> 02:24:24,000

jimmy you're the best

3601  
02:24:27,349 --> 02:24:25,680  
we'll be right back after this short

3602  
02:24:55,030 --> 02:24:27,359  
break i'm your host timmy church this is

3603  
02:24:59,270 --> 02:24:56,870  
hey what up y'all should go biblical fox

3604  
02:25:04,550 --> 02:24:59,280  
here and you are listening to my boy

3605  
02:25:15,590 --> 02:25:07,830  
despite popular opinion reading a book

3606  
02:25:19,670 --> 02:25:17,830  
this is jimmy church and i'll be at the

3607  
02:25:22,870 --> 02:25:19,680  
ufo megacon this june

3608  
02:25:25,510 --> 02:25:22,880  
6th through the 12th 2021 in laughlin

3609  
02:25:28,309 --> 02:25:25,520  
nevada the laughlin ufo megacon

3610  
02:25:29,270 --> 02:25:28,319  
is unique it's seven days of education

3611  
02:25:32,550 --> 02:25:29,280  
and disclosure

3612  
02:25:34,630 --> 02:25:32,560  
it's unlike all other ufo conferences

3613  
02:25:37,270 --> 02:25:34,640

the laughlin ufo mega conference

3614

02:25:39,750 --> 02:25:37,280

specializes in bringing you new people

3615

02:25:40,389 --> 02:25:39,760

offering new information and disclosure

3616

02:25:42,389 --> 02:25:40,399

all of this

3617

02:25:44,469 --> 02:25:42,399

is offered at prices so low you can

3618

02:25:47,590 --> 02:25:44,479

actually afford to be there

3619

02:25:50,950 --> 02:25:47,600

for instance seven night hotel packages

3620

02:25:53,750 --> 02:25:50,960

one or two people start at just 320

3621

02:25:55,830 --> 02:25:53,760

inclusive education and disclosure is

3622

02:25:56,469 --> 02:25:55,840

why the laughlin ufo mega conference

3623

02:25:58,550 --> 02:25:56,479

exists

3624

02:26:00,309 --> 02:25:58,560

join us for all seven days or a half a

3625

02:26:03,550 --> 02:26:00,319

week or just a day or two

3626  
02:26:04,870 --> 02:26:03,560  
but join us go to laughlin

3627  
02:26:07,670 --> 02:26:04,880  
ufomegaconference.com

3628  
02:26:08,950 --> 02:26:07,680  
register now the only thing keeping you

3629  
02:26:12,750 --> 02:26:08,960  
from being with all of us

3630  
02:26:19,429 --> 02:26:12,760  
is you just go to

3631  
02:26:23,270 --> 02:26:21,190  
this is jimmy church of fade to black

3632  
02:26:26,389 --> 02:26:23,280  
and i take life change t

3633  
02:26:27,110 --> 02:26:26,399  
supplements every single day it's what i

3634  
02:26:29,630 --> 02:26:27,120  
do

3635  
02:26:33,270 --> 02:26:29,640  
click on their banner at

3636  
02:26:38,070 --> 02:26:35,429  
when you take the beans from central

3637  
02:26:39,349 --> 02:26:38,080  
america with dashes of indonesian and

3638  
02:26:41,590 --> 02:26:39,359

african mixed in

3639

02:26:42,950 --> 02:26:41,600

and then roasted to the dark side of

3640

02:26:46,150 --> 02:26:42,960

fade to black

3641

02:26:49,110 --> 02:26:46,160

you create the ultimate brew of fringe

3642

02:26:50,790 --> 02:26:49,120

introducing the fade to black blend from

3643

02:26:53,830 --> 02:26:50,800

river moon coffee

3644

02:26:55,910 --> 02:26:53,840

yes river moon's darkest customized

3645

02:26:59,110 --> 02:26:55,920

roast was created for the love

3646

02:27:01,910 --> 02:26:59,120

of fade to black the alchemy of

3647

02:27:04,550 --> 02:27:01,920

masterful roasting and smoking the beans

3648

02:27:08,230 --> 02:27:04,560

is in every sip of this full-bodied

3649

02:27:10,790 --> 02:27:08,240

dark java i need my coffee doc

3650

02:27:11,750 --> 02:27:10,800

deep with distinct bittersweet chocolate

3651

02:27:14,309 --> 02:27:11,760

highlights

3652

02:27:16,870 --> 02:27:14,319

just like the bunker leaning further

3653

02:27:18,309 --> 02:27:16,880

into the darkness of the roast is fade

3654

02:27:20,710 --> 02:27:18,319

to black blend from

3655

02:27:23,030 --> 02:27:20,720

river moon coffee just click on the

3656

02:27:23,990 --> 02:27:23,040

banner at jimmychurchradio.com and use

3657

02:27:30,309 --> 02:27:24,000

the promo code

3658

02:27:32,230 --> 02:27:30,319

f2b blend for 15 off of your order today

3659

02:27:33,830 --> 02:27:32,240

this is billy carson with forbidden

3660

02:27:36,710 --> 02:27:33,840

knowledge dot tv

3661

02:27:38,230 --> 02:27:36,720

forbidden knowledge tv has just reached

3662

02:27:41,030 --> 02:27:38,240

its one year anniversary

3663

02:27:43,110 --> 02:27:41,040

that's right one year and as a show of

3664

02:27:44,070 --> 02:27:43,120

appreciation we are giving all new

3665

02:27:46,790 --> 02:27:44,080

subscribers a

3666

02:27:47,990 --> 02:27:46,800

free 30-day trial of forbidden knowledge

3667

02:27:51,110 --> 02:27:48,000

dot tv

3668

02:27:51,910 --> 02:27:51,120

that's 30 days to binge watch thousands

3669

02:27:54,469 --> 02:27:51,920

of movies

3670

02:27:55,270 --> 02:27:54,479

documentaries conferences workshops

3671

02:27:57,910 --> 02:27:55,280

lectures

3672

02:27:58,630 --> 02:27:57,920

yoga classes meditation courses and so

3673

02:28:01,349 --> 02:27:58,640

much more

3674

02:28:03,270 --> 02:28:01,359

so log on to forbidden knowledge dot tv

3675

02:28:06,469 --> 02:28:03,280

from your computer or mobile device

3676

02:28:09,990 --> 02:28:06,479

or get the forbidden knowledge tv app on

3677

02:28:13,349 --> 02:28:10,000

apple tv roku amazon itunes

3678

02:28:16,870 --> 02:28:13,359

or google play today and use coupon code

3679

02:28:19,270 --> 02:28:16,880

30 days free that's coupon code 30 days

3680

02:28:24,630 --> 02:28:19,280

free on forbidden knowledge dot tv

3681

02:28:29,670 --> 02:28:26,870

are you intrigued by paranormal talk

3682

02:28:30,070 --> 02:28:29,680

radio you love the new paranormal radio

3683

02:28:33,030 --> 02:28:30,080

app

3684

02:28:34,870 --> 02:28:33,040

from talk stream live you'll find a

3685

02:28:35,910 --> 02:28:34,880

great selection of talk shows covering

3686

02:28:39,030 --> 02:28:35,920

ufos

3687

02:28:41,429 --> 02:28:39,040

ghosts strange phenomena and much more

3688

02:28:43,190 --> 02:28:41,439

download the paranormal radio app now

3689

02:28:45,110 --> 02:28:43,200

and start listening to the very best in

3690

02:28:46,630 --> 02:28:45,120

paranormal talk entertainment

3691

02:28:49,510 --> 02:28:46,640

including the network you're listening

3692

02:28:52,830 --> 02:28:49,520

to right now the paranormal radio app

3693

02:29:07,389 --> 02:28:52,840

free in google play and the ios app

3694

02:29:07,399 --> 02:29:14,150

kgraradio.com

3695

02:29:14,160 --> 02:29:35,429

this is kjcr jimmychurchradio.com

3696

02:29:40,550 --> 02:29:39,110

all right welcome back fade to black

3697

02:29:43,110 --> 02:29:40,560

hi my name is jimmy church i want to

3698

02:29:46,550 --> 02:29:43,120

thank javi loeb uh for coming in tonight

3699

02:29:47,030 --> 02:29:46,560

again we pre-recorded that uh right

3700

02:29:49,510 --> 02:29:47,040

before

3701

02:29:50,070 --> 02:29:49,520

show time tonight to make it as live and

3702

02:29:52,070 --> 02:29:50,080

up-to-date

3703

02:30:02,830 --> 02:29:52,080

as possible i have opened up the phone

3704

02:30:05,830 --> 02:30:04,309

747-228-2051-747-228-2051 what your

3705

02:30:08,870 --> 02:30:05,840

comments are

3706

02:30:09,750 --> 02:30:08,880

um about everything that avi went

3707

02:30:11,670 --> 02:30:09,760

through tonight

3708

02:30:12,790 --> 02:30:11,680

it was a very very interesting

3709

02:30:15,990 --> 02:30:12,800

conversation

3710

02:30:16,790 --> 02:30:16,000

comprehensive compelling um and a lot of

3711

02:30:19,830 --> 02:30:16,800

information

3712

02:30:22,070 --> 02:30:19,840

uh was packed in there uh we did uh just

3713

02:30:26,469 --> 02:30:22,080

over two hours uh tonight

3714

02:30:29,429 --> 02:30:26,479

and uh i realized also the uh

3715

02:30:31,670 --> 02:30:29,439

uh the commercials were out of sync as

3716

02:30:32,710 --> 02:30:31,680

we started to record i lost track of the

3717

02:30:35,910 --> 02:30:32,720

time

3718

02:30:39,110 --> 02:30:35,920

and i was involved in the conversation

3719

02:30:41,270 --> 02:30:39,120

and and and and i got lost and

3720

02:30:42,389 --> 02:30:41,280

and so things were a little out of whack

3721

02:30:44,790 --> 02:30:42,399

but anyway

3722

02:30:46,550 --> 02:30:44,800

uh a great conversation so what did you

3723

02:30:47,270 --> 02:30:46,560

think seven four seven two two eight two

3724

02:30:49,830 --> 02:30:47,280

zero five

3725

02:30:51,349 --> 02:30:49,840

one i don't have anything prepared for

3726

02:30:55,349 --> 02:30:51,359

right now

3727

02:30:55,910 --> 02:30:55,359

um uh to go into uh so the phone lines

3728

02:30:57,750 --> 02:30:55,920

are open

3729

02:30:59,030 --> 02:30:57,760

seven four seven two two eight two zero

3730

02:31:02,550 --> 02:30:59,040

five one

3731

02:31:05,910 --> 02:31:02,560

and uh the the the takeaways

3732

02:31:09,110 --> 02:31:05,920

um that i have with this which

3733

02:31:12,870 --> 02:31:09,120

um i think avi uh was

3734

02:31:15,990 --> 02:31:12,880

was brilliant in he was being kind

3735

02:31:18,950 --> 02:31:16,000

uh to me because i'm asking questions

3736

02:31:22,070 --> 02:31:18,960

for somebody like him

3737

02:31:22,550 --> 02:31:22,080

are fairly basic and and i get that but

3738

02:31:26,150 --> 02:31:22,560

i need

3739

02:31:28,550 --> 02:31:26,160

so many

3740

02:31:30,070 --> 02:31:28,560

varied different opinions and theories

3741

02:31:33,349 --> 02:31:30,080

about what is going on

3742

02:31:34,950 --> 02:31:33,359

and that includes the big bang there's

3743

02:31:37,670 --> 02:31:34,960

debate going on

3744

02:31:38,389 --> 02:31:37,680

today in the scientific community if the

3745

02:31:41,349 --> 02:31:38,399

big bang

3746

02:31:43,910 --> 02:31:41,359

actually happened uh the way that it has

3747

02:31:47,349 --> 02:31:43,920

been laid out and i used the word dogma

3748

02:31:50,389 --> 02:31:47,359

uh for a good reason tonight um in

3749

02:31:52,469 --> 02:31:50,399

the interview um

3750

02:31:54,550 --> 02:31:52,479

because it has been repeated over and

3751

02:31:55,349 --> 02:31:54,560

over again and eventually we just accept

3752

02:32:00,230 --> 02:31:55,359

it as

3753

02:32:02,550 --> 02:32:00,240

as truth um to go against einstein

3754

02:32:04,150 --> 02:32:02,560

which uh nobody wants to do nobody wants

3755

02:32:07,270 --> 02:32:04,160

to challenge that

3756

02:32:12,070 --> 02:32:07,280

and einstein's uh

3757

02:32:15,190 --> 02:32:12,080

uh um theories both of them

3758

02:32:18,630 --> 02:32:15,200

uh were so well done

3759

02:32:20,710 --> 02:32:18,640

those numbers uh today are perfect you

3760

02:32:23,910 --> 02:32:20,720

can go back to newton too

3761

02:32:24,469 --> 02:32:23,920

and the the math is so good that today

3762

02:32:28,309 --> 02:32:24,479

it

3763

02:32:31,670 --> 02:32:28,319

remains solid there's uh most of

3764

02:32:35,349 --> 02:32:31,680

uh what einstein has presented to us

3765

02:32:38,870 --> 02:32:35,359

uh still holds true today and nobody

3766

02:32:41,910 --> 02:32:38,880

wants to step up and challenge i

3767

02:32:44,230 --> 02:32:41,920

i i think you know

3768

02:32:45,910 --> 02:32:44,240

i'm just not that smart but the more

3769

02:32:49,270 --> 02:32:45,920

that i think about

3770

02:32:52,710 --> 02:32:49,280

um everything and infinity

3771

02:32:56,550 --> 02:32:52,720

and time and the universe and what space

3772

02:32:59,670 --> 02:32:56,560

actually is out there the great void

3773

02:33:01,910 --> 02:32:59,680

okay so our universe is 13.8 billion

3774

02:33:04,309 --> 02:33:01,920

years old i accept that

3775

02:33:05,270 --> 02:33:04,319

but there was plenty of action going on

3776

02:33:07,670 --> 02:33:05,280

before then

3777

02:33:08,309 --> 02:33:07,680

time doesn't start the beginning of

3778

02:33:11,349 --> 02:33:08,319

everything

3779

02:33:12,870 --> 02:33:11,359

is not there there was something before

3780

02:33:15,429 --> 02:33:12,880

the big bang and there was something

3781

02:33:17,429 --> 02:33:15,439

before that that came before

3782

02:33:19,990 --> 02:33:17,439

the big bang that's it there isn't

3783

02:33:22,790 --> 02:33:20,000

another but nobody wants to step up and

3784

02:33:24,150 --> 02:33:22,800

challenge that and i find that very very

3785

02:33:27,270 --> 02:33:24,160

interesting

3786

02:33:30,309 --> 02:33:27,280

avi is okay with talking about it and

3787

02:33:33,190 --> 02:33:30,319

uh so there's that part and

3788

02:33:34,309 --> 02:33:33,200

the the other interesting things and

3789

02:33:36,950 --> 02:33:34,319

there were so many

3790

02:33:38,389 --> 02:33:36,960

uh tonight uh with avi uh by the way

3791

02:33:40,150 --> 02:33:38,399

phone lines are open seven four seven

3792

02:33:42,230 --> 02:33:40,160

two two eight two zero five one

3793

02:33:43,190 --> 02:33:42,240

i've got some calls on hold if you wanna

3794

02:33:45,030 --> 02:33:43,200

jump in

3795

02:33:46,830 --> 02:33:45,040

seven four seven two two eight two zero

3796

02:33:49,750 --> 02:33:46,840

five one um

3797

02:33:53,030 --> 02:33:49,760

is the i asked

3798

02:33:56,950 --> 02:33:53,040

avi early on the show is there a

3799

02:33:58,870 --> 02:33:56,960

central depository of numbers where you

3800

02:34:00,870 --> 02:33:58,880

guys go to

3801  
02:34:02,070 --> 02:34:00,880  
right everybody's on the same page is

3802  
02:34:03,910 --> 02:34:02,080  
there and he said

3803  
02:34:05,830 --> 02:34:03,920  
yes and i thought that that was pretty

3804  
02:34:08,870 --> 02:34:05,840  
interesting i should have said

3805  
02:34:12,150 --> 02:34:08,880  
where is it can i see it um

3806  
02:34:13,670 --> 02:34:12,160  
i put the same onus i put the same

3807  
02:34:17,110 --> 02:34:13,680  
situation

3808  
02:34:19,750 --> 02:34:17,120  
on egyptologist on historians

3809  
02:34:21,670 --> 02:34:19,760  
um you want to quote numbers and talk

3810  
02:34:23,590 --> 02:34:21,680  
about history in years bc

3811  
02:34:24,950 --> 02:34:23,600  
and this and this where are you getting

3812  
02:34:27,030 --> 02:34:24,960  
your numbers from

3813  
02:34:28,630 --> 02:34:27,040

where is it are all of you going to the

3814

02:34:29,990 --> 02:34:28,640

same place because the numbers are

3815

02:34:32,309 --> 02:34:30,000

different how come you guys

3816

02:34:33,429 --> 02:34:32,319

can't agree on this and it's the same

3817

02:34:36,870 --> 02:34:33,439

thing with the numbers

3818

02:34:40,070 --> 02:34:36,880

of the universe of the milky way

3819

02:34:43,510 --> 02:34:40,080

the expansion uh nobody

3820

02:34:46,710 --> 02:34:43,520

to me is on the same page no no you hear

3821

02:34:49,830 --> 02:34:46,720

different things quoted um all day long

3822

02:34:53,990 --> 02:34:49,840

avi is in a general sense

3823

02:34:57,429 --> 02:34:54,000

where i am one trillion

3824

02:35:02,150 --> 02:34:57,439

uh uh galaxies in the universe

3825

02:35:05,990 --> 02:35:02,160

um 500 billion stars in our milky way

3826

02:35:07,429 --> 02:35:06,000

uh with 500 at least 500 billion planets

3827

02:35:09,510 --> 02:35:07,439

and probably

3828

02:35:11,110 --> 02:35:09,520

20 billion that are just like planet

3829

02:35:12,950 --> 02:35:11,120

earth and

3830

02:35:15,270 --> 02:35:12,960

that's where we are today and those

3831

02:35:19,510 --> 02:35:15,280

numbers are increasing

3832

02:35:21,349 --> 02:35:19,520

um every single day every day

3833

02:35:23,190 --> 02:35:21,359

you know if you're a cosmologist if

3834

02:35:24,710 --> 02:35:23,200

you're an astrophysicist every day those

3835

02:35:28,070 --> 02:35:24,720

numbers are bigger

3836

02:35:30,230 --> 02:35:28,080

um and they're crazier

3837

02:35:32,550 --> 02:35:30,240

you know and that's the part where it's

3838

02:35:34,230 --> 02:35:32,560

a numbers game i i repeated that many

3839

02:35:38,230 --> 02:35:34,240

times tonight with avi

3840

02:35:40,389 --> 02:35:38,240

it's a numbers game it's a numbers game

3841

02:35:41,429 --> 02:35:40,399

that that's it there is no other way to

3842

02:35:44,790 --> 02:35:41,439

look at it it

3843

02:35:49,270 --> 02:35:44,800

is a numbers game there is

3844

02:35:52,870 --> 02:35:49,280

probably a few identical planets

3845

02:35:56,070 --> 02:35:52,880

like earth in the universe with

3846

02:35:58,150 --> 02:35:56,080

me and you right that

3847

02:36:00,790 --> 02:35:58,160

that's that's a numbers game it's not

3848

02:36:01,590 --> 02:36:00,800

about if there is intelligent life out

3849

02:36:04,630 --> 02:36:01,600

there

3850

02:36:09,590 --> 02:36:04,640

it's how much that's it and so

3851  
02:36:12,710 --> 02:36:09,600  
the universe is one thing and it is big

3852  
02:36:16,469 --> 02:36:12,720  
if you just look at our milky way

3853  
02:36:20,230 --> 02:36:16,479  
it is as equally as impressive

3854  
02:36:21,510 --> 02:36:20,240  
right here our home the milky way

3855  
02:36:23,429 --> 02:36:21,520  
there is so much life here it's

3856  
02:36:24,389 --> 02:36:23,439  
incredible it's incredible it's a

3857  
02:36:27,190 --> 02:36:24,399  
numbers game

3858  
02:36:27,590 --> 02:36:27,200  
there isn't another way to look at it

3859  
02:36:31,830 --> 02:36:27,600  
seven

3860  
02:36:35,270 --> 02:36:31,840  
one oh

3861  
02:36:39,429 --> 02:36:35,280  
um also avi said something

3862  
02:36:44,230 --> 02:36:39,439  
very very very interesting

3863  
02:36:46,309 --> 02:36:44,240

he said 300 years

3864

02:36:47,750 --> 02:36:46,319

300 years that's our window of

3865

02:36:50,469 --> 02:36:47,760

opportunity

3866

02:36:51,830 --> 02:36:50,479

for blowing this popsicle stand right

3867

02:36:54,870 --> 02:36:51,840

that's it

3868

02:36:55,349 --> 02:36:54,880

300 years we need to and there's too

3869

02:36:59,590 --> 02:36:55,359

many

3870

02:37:02,790 --> 02:36:59,600

things that come

3871

02:37:04,790 --> 02:37:02,800

in the way and it's not just

3872

02:37:06,469 --> 02:37:04,800

uh you know what what could happen with

3873

02:37:08,950 --> 02:37:06,479

our son

3874

02:37:11,110 --> 02:37:08,960

that that's there there are natural

3875

02:37:11,670 --> 02:37:11,120

disasters there could be an asteroid it

3876

02:37:15,349 --> 02:37:11,680

could be an

3877

02:37:19,190 --> 02:37:15,359

alien invasion there could be plagues uh

3878

02:37:22,230 --> 02:37:19,200

nuclear war there's all kinds of things

3879

02:37:25,510 --> 02:37:22,240

that could end it for us here right

3880

02:37:27,990 --> 02:37:25,520

and it's not just uh the uh

3881

02:37:30,190 --> 02:37:28,000

instability of our sun the reason why we

3882

02:37:35,030 --> 02:37:30,200

are here is because our sun has been

3883

02:37:39,429 --> 02:37:35,040

amazingly stable for five billion years

3884

02:37:42,389 --> 02:37:39,439

that part of everything is over

3885

02:37:44,309 --> 02:37:42,399

okay we've got uh out of the five

3886

02:37:48,389 --> 02:37:44,319

billion years that are left

3887

02:37:50,870 --> 02:37:48,399

you back up that first billion years

3888

02:37:52,070 --> 02:37:50,880

is crazy town for the sun and we don't

3889

02:37:55,110 --> 02:37:52,080

know

3890

02:37:58,550 --> 02:37:55,120

where the helium hydrogen

3891

02:37:59,429 --> 02:37:58,560

core mix change is going to happen but

3892

02:38:02,950 --> 02:37:59,439

when it does

3893

02:38:05,830 --> 02:38:02,960

i'm telling you that is craziness

3894

02:38:06,710 --> 02:38:05,840

what is potentially going to happen with

3895

02:38:08,389 --> 02:38:06,720

the sun

3896

02:38:10,230 --> 02:38:08,399

it's going to expand it's going to

3897

02:38:13,030 --> 02:38:10,240

contract it's going to get

3898

02:38:13,990 --> 02:38:13,040

hot everything here is going to

3899

02:38:16,550 --> 02:38:14,000

evaporate there

3900

02:38:17,590 --> 02:38:16,560

won't be anything the surface of the

3901

02:38:20,950 --> 02:38:17,600

earth

3902

02:38:22,630 --> 02:38:20,960

um sooner than later

3903

02:38:23,990 --> 02:38:22,640

it's going to be thousands of degrees

3904

02:38:25,270 --> 02:38:24,000

there won't be any water there's not

3905

02:38:27,270 --> 02:38:25,280

going to be any life it's all going to

3906

02:38:29,349 --> 02:38:27,280

burn up and go

3907

02:38:30,630 --> 02:38:29,359

we need to be gone we need to start

3908

02:38:33,910 --> 02:38:30,640

making plans

3909

02:38:36,550 --> 02:38:33,920

now about leaving

3910

02:38:37,910 --> 02:38:36,560

we have to have an exit strategy and his

3911

02:38:40,710 --> 02:38:37,920

point to that

3912

02:38:42,469 --> 02:38:40,720

was uh pretty amazing and to the point i

3913

02:38:46,070 --> 02:38:42,479

mean to the point i just said point

3914

02:38:48,389 --> 02:38:46,080

four times 300 years

3915

02:38:49,510 --> 02:38:48,399

300 years very very interesting

3916

02:38:52,270 --> 02:38:49,520

conversation

3917

02:38:53,670 --> 02:38:52,280

with that let's go to the phone

3918

02:38:55,349 --> 02:38:53,680

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3919

02:38:59,030 --> 02:38:55,359

let's see who is up first hi you're live

3920

02:38:59,040 --> 02:39:03,030

you're live

3921

02:39:10,550 --> 02:39:07,349

you yes you are live oh wow hey

3922

02:39:13,110 --> 02:39:10,560

uh man scott calling from uh

3923

02:39:15,030 --> 02:39:13,120

lebanon oregon hey hey scott take me out

3924

02:39:20,150 --> 02:39:15,040

speaker

3925

02:39:25,670 --> 02:39:23,429

here yes i'm here how are you all right

3926

02:39:27,110 --> 02:39:25,680

i was on my headset sorry that's okay

3927

02:39:28,950 --> 02:39:27,120

that's okay

3928

02:39:31,510 --> 02:39:28,960

so i was listening to the show tonight

3929

02:39:35,270 --> 02:39:31,520

and a couple of things kind of hit me

3930

02:39:37,030 --> 02:39:35,280

and i was hoping to talk to avi i didn't

3931

02:39:40,469 --> 02:39:37,040

know you pre-recorded that

3932

02:39:41,990 --> 02:39:40,479

um my biggest question and concern is is

3933

02:39:44,710 --> 02:39:42,000

we're spending so much time

3934

02:39:46,710 --> 02:39:44,720

and money shooting rockets off into

3935

02:39:48,550 --> 02:39:46,720

space with people on them

3936

02:39:51,190 --> 02:39:48,560

why aren't we spending so much time and

3937

02:39:52,950 --> 02:39:51,200

money on figuring out how to sustain our

3938

02:39:56,469 --> 02:39:52,960

lives to go out there

3939

02:39:59,590 --> 02:39:56,479

in the first place replicating water

3940

02:40:00,710 --> 02:39:59,600

replicating food creating you know heat

3941

02:40:03,349 --> 02:40:00,720

suits or cold

3942

02:40:05,670 --> 02:40:03,359

suits for the the temperature swings

3943

02:40:08,389 --> 02:40:05,680

that you're going to deal with in space

3944

02:40:09,110 --> 02:40:08,399

why are we not spending so much time and

3945

02:40:11,429 --> 02:40:09,120

money

3946

02:40:12,710 --> 02:40:11,439

figuring out how to keep ourselves alive

3947

02:40:14,710 --> 02:40:12,720

indefinitely

3948

02:40:16,710 --> 02:40:14,720

in these extreme conditions that we're

3949

02:40:18,230 --> 02:40:16,720

gonna find ourselves in

3950

02:40:19,830 --> 02:40:18,240

well that was one of the points i

3951

02:40:22,630 --> 02:40:19,840

brought up to avi these

3952

02:40:23,349 --> 02:40:22,640

these are the conversations we need to

3953

02:40:26,790 --> 02:40:23,359

be having

3954

02:40:28,230 --> 02:40:26,800

now if we are going to if we have to

3955

02:40:31,510 --> 02:40:28,240

leave and we do we have to

3956

02:40:32,870 --> 02:40:31,520

we can't stay okay that's it we can't

3957

02:40:36,630 --> 02:40:32,880

stay

3958

02:40:38,550 --> 02:40:36,640

and and if if the

3959

02:40:39,670 --> 02:40:38,560

the way off this planet which is an

3960

02:40:42,790 --> 02:40:39,680

obvious one

3961

02:40:45,910 --> 02:40:42,800

where we have to build really large

3962

02:40:47,429 --> 02:40:45,920

generational starships right that we're

3963

02:40:50,790 --> 02:40:47,439

going to have

3964

02:40:54,710 --> 02:40:50,800

kids and grandkids a hundred times over

3965

02:40:57,830 --> 02:40:54,720

right on these ships everything

3966

02:40:58,790 --> 02:40:57,840

has to be thought out and discussed all

3967

02:41:00,469 --> 02:40:58,800

of it

3968

02:41:02,389 --> 02:41:00,479

how these ships are built they're

3969

02:41:04,150 --> 02:41:02,399

obviously to be cities

3970

02:41:05,830 --> 02:41:04,160

how do you you know what one of the

3971

02:41:10,389 --> 02:41:05,840

biggest

3972

02:41:15,269 --> 02:41:10,399

scott is this

3973

02:41:18,710 --> 02:41:15,279

how do you occupy your time

3974

02:41:19,750 --> 02:41:18,720

how do you keep everybody's mind moving

3975

02:41:21,590 --> 02:41:19,760

forward

3976

02:41:23,590 --> 02:41:21,600

how do you do that here on earth we've

3977

02:41:26,230 --> 02:41:23,600

got schools we've got things you can go

3978

02:41:26,710 --> 02:41:26,240

fishing you can go on vacation you can

3979

02:41:29,830 --> 02:41:26,720

there's

3980

02:41:31,910 --> 02:41:29,840

things you can do to keep your mind

3981

02:41:35,510 --> 02:41:31,920

moving so you don't stagnate

3982

02:41:39,190 --> 02:41:35,520

but if you're on a ship how do you

3983

02:41:41,190 --> 02:41:39,200

teach how do you you know with kids this

3984

02:41:42,389 --> 02:41:41,200

is a big question for me with kids in

3985

02:41:44,630 --> 02:41:42,399

school

3986

02:41:46,150 --> 02:41:44,640

here we can talk about nature and and

3987

02:41:48,630 --> 02:41:46,160

the oceans and

3988

02:41:50,630 --> 02:41:48,640

and trees and we can talk about

3989

02:41:52,710 --> 02:41:50,640

industrial things and technology

3990

02:41:54,710 --> 02:41:52,720

and everything that we have on this

3991

02:41:58,230 --> 02:41:54,720

planet you're not going to have that

3992

02:42:01,429 --> 02:41:58,240

on a ship kids can't go play

3993

02:42:04,309 --> 02:42:01,439

in the forest right they can't go see

3994

02:42:05,030 --> 02:42:04,319

the grand canyon so what is it that you

3995

02:42:08,790 --> 02:42:05,040

are going to

3996

02:42:09,750 --> 02:42:08,800

teach kids um about about everything to

3997

02:42:12,469 --> 02:42:09,760

keep them

3998

02:42:14,870 --> 02:42:12,479

moving forward how do you occupy time

3999

02:42:18,150 --> 02:42:14,880

then you have adults

4000

02:42:23,110 --> 02:42:18,160

how what do we do what do you do for

4001

02:42:25,110 --> 02:42:23,120

10 000 years right what do you do

4002

02:42:26,269 --> 02:42:25,120

what do you do how do we overcome these

4003

02:42:29,269 --> 02:42:26,279

are fundamental

4004

02:42:31,110 --> 02:42:29,279

philosophical deep questions that we

4005

02:42:31,990 --> 02:42:31,120

have to sit down and discuss and talk

4006

02:42:33,910 --> 02:42:32,000

about

4007

02:42:36,469 --> 02:42:33,920

because we have to get it done and we

4008

02:42:39,990 --> 02:42:36,479

don't have a choice

4009

02:42:41,990 --> 02:42:40,000

i think a lot of training into uh

4010

02:42:43,269 --> 02:42:42,000

you know figuring out more about our

4011

02:42:45,750 --> 02:42:43,279

consciousness

4012

02:42:46,870 --> 02:42:45,760

learning how to astral project to

4013

02:42:49,110 --> 02:42:46,880

different realms

4014

02:42:51,830 --> 02:42:49,120

and different dimensions that could

4015

02:42:54,150 --> 02:42:51,840

maybe fill in the gap of what you're

4016

02:42:55,510 --> 02:42:54,160

you're suggesting there of how to bid

4017

02:42:57,750 --> 02:42:55,520

your time

4018

02:42:59,670 --> 02:42:57,760

if we're stuck on a ship but we can we

4019

02:43:02,710 --> 02:42:59,680

can project ourselves to

4020

02:43:05,590 --> 02:43:02,720

earth again and go fishing

4021

02:43:07,510 --> 02:43:05,600

that would be you know something that

4022

02:43:08,630 --> 02:43:07,520

maybe could tie us over for that time

4023

02:43:11,990 --> 02:43:08,640

period

4024

02:43:15,110 --> 02:43:12,000

have you um have you thought about

4025

02:43:17,830 --> 02:43:15,120

uh because i have

4026  
02:43:19,750 --> 02:43:17,840  
mars okay so there's you know depending

4027  
02:43:21,190 --> 02:43:19,760  
on where mars is and how we launch and

4028  
02:43:24,630 --> 02:43:21,200  
how fast we go

4029  
02:43:26,790 --> 02:43:24,640  
and all of that okay let's say

4030  
02:43:28,469 --> 02:43:26,800  
let's say on the best side of things

4031  
02:43:31,750 --> 02:43:28,479  
let's say it's a year

4032  
02:43:33,110 --> 02:43:31,760  
okay a year to get to mars it's probably

4033  
02:43:36,150 --> 02:43:33,120  
longer but a year

4034  
02:43:39,190 --> 02:43:36,160  
the ship is not going to be that big

4035  
02:43:43,349 --> 02:43:39,200  
right you're going to have to be

4036  
02:43:46,230 --> 02:43:43,359  
in an enclosed can

4037  
02:43:47,590 --> 02:43:46,240  
for a year staring at the same five or

4038  
02:43:49,510 --> 02:43:47,600

six people

4039

02:43:52,230 --> 02:43:49,520

you know you don't have you've got one

4040

02:43:55,110 --> 02:43:52,240

room you can go into or the other room

4041

02:43:56,389 --> 02:43:55,120

right that's it that's it you got your

4042

02:43:57,670 --> 02:43:56,399

bunk

4043

02:43:59,830 --> 02:43:57,680

you know i don't even know if there's

4044

02:44:01,830 --> 02:43:59,840

going to be gravity is there

4045

02:44:03,349 --> 02:44:01,840

is there going to be artificial gravity

4046

02:44:06,790 --> 02:44:03,359

something to

4047

02:44:08,070 --> 02:44:06,800

to uh make you feel a little bit normal

4048

02:44:10,309 --> 02:44:08,080

maybe not

4049

02:44:12,550 --> 02:44:10,319

and and you're gonna do that for a year

4050

02:44:14,630 --> 02:44:12,560

going there and then a year coming back

4051  
02:44:16,870 --> 02:44:14,640  
if you do come back maybe you're gonna

4052  
02:44:18,309 --> 02:44:16,880  
stay on mars maybe there isn't a return

4053  
02:44:21,830 --> 02:44:18,319  
trip i don't know

4054  
02:44:25,830 --> 02:44:21,840  
but how would you occupy your time

4055  
02:44:28,630 --> 02:44:25,840  
for a year in something that enclosed

4056  
02:44:29,429 --> 02:44:28,640  
i don't know man it's it's yeah that's a

4057  
02:44:31,830 --> 02:44:29,439  
that's a hard

4058  
02:44:34,630 --> 02:44:31,840  
hard thing to even think about elon musk

4059  
02:44:38,469 --> 02:44:34,640  
better come out with a real good vr

4060  
02:44:42,710 --> 02:44:38,479  
program video games man

4061  
02:44:47,429 --> 02:44:42,720  
video game and you know when because

4062  
02:44:50,469 --> 02:44:47,439  
it's not any different uh to the mind

4063  
02:44:51,030 --> 02:44:50,479

if you're in solitary confinement in a

4064

02:44:54,469 --> 02:44:51,040

prison

4065

02:44:55,590 --> 02:44:54,479

right 24 hours a day and and what that

4066

02:44:59,030 --> 02:44:55,600

does mentally

4067

02:45:02,230 --> 02:44:59,040

to somebody and it's

4068

02:45:05,269 --> 02:45:02,240

it's it's got to be a concern

4069

02:45:08,630 --> 02:45:05,279

you know i like being alone i do i

4070

02:45:11,670 --> 02:45:08,640

i enjoy uh being alone but i

4071

02:45:13,670 --> 02:45:11,680

i'd rather hang out with people right if

4072

02:45:16,150 --> 02:45:13,680

i had my choice exactly

4073

02:45:16,950 --> 02:45:16,160

i i don't know and and i think about

4074

02:45:21,110 --> 02:45:16,960

this often

4075

02:45:23,910 --> 02:45:21,120

so who is thinking about this right now

4076

02:45:25,190 --> 02:45:23,920

there's a lot of forward uh you know

4077

02:45:27,030 --> 02:45:25,200

thinking people

4078

02:45:28,870 --> 02:45:27,040

that that discuss these things but i

4079

02:45:32,070 --> 02:45:28,880

think it's mainly

4080

02:45:34,070 --> 02:45:32,080

in in sci-fi in science fiction circles

4081

02:45:35,670 --> 02:45:34,080

you know writers and creators of movies

4082

02:45:38,710 --> 02:45:35,680

and television and books and

4083

02:45:41,590 --> 02:45:38,720

authors where they contemplate these

4084

02:45:43,670 --> 02:45:41,600

very deep subjects but are they talking

4085

02:45:45,110 --> 02:45:43,680

about it at the united nations

4086

02:45:46,950 --> 02:45:45,120

right are they talking about this at

4087

02:45:51,830 --> 02:45:46,960

darpa do they talk about this at

4088

02:45:53,830 --> 02:45:51,840

nasa i mean the real we would never know

4089

02:45:54,870 --> 02:45:53,840

not yet anyway they're not going to tell

4090

02:45:56,870 --> 02:45:54,880

us anything

4091

02:45:57,910 --> 02:45:56,880

but that that's what i was getting to is

4092

02:46:00,150 --> 02:45:57,920

is well

4093

02:46:01,670 --> 02:46:00,160

you know i understand you know we got to

4094

02:46:03,510 --> 02:46:01,680

build the rockets we got to send them

4095

02:46:05,349 --> 02:46:03,520

there we got to figure out viable ways

4096

02:46:07,429 --> 02:46:05,359

of actually getting there

4097

02:46:09,590 --> 02:46:07,439

but i think we should reign back a

4098

02:46:11,110 --> 02:46:09,600

little bit on the amount of money that

4099

02:46:14,230 --> 02:46:11,120

you're putting into that and then

4100

02:46:16,790 --> 02:46:14,240

start figuring out and i'm going sci-fi

4101  
02:46:17,750 --> 02:46:16,800  
here but you know how to how to print a

4102  
02:46:21,190 --> 02:46:17,760  
cheeseburger

4103  
02:46:23,990 --> 02:46:21,200  
i know yes yeah yeah

4104  
02:46:25,510 --> 02:46:24,000  
like that we need to figure out how to

4105  
02:46:27,670 --> 02:46:25,520  
keep ourselves alive

4106  
02:46:29,110 --> 02:46:27,680  
indefinitely and it was something

4107  
02:46:31,990 --> 02:46:29,120  
avialopa saying tonight

4108  
02:46:33,670 --> 02:46:32,000  
is that you know we we you know i i

4109  
02:46:35,190 --> 02:46:33,680  
can't say it word for word but he was

4110  
02:46:36,630 --> 02:46:35,200  
basically saying you know we send people

4111  
02:46:37,510 --> 02:46:36,640  
there and then they figure out how to

4112  
02:46:39,269 --> 02:46:37,520  
live there

4113  
02:46:40,550 --> 02:46:39,279

well how about we figure out how to live

4114

02:46:42,790 --> 02:46:40,560

indefinitely first

4115

02:46:44,469 --> 02:46:42,800

no matter what well no matter where we

4116

02:46:47,670 --> 02:46:44,479

are and then we go there

4117

02:46:50,790 --> 02:46:47,680

that's right excuse me i just coughed

4118

02:46:53,590 --> 02:46:50,800

um what he said was uh

4119

02:46:55,750 --> 02:46:53,600

that we'll practice on the moon right

4120

02:46:58,070 --> 02:46:55,760

and then we'll practice on mars

4121

02:46:59,990 --> 02:46:58,080

and i get that you know okay you know

4122

02:47:03,030 --> 02:47:00,000

baby steps i understand

4123

02:47:03,429 --> 02:47:03,040

i want to know how these ships are going

4124

02:47:09,269 --> 02:47:03,439

to

4125

02:47:10,469 --> 02:47:09,279

massive going right straight science

4126  
02:47:11,910 --> 02:47:10,479  
fiction

4127  
02:47:14,469 --> 02:47:11,920  
you know i don't care if you're talking

4128  
02:47:16,389 --> 02:47:14,479  
about an imperial star cruiser whatever

4129  
02:47:20,230 --> 02:47:16,399  
is on your mind

4130  
02:47:22,710 --> 02:47:20,240  
that has to get built and we aren't

4131  
02:47:26,389 --> 02:47:22,720  
going to be flying

4132  
02:47:28,710 --> 02:47:26,399  
steel and aluminum in titanium

4133  
02:47:29,670 --> 02:47:28,720  
you know all day long from planet earth

4134  
02:47:31,190 --> 02:47:29,680  
up to build the

4135  
02:47:33,190 --> 02:47:31,200  
the resources have to come from

4136  
02:47:35,429 --> 02:47:33,200  
somewhere else you know

4137  
02:47:36,710 --> 02:47:35,439  
from an asteroid i don't know do we grab

4138  
02:47:39,830 --> 02:47:36,720

an asteroid and

4139

02:47:42,950 --> 02:47:39,840

tow it into orbit and start mining that

4140

02:47:46,150 --> 02:47:42,960

but you can see what we launch

4141

02:47:49,190 --> 02:47:46,160

um with a spacex or the chinese

4142

02:47:52,469 --> 02:47:49,200

long march or soyuz it's very

4143

02:47:54,389 --> 02:47:52,479

small payloads very small

4144

02:47:55,670 --> 02:47:54,399

you know and i mean what we would have

4145

02:47:57,590 --> 02:47:55,680

to fly tens of

4146

02:47:58,950 --> 02:47:57,600

thousands of those to start building

4147

02:48:02,309 --> 02:47:58,960

some you know

4148

02:48:04,230 --> 02:48:02,319

uh generational starship so

4149

02:48:05,349 --> 02:48:04,240

where are these discussions coming from

4150

02:48:08,790 --> 02:48:05,359

is anybody

4151  
02:48:11,349 --> 02:48:08,800  
doing any forward planning here

4152  
02:48:11,990 --> 02:48:11,359  
i i don't you know and this is the other

4153  
02:48:14,870 --> 02:48:12,000  
thing scott

4154  
02:48:17,269 --> 02:48:14,880  
tripp on this i i swear this is where my

4155  
02:48:20,710 --> 02:48:17,279  
mind goes

4156  
02:48:23,990 --> 02:48:20,720  
what if tomorrow

4157  
02:48:28,830 --> 02:48:24,000  
we start tracking like the

4158  
02:48:31,429 --> 02:48:28,840  
asteroid right the doomsday

4159  
02:48:34,150 --> 02:48:31,439  
asteroid we're stuck

4160  
02:48:34,870 --> 02:48:34,160  
right now right now we're stuck that's

4161  
02:48:41,429 --> 02:48:34,880  
it

4162  
02:48:44,870 --> 02:48:41,439  
there isn't any plans

4163  
02:48:46,309 --> 02:48:44,880

i would hope that if the the the mother

4164

02:48:49,590 --> 02:48:46,319

lode asteroid the

4165

02:48:52,630 --> 02:48:49,600

end-all extinction event happens

4166

02:48:53,269 --> 02:48:52,640

that we have a plan of getting a

4167

02:48:56,710 --> 02:48:53,279

thousand

4168

02:48:59,670 --> 02:48:56,720

ship

4169

02:49:01,110 --> 02:48:59,680

and out in the other direction to carry

4170

02:49:04,309 --> 02:49:01,120

on humanity

4171

02:49:07,510 --> 02:49:04,319

right right am i wrong

4172

02:49:09,429 --> 02:49:07,520

in thinking like that no but we also

4173

02:49:12,030 --> 02:49:09,439

have to figure out a way to keep them

4174

02:49:15,429 --> 02:49:12,040

alive on that ship

4175

02:49:17,269 --> 02:49:15,439

indefinitely do you go if

4176  
02:49:19,030 --> 02:49:17,279  
if somebody gives you a card to punch

4177  
02:49:22,469 --> 02:49:19,040  
and says okay

4178  
02:49:25,830 --> 02:49:22,479  
uh everything's good everything's good

4179  
02:49:27,990 --> 02:49:25,840  
ship is built to survive no radiation

4180  
02:49:29,990 --> 02:49:28,000  
issues you've got gravity you've got a

4181  
02:49:30,950 --> 02:49:30,000  
forest you've got plants you got this

4182  
02:49:33,110 --> 02:49:30,960  
you got that

4183  
02:49:34,870 --> 02:49:33,120  
you got all the video games you can play

4184  
02:49:37,990 --> 02:49:34,880  
and pizza every day

4185  
02:49:41,429 --> 02:49:38,000  
and they you are good to go do you go

4186  
02:49:45,349 --> 02:49:41,439  
do you go on a one-way trip to nowhere

4187  
02:49:48,389 --> 02:49:45,359  
nope you stay here i'm gonna stay here

4188  
02:49:52,150 --> 02:49:48,399

i'm gonna get a nice cold bottle of that

4189

02:49:53,429 --> 02:49:52,160

that uh crystal skull vodka and i'm

4190

02:49:56,870 --> 02:49:53,439

going fishing

4191

02:49:58,550 --> 02:49:56,880

really like uh like woody harrelson what

4192

02:50:02,469 --> 02:49:58,560

was that movie

4193

02:50:03,830 --> 02:50:02,479

uh uh 22 2012. yeah 2012.

4194

02:50:05,590 --> 02:50:03,840

yeah where he's on the mountain yeah

4195

02:50:08,550 --> 02:50:05,600

that's me that's me for sure

4196

02:50:09,349 --> 02:50:08,560

it was so funny when he raised his hands

4197

02:50:11,349 --> 02:50:09,359

you remember

4198

02:50:12,870 --> 02:50:11,359

at the end of it right when everything

4199

02:50:14,950 --> 02:50:12,880

is coming towards him

4200

02:50:15,990 --> 02:50:14,960

and he's like coming in let's go let's

4201

02:50:19,110 --> 02:50:16,000

go

4202

02:50:19,670 --> 02:50:19,120

so yep yeah that's me i'm the one that's

4203

02:50:22,710 --> 02:50:19,680

gonna run

4204

02:50:25,349 --> 02:50:22,720

straight towards it well you know

4205

02:50:26,389 --> 02:50:25,359

um i have a jeep right i have a nice

4206

02:50:29,670 --> 02:50:26,399

four-wheel-drive

4207

02:50:32,150 --> 02:50:29,680

jeep that can handle just about anything

4208

02:50:34,469 --> 02:50:32,160

and i thought about that i thought about

4209

02:50:36,150 --> 02:50:34,479

that how quick can i load it up

4210

02:50:37,750 --> 02:50:36,160

and just drive to the mountains and hang

4211

02:50:41,510 --> 02:50:37,760

out with woody harrelson if

4212

02:50:44,870 --> 02:50:41,520

if if it goes down

4213

02:50:48,870 --> 02:50:44,880

right if it goes down how quick

4214

02:50:50,469 --> 02:50:48,880

and and i i wouldn't how do i say this i

4215

02:50:52,230 --> 02:50:50,479

don't know if i would go and try to find

4216

02:50:55,510 --> 02:50:52,240

somebody with a bunker

4217

02:50:56,630 --> 02:50:55,520

or i would try to you know save my nah

4218

02:50:59,510 --> 02:50:56,640

i think i would just head to the

4219

02:51:02,790 --> 02:50:59,520

mountains and and ride it out

4220

02:51:05,750 --> 02:51:02,800

oh yeah i mean i mean

4221

02:51:06,469 --> 02:51:05,760

to be fearful in the face of death i

4222

02:51:10,070 --> 02:51:06,479

don't know

4223

02:51:13,110 --> 02:51:10,080

of

4224

02:51:16,389 --> 02:51:13,120

wrong but i i'd rather

4225

02:51:20,389 --> 02:51:16,399

face death faith you know head on

4226

02:51:23,030 --> 02:51:20,399

you know i'd bring it i can't die

4227

02:51:25,510 --> 02:51:23,040

i already know that i'm i'm a ethereal

4228

02:51:28,710 --> 02:51:25,520

being of pure energy that cannot

4229

02:51:30,389 --> 02:51:28,720

die period i mean my physical form might

4230

02:51:33,110 --> 02:51:30,399

might go away but

4231

02:51:33,429 --> 02:51:33,120

i'm not going to so i might as well you

4232

02:51:36,550 --> 02:51:33,439

know

4233

02:51:37,750 --> 02:51:36,560

just go for it well you you bring up a

4234

02:51:40,710 --> 02:51:37,760

really good point

4235

02:51:41,269 --> 02:51:40,720

um uh your first question you know are

4236

02:51:47,670 --> 02:51:41,279

we

4237

02:51:48,710 --> 02:51:47,680

if you remember it was about four years

4238

02:51:50,870 --> 02:51:48,720

ago

4239

02:51:51,750 --> 02:51:50,880

i want everybody to just kind of go on

4240

02:51:54,070 --> 02:51:51,760

the way back

4241

02:51:55,910 --> 02:51:54,080

machine with me for a second it was

4242

02:51:59,269 --> 02:51:55,920

about four years ago

4243

02:52:02,710 --> 02:51:59,279

and nasa was doing a press conference

4244

02:52:06,070 --> 02:52:02,720

and talking about going to the moon and

4245

02:52:10,230 --> 02:52:06,080

where technology is today and

4246

02:52:12,550 --> 02:52:10,240

one of the engineers slipped up

4247

02:52:13,990 --> 02:52:12,560

one of the engineers said i'm

4248

02:52:17,349 --> 02:52:14,000

paraphrasing but i

4249

02:52:19,590 --> 02:52:17,359

caught it said something like well once

4250

02:52:22,710 --> 02:52:19,600

we figure out how to survive the

4251

02:52:25,429 --> 02:52:22,720

van allen belt and the radiation

4252

02:52:26,870 --> 02:52:25,439

then we will get out of low earth orbit

4253

02:52:28,710 --> 02:52:26,880

where you know the iss

4254

02:52:31,429 --> 02:52:28,720

is right now that no humans have gone

4255

02:52:34,469 --> 02:52:31,439

beyond that since apollo

4256

02:52:34,870 --> 02:52:34,479

and i was like wait a minute i thought

4257

02:52:38,230 --> 02:52:34,880

we

4258

02:52:41,349 --> 02:52:38,240

could survive the van allen belt

4259

02:52:45,110 --> 02:52:41,359

right we went to the moon so

4260

02:52:47,750 --> 02:52:45,120

why is this an issue now

4261

02:52:48,309 --> 02:52:47,760

and i found that just fascinating in

4262

02:52:50,950 --> 02:52:48,319

that

4263

02:52:51,429 --> 02:52:50,960

did he slip up did he make a mistake

4264

02:52:54,309 --> 02:52:51,439

right

4265

02:52:56,630 --> 02:52:54,319

is there an issue with radiation out

4266

02:52:56,950 --> 02:52:56,640

there that we weren't aware of that you

4267

02:52:59,750 --> 02:52:56,960

know

4268

02:53:02,150 --> 02:52:59,760

about did we even go to the moon how did

4269

02:53:04,790 --> 02:53:02,160

we get there with technology in 1969

4270

02:53:07,349 --> 02:53:04,800

1970 71-72

4271

02:53:09,429 --> 02:53:07,359

yet the van allen belt was in the way

4272

02:53:10,950 --> 02:53:09,439

wasn't radiation a consideration back

4273

02:53:14,550 --> 02:53:10,960

then it seemed like

4274

02:53:18,230 --> 02:53:14,560

buzz aldrin's still alive right so

4275

02:53:20,870 --> 02:53:18,240

what how is this how is this

4276  
02:53:21,670 --> 02:53:20,880  
correct and it was something that just

4277  
02:53:25,030 --> 02:53:21,680  
puzzled me

4278  
02:53:28,550 --> 02:53:25,040  
because now their big concern

4279  
02:53:31,590 --> 02:53:28,560  
is how do we fight radiation

4280  
02:53:33,190 --> 02:53:31,600  
and keep everybody alive on a trip to

4281  
02:53:35,750 --> 02:53:33,200  
mars

4282  
02:53:39,190 --> 02:53:35,760  
it's like haven't you been thinking

4283  
02:53:42,630 --> 02:53:39,200  
about this already right haven't you

4284  
02:53:46,790 --> 02:53:42,640  
what what what's the design uh

4285  
02:53:50,230 --> 02:53:46,800  
standards as you are submitting

4286  
02:53:55,830 --> 02:53:50,240  
for uh a design competition

4287  
02:53:57,990 --> 02:53:55,840  
right to design a new uh mars spacecraft

4288  
02:53:59,110 --> 02:53:58,000

where is the consideration for radiation

4289

02:54:01,750 --> 02:53:59,120

now

4290

02:54:03,750 --> 02:54:01,760

and why is it that you want to say well

4291

02:54:05,510 --> 02:54:03,760

when we figure that out then we know

4292

02:54:09,349 --> 02:54:05,520

that we can go back to the moon

4293

02:54:11,590 --> 02:54:09,359

and go and go to mars i found that

4294

02:54:13,349 --> 02:54:11,600

i i think it was a slip up do you

4295

02:54:16,070 --> 02:54:13,359

remember this conversation i'm talking

4296

02:54:20,389 --> 02:54:16,080

about at the press conference

4297

02:54:22,469 --> 02:54:20,399

uh very very slightly yeah

4298

02:54:23,830 --> 02:54:22,479

because you know it comes down to

4299

02:54:27,670 --> 02:54:23,840

spacesuits

4300

02:54:30,550 --> 02:54:27,680

uh the if we go back to apollo

4301  
02:54:31,110 --> 02:54:30,560  
and and think about the command module

4302  
02:54:36,150 --> 02:54:31,120  
and

4303  
02:54:38,150 --> 02:54:36,160  
put together not the skin on the humans

4304  
02:54:41,110 --> 02:54:38,160  
the skin of the spacecraft

4305  
02:54:41,990 --> 02:54:41,120  
what were they doing to battle radiation

4306  
02:54:45,190 --> 02:54:42,000  
what were they do

4307  
02:54:45,910 --> 02:54:45,200  
what what because now they're talking

4308  
02:54:48,550 --> 02:54:45,920  
about

4309  
02:54:49,110 --> 02:54:48,560  
oh we've got to have three feet of water

4310  
02:54:51,670 --> 02:54:49,120  
you know

4311  
02:54:52,710 --> 02:54:51,680  
around uh the spacecraft going to mars

4312  
02:54:56,070 --> 02:54:52,720  
to block out the

4313  
02:54:57,110 --> 02:54:56,080

three feet of what what what it doesn't

4314

02:54:59,269 --> 02:54:57,120

make any

4315

02:55:00,230 --> 02:54:59,279

it's like they haven't considered any of

4316

02:55:03,510 --> 02:55:00,240

that before

4317

02:55:06,550 --> 02:55:03,520

well that very consideration scott

4318

02:55:08,790 --> 02:55:06,560

is what has to come into play for these

4319

02:55:10,230 --> 02:55:08,800

generational spacecraft that are going

4320

02:55:13,830 --> 02:55:10,240

to be heading out into space

4321

02:55:15,349 --> 02:55:13,840

through all kinds of electromagnetic

4322

02:55:17,349 --> 02:55:15,359

radiation and things that you're going

4323

02:55:20,230 --> 02:55:17,359

to encounter in deep space

4324

02:55:21,510 --> 02:55:20,240

i have no idea right those gravitational

4325

02:55:23,750 --> 02:55:21,520

waves and

4326  
02:55:24,710 --> 02:55:23,760  
um what if uh if there's some kind of

4327  
02:55:27,590 --> 02:55:24,720  
quasar

4328  
02:55:29,429 --> 02:55:27,600  
some kind of pulse that that what's

4329  
02:55:32,230 --> 02:55:29,439  
going to save the ship

4330  
02:55:34,230 --> 02:55:32,240  
those are the considerations yes yes yes

4331  
02:55:36,870 --> 02:55:34,240  
yes yes i can't imagine

4332  
02:55:38,590 --> 02:55:36,880  
um and the micro meteorites how do we

4333  
02:55:41,510 --> 02:55:38,600  
keep ourselves alive

4334  
02:55:42,870 --> 02:55:41,520  
indefinitely that's the biggest thing

4335  
02:55:43,990 --> 02:55:42,880  
like uh you're talking about the

4336  
02:55:46,550 --> 02:55:44,000  
tardigrade

4337  
02:55:47,110 --> 02:55:46,560  
and and how he just laughed it off you

4338  
02:55:49,190 --> 02:55:47,120

know

4339

02:55:50,790 --> 02:55:49,200

like that's the best you got that's

4340

02:55:53,830 --> 02:55:50,800

where we need to get to

4341

02:55:56,870 --> 02:55:53,840

before i think we go venturing off out

4342

02:55:58,469 --> 02:55:56,880

into anywhere honestly you caught that i

4343

02:56:03,990 --> 02:55:58,479

think we need to

4344

02:56:04,950 --> 02:56:04,000

to make ourselves like the tardigrade

4345

02:56:08,070 --> 02:56:04,960

and just laugh

4346

02:56:10,469 --> 02:56:08,080

anything off before we go doing anything

4347

02:56:12,230 --> 02:56:10,479

yeah there would be more that would be

4348

02:56:14,150 --> 02:56:12,240

my thing you know there's all there's a

4349

02:56:17,510 --> 02:56:14,160

lot of money being spent

4350

02:56:20,469 --> 02:56:17,520

that that that could be used to figure

4351  
02:56:23,670 --> 02:56:20,479  
out how to make us like the tardigrade

4352  
02:56:26,870 --> 02:56:23,680  
there's something in the tardigrade dna

4353  
02:56:29,590 --> 02:56:26,880  
that allows it to survive anything

4354  
02:56:31,030 --> 02:56:29,600  
heat cold radiation it doesn't matter

4355  
02:56:34,389 --> 02:56:31,040  
they laugh it off and i

4356  
02:56:36,389 --> 02:56:34,399  
i it was it was a cavalier

4357  
02:56:38,070 --> 02:56:36,399  
response for me about the tardigrades

4358  
02:56:39,990 --> 02:56:38,080  
but it's really true

4359  
02:56:41,830 --> 02:56:40,000  
they can survive anything they can

4360  
02:56:42,710 --> 02:56:41,840  
survive anything scott thank you for the

4361  
02:56:44,790 --> 02:56:42,720  
phone call

4362  
02:56:47,269 --> 02:56:44,800  
and i just ignored everybody else on

4363  
02:56:49,590 --> 02:56:47,279

hold man that was a great conversation

4364

02:56:51,510 --> 02:56:49,600

thank you i was noticing that too sorry

4365

02:56:53,190 --> 02:56:51,520

everybody hold on hold on

4366

02:56:55,349 --> 02:56:53,200

hey have a good night jimmy church have

4367

02:56:57,510 --> 02:56:55,359

a good night fade to black community

4368

02:56:59,110 --> 02:56:57,520

and uh go bagly tatley that's what i'm

4369

02:57:00,550 --> 02:56:59,120

talking about fade to black scott thank

4370

02:57:02,790 --> 02:57:00,560

you so much

4371

02:57:04,389 --> 02:57:02,800

and that's what happens when i get deep

4372

02:57:06,070 --> 02:57:04,399

into a conversation

4373

02:57:08,150 --> 02:57:06,080

i just forget about everything else but

4374

02:57:11,190 --> 02:57:08,160

yeah that is

4375

02:57:14,790 --> 02:57:11,200

one of the points that not only

4376  
02:57:17,750 --> 02:57:14,800  
avi uh agreed with but that i brought up

4377  
02:57:19,830 --> 02:57:17,760  
is who's making these plans today 300

4378  
02:57:22,309 --> 02:57:19,840  
years is going to go by like it was

4379  
02:57:24,469 --> 02:57:22,319  
nothing we need to make sure that we

4380  
02:57:26,870 --> 02:57:24,479  
have some kind of exit strategy if

4381  
02:57:28,309 --> 02:57:26,880  
something goes down whatever it may be

4382  
02:57:32,790 --> 02:57:28,319  
something is about to go down

4383  
02:57:36,710 --> 02:57:32,800  
we need to know um sn15 from spacex

4384  
02:57:38,950 --> 02:57:36,720  
is not the answer it's cool

4385  
02:57:40,550 --> 02:57:38,960  
but it's not the answer we need to have

4386  
02:57:42,790 --> 02:57:40,560  
these conversations now

4387  
02:57:44,110 --> 02:57:42,800  
and these are hard again this these are

4388  
02:57:47,190 --> 02:57:44,120

hard deep

4389

02:57:50,070 --> 02:57:47,200

philosophical questions

4390

02:57:50,469 --> 02:57:50,080

you know we've got to leave who gets on

4391

02:57:52,469 --> 02:57:50,479

the ship

4392

02:57:53,590 --> 02:57:52,479

how big do we build this show how many

4393

02:57:56,150 --> 02:57:53,600

of these ships do

4394

02:57:57,190 --> 02:57:56,160

do we build and where do we send them to

4395

02:58:00,309 --> 02:57:57,200

what are the targets

4396

02:58:03,349 --> 02:58:00,319

are some just heading out just

4397

02:58:06,389 --> 02:58:03,359

aimlessly in a direction well probably

4398

02:58:07,269 --> 02:58:06,399

you know do we go to alpha centauri well

4399

02:58:09,269 --> 02:58:07,279

okay

4400

02:58:11,510 --> 02:58:09,279

approximate b's right there i don't know

4401

02:58:14,950 --> 02:58:11,520

if that's the answer but it's certainly

4402

02:58:15,429 --> 02:58:14,960

a target and a goal the moon is not the

4403

02:58:20,790 --> 02:58:15,439

answer

4404

02:58:21,590 --> 02:58:20,800

there you go this is fade to black what

4405

02:58:25,110 --> 02:58:21,600

a great

4406

02:58:28,150 --> 02:58:25,120

the week avi loeb

4407

02:58:29,990 --> 02:58:28,160

thank you so much and um

4408

02:58:32,309 --> 02:58:30,000

my next show with avi there's no doubt

4409

02:58:34,710 --> 02:58:32,319

about it entropy i'm going right

4410

02:58:35,349 --> 02:58:34,720

there tomorrow night here on fade to

4411

02:58:38,950 --> 02:58:35,359

black

4412

02:58:39,349 --> 02:58:38,960

alan steinfeld again finally alan on the

4413

02:58:41,750 --> 02:58:39,359

show

4414

02:58:43,110 --> 02:58:41,760

after almost nine years he will be with

4415

02:58:43,910 --> 02:58:43,120

us tomorrow night we're talking about

4416

02:58:46,550 --> 02:58:43,920

his new book

4417

02:58:47,670 --> 02:58:46,560

it's a bestseller right now on amazon

4418

02:58:49,950 --> 02:58:47,680

making contact

4419

02:58:51,110 --> 02:58:49,960

preparing for the new realities of

4420

02:58:53,750 --> 02:58:51,120

extraterrestrial

4421

02:58:55,190 --> 02:58:53,760

existence and then on wednesday night

4422

02:58:58,230 --> 02:58:55,200

it's another first time guest

4423

02:58:58,950 --> 02:58:58,240

nancy tremaine is with us and her new

4424

02:59:02,150 --> 02:58:58,960

book

4425

02:59:03,429 --> 02:59:02,160

enlightened chapters of my life and then

4426  
02:59:06,070 --> 02:59:03,439  
of course

4427  
02:59:08,070 --> 02:59:06,080  
it is thursday night wrapping up the

4428  
02:59:10,710 --> 02:59:08,080  
week no fader night this week

4429  
02:59:11,910 --> 02:59:10,720  
thursday night jacques valet and paola

4430  
02:59:14,070 --> 02:59:11,920  
harris

4431  
02:59:15,830 --> 02:59:14,080  
for an exclusive evening right here an

4432  
02:59:16,550 --> 02:59:15,840  
announcement and conversation on fade to

4433  
02:59:19,510 --> 02:59:16,560  
black

4434  
02:59:20,150 --> 02:59:19,520  
about their new book trinity the best

4435  
02:59:22,550 --> 02:59:20,160  
kept

4436  
02:59:23,990 --> 02:59:22,560  
secret what a great week coming up on

4437  
02:59:25,269 --> 02:59:24,000  
fade to black

4438  
02:59:27,030 --> 02:59:25,279

i want to thank avi loeb great

4439

02:59:29,030 --> 02:59:27,040

conversation tonight

4440

02:59:30,790 --> 02:59:29,040

fade to black's executive producers rita

4441

02:59:33,269 --> 02:59:30,800

kamarian shows produced by hill j

4442

02:59:34,790 --> 02:59:33,279

palm renee dennis and kevin announcers

4443

02:59:37,670 --> 02:59:34,800

are steve harter gene vettel

4444

02:59:38,469 --> 02:59:37,680

mark d kovar webmaster is drew the geek

4445

02:59:42,230 --> 02:59:38,479

music doug

4446

02:59:44,309 --> 02:59:42,240

aldrich introspaceboy spaceboymusic.com

4447

02:59:45,990 --> 02:59:44,319

fade to black is produced by kjcr for

4448

02:59:47,750 --> 02:59:46,000

the game changer network and syndication

4449

02:59:49,830 --> 02:59:47,760

is kgra

4450

02:59:52,309 --> 02:59:49,840

the planet this broadcast owned

4451  
02:59:53,990 --> 02:59:52,319  
copyrighted 2021 by faded black and the

4452  
02:59:56,070 --> 02:59:54,000  
game changer network inc

4453  
02:59:57,590 --> 02:59:56,080  
it cannot be re-broadcast downloaded

4454  
02:59:58,389 --> 02:59:57,600  
copied or used anywhere in the known

4455  
02:59:59,990 --> 02:59:58,399  
universe

4456  
03:00:01,750 --> 03:00:00,000  
without written permission from fade to

4457  
03:00:03,510 --> 03:00:01,760  
black or the game changer network

4458  
03:00:04,790 --> 03:00:03,520  
our meals jimmy church tomorrow night

4459  
03:00:08,550 --> 03:00:04,800  
alan steinfeld