



1
00:00:04,550 --> 00:00:01,400
today it's really an honor to be here

2
00:00:09,200 --> 00:00:04,560
and to talk with you about this work so

3
00:00:11,089 --> 00:00:09,210
the short title for my talk is a fate

4
00:00:12,830 --> 00:00:11,099
follows free will and I'd like to amend

5
00:00:14,600 --> 00:00:12,840
that a little bit out of humility the

6
00:00:16,490 --> 00:00:14,610
title should really be fake could follow

7
00:00:18,590 --> 00:00:16,500
for you well I'm going to explain how

8
00:00:19,790 --> 00:00:18,600
this could be the case I'm not going to

9
00:00:21,679 --> 00:00:19,800
go so far as to say that it is the case

10
00:00:24,080 --> 00:00:21,689
or to prove that but I'm going to try

11
00:00:26,570 --> 00:00:24,090
and give a model for it the way it works

12
00:00:28,490 --> 00:00:26,580
using two theories to current theories

13
00:00:29,630 --> 00:00:28,500

of quantum mechanics consistent

14

00:00:31,550 --> 00:00:29,640

histories and relational quantum

15

00:00:33,410 --> 00:00:31,560

mechanics so it's called retroactive

16

00:00:35,090 --> 00:00:33,420

event determination in the

17

00:00:36,620 --> 00:00:35,100

interpretation of macroscopic quantum

18

00:00:37,790 --> 00:00:36,630

superposition States inconsistent

19

00:00:43,310 --> 00:00:37,800

histories and relational quantum

20

00:00:44,990 --> 00:00:43,320

mechanics so my goal today is described

21

00:00:47,930 --> 00:00:45,000

an interpretation of macroscopic quantum

22

00:00:49,400 --> 00:00:47,940

superposition States the proposed that

23

00:00:53,779 --> 00:00:49,410

mqs dates are all around you all the

24

00:00:56,299 --> 00:00:53,789

time including right now and examine the

25

00:00:57,650 --> 00:00:56,309

flow of time I in the process of doing

26

00:01:00,020 --> 00:00:57,660

that we're gonna have to relook at the

27

00:01:01,430 --> 00:01:00,030

flow of time and and of course in

28

00:01:03,080 --> 00:01:01,440

keeping with the topic of this

29

00:01:05,060 --> 00:01:03,090

conference where that will affect our

30

00:01:07,160 --> 00:01:05,070

flow of energy so might be something to

31

00:01:08,480 --> 00:01:07,170

keep in mind I'd like to receive

32

00:01:10,160 --> 00:01:08,490

feedback about possible experiments and

33

00:01:11,330 --> 00:01:10,170

I'll give you a few experiments but I've

34

00:01:13,219 --> 00:01:11,340

thought of or the other people have done

35

00:01:17,149 --> 00:01:13,229

that could be performed to to

36

00:01:18,770 --> 00:01:17,159

demonstrate this and as it said earlier

37

00:01:20,499 --> 00:01:18,780

I'm unaffiliated and I'm not proud of

38

00:01:23,390 --> 00:01:20,509

that I'd like to find collaborators or

39

00:01:26,420 --> 00:01:23,400

especially in a mathematical geniuses

40

00:01:27,859 --> 00:01:26,430

would be great I might come from a

41

00:01:29,600 --> 00:01:27,869

physics background I went to Berkeley

42

00:01:33,130 --> 00:01:29,610

and I was a high school teacher for

43

00:01:35,690 --> 00:01:33,140

about 10 years so that's my background

44

00:01:37,880 --> 00:01:35,700

so getting the macroscopic quantum

45

00:01:39,260 --> 00:01:37,890

superposition states by the way I'd like

46

00:01:41,210 --> 00:01:39,270

to say I would very much like your

47

00:01:42,289 --> 00:01:41,220

feedback on the presentation I give the

48

00:01:43,819 --> 00:01:42,299

form out of the presentation and the

49

00:01:46,310 --> 00:01:43,829

topic so please feel free to give me

50

00:01:49,940 --> 00:01:46,320

feedback I'm here to learn macroscopic

51
00:01:51,170 --> 00:01:49,950
quantum superposition States a quantum

52
00:01:52,190 --> 00:01:51,180
superposition state for those of you who

53
00:01:54,050 --> 00:01:52,200
aren't so familiar with quantum

54
00:01:56,120 --> 00:01:54,060
mechanics is one of the central features

55
00:01:58,429 --> 00:01:56,130
that make quantum mechanics weird it's

56
00:01:59,899 --> 00:01:58,439
the concept which I'll try and describe

57
00:02:05,030 --> 00:01:59,909
very briefly but will not do it justice

58
00:02:08,270 --> 00:02:05,040
is that for quantum systems like

59
00:02:10,930 --> 00:02:08,280
electrons and protons they can be in

60
00:02:12,090 --> 00:02:10,940
what we call in determine States

61
00:02:13,440 --> 00:02:12,100
everybody

62
00:02:15,150 --> 00:02:13,450
in this room is obviously in a

63
00:02:16,440 --> 00:02:15,160

determined state because they're in a

64

00:02:18,120 --> 00:02:16,450

single place they have a single energy

65

00:02:20,700 --> 00:02:18,130

if you were to measure their energy they

66

00:02:23,040 --> 00:02:20,710

have single values for every measurement

67

00:02:25,650 --> 00:02:23,050

you can make of them but quantum systems

68

00:02:26,880 --> 00:02:25,660

can take multiple values until you make

69

00:02:28,050 --> 00:02:26,890

a measurement so they can be in what are

70

00:02:30,090 --> 00:02:28,060

called superposition states that you

71

00:02:31,740 --> 00:02:30,100

cannot predict the outcome until you

72

00:02:35,280 --> 00:02:31,750

actually make a measurement and get a

73

00:02:36,420 --> 00:02:35,290

definite result so macroscopic quantum

74

00:02:38,880 --> 00:02:36,430

superposition states are actually a

75

00:02:40,590 --> 00:02:38,890

prediction of modern quantum theory not

76

00:02:41,490 --> 00:02:40,600

an unfortunate byproduct but they're

77

00:02:42,690 --> 00:02:41,500

often treated as an unfortunate

78

00:02:45,270 --> 00:02:42,700

by-product because people don't

79

00:02:47,220 --> 00:02:45,280

understand how they could possibly exist

80

00:02:49,710 --> 00:02:47,230

in the world so I'm going to read you a

81

00:02:53,400 --> 00:02:49,720

couple of quotes from Griffiths so you

82

00:02:54,810 --> 00:02:53,410

just listen to me if one supposes it the

83

00:02:57,480 --> 00:02:54,820

Hilbert space structure of quantum

84

00:02:59,220 --> 00:02:57,490

mechanics is correct then mqs dates will

85

00:03:00,930 --> 00:02:59,230

be present in the theory because

86

00:03:03,240 --> 00:03:00,940

essentially a Hilbert space is a linear

87

00:03:04,590 --> 00:03:03,250

vector space in any combination of any

88

00:03:07,830 --> 00:03:04,600

linear combination of two possible

89

00:03:10,830 --> 00:03:07,840

States is also a valid state so mqs

90

00:03:14,370 --> 00:03:10,840

states are equally valid to microscopic

91

00:03:16,860 --> 00:03:14,380

quantum superpositions the reason we get

92

00:03:19,290 --> 00:03:16,870

paradoxes such as the delay choice

93

00:03:20,880 --> 00:03:19,300

experiment paradox is from the process

94

00:03:23,520 --> 00:03:20,890

of implicitly choosing families which

95

00:03:25,380 --> 00:03:23,530

contain no mqs states will make the

96

00:03:26,490 --> 00:03:25,390

assumption that there's no mqs states

97

00:03:28,380 --> 00:03:26,500

because they don't have any physical

98

00:03:30,690 --> 00:03:28,390

reality in our minds we think that and

99

00:03:32,190 --> 00:03:30,700

then inferring from this assumption that

100

00:03:33,180 --> 00:03:32,200

the future influences the past or that

101
00:03:35,400 --> 00:03:33,190
there are mysterious a non-local

102
00:03:37,320 --> 00:03:35,410
influences so Griffith shows that

103
00:03:38,850 --> 00:03:37,330
through the ideas of consistent

104
00:03:41,340 --> 00:03:38,860
histories all of these paradoxes can be

105
00:03:43,890 --> 00:03:41,350
described but you do have to include mqs

106
00:03:45,350 --> 00:03:43,900
states as part of the theory and then of

107
00:03:47,670 --> 00:03:45,360
course most physicists do not have any

108
00:03:50,580 --> 00:03:47,680
intuitive idea as to what mqs states

109
00:03:52,290 --> 00:03:50,590
mean and so we we try to write them out

110
00:03:53,370 --> 00:03:52,300
of the theory I'm going to try and give

111
00:03:56,970 --> 00:03:53,380
you an idea of what they could mean

112
00:03:58,410 --> 00:03:56,980
today so far experiment a if you'll do

113
00:04:00,450 --> 00:03:58,420

me a favor and think about this first

114

00:04:04,110 --> 00:04:00,460

statement is it possible to know right

115

00:04:06,740 --> 00:04:04,120

now without observation of it what is

116

00:04:09,720 --> 00:04:06,750

going on outside the walls of this room

117

00:04:11,550 --> 00:04:09,730

so we have a certain bounded area that

118

00:04:12,540 --> 00:04:11,560

we can observe right now and outside the

119

00:04:13,950 --> 00:04:12,550

walls of this room I think we would all

120

00:04:15,570 --> 00:04:13,960

agree we can't tell what's going on

121

00:04:16,920 --> 00:04:15,580

except through observation now the

122

00:04:18,510 --> 00:04:16,930

observation could take a number of

123

00:04:20,490 --> 00:04:18,520

different forms we could have a video

124

00:04:21,690 --> 00:04:20,500

camera with a live feed into the room

125

00:04:23,129 --> 00:04:21,700

and so we could actually be observing

126

00:04:24,300 --> 00:04:23,139

what's going on out there by gaining

127

00:04:26,610 --> 00:04:24,310

Nation about it through a video camera

128

00:04:27,929 --> 00:04:26,620

we could pull it a cell phone and make a

129

00:04:30,119 --> 00:04:27,939

phone call to somebody that's outside

130

00:04:32,100 --> 00:04:30,129

another way of gaining information about

131

00:04:33,719 --> 00:04:32,110

what's going on outside this room but

132

00:04:35,219 --> 00:04:33,729

without any of those things I think we'd

133

00:04:36,149 --> 00:04:35,229

all agree that we if we have no

134

00:04:38,010 --> 00:04:36,159

information from an

135

00:04:39,629 --> 00:04:38,020

information-theoretic point of view we

136

00:04:43,140 --> 00:04:39,639

can't know what's going on outside the

137

00:04:45,420 --> 00:04:43,150

wall of the walls of this room so the

138

00:04:46,709 --> 00:04:45,430

answer is no now the second question I'd

139

00:04:48,959 --> 00:04:46,719

like to go just a little bit deeper is

140

00:04:51,929 --> 00:04:48,969

it possible to know right now without

141

00:04:53,580 --> 00:04:51,939

observation of it whether something

142

00:04:57,240 --> 00:04:53,590

definite is going on outside the walls

143

00:04:58,649 --> 00:04:57,250

of this room and I think if you think

144

00:05:00,269 --> 00:04:58,659

about it most of us would probably say

145

00:05:01,830 --> 00:05:00,279

well I don't know what's going on but

146

00:05:03,689 --> 00:05:01,840

yes there's something definite going on

147

00:05:04,740 --> 00:05:03,699

and there's a few reasons why we say

148

00:05:06,240 --> 00:05:04,750

that there's definitely something

149

00:05:07,050 --> 00:05:06,250

definite going on outside the walls of

150

00:05:08,969 --> 00:05:07,060

this room even though we're not

151
00:05:10,559 --> 00:05:08,979
observing it the reasons for that

152
00:05:12,929 --> 00:05:10,569
essentially are every time we have

153
00:05:15,149 --> 00:05:12,939
observed it in the past it's obviously

154
00:05:16,379 --> 00:05:15,159
been definite so anytime we make an

155
00:05:18,059 --> 00:05:16,389
observation is something there's there's

156
00:05:19,379 --> 00:05:18,069
always a definite result one hundred

157
00:05:21,029 --> 00:05:19,389
percent of the time in our lives so

158
00:05:22,619 --> 00:05:21,039
we've got a perfect track record showing

159
00:05:24,809 --> 00:05:22,629
us that whenever you know that there's

160
00:05:26,730 --> 00:05:24,819
something definitely going on outside we

161
00:05:28,679 --> 00:05:26,740
can also retro actively go outside the

162
00:05:31,730 --> 00:05:28,689
door after this talk you could walk out

163
00:05:34,740 --> 00:05:31,740

there and ask maybe somebody's out there

164

00:05:36,679 --> 00:05:34,750

with doing the the front table with

165

00:05:38,579 --> 00:05:36,689

papers and working on some of the

166

00:05:40,079 --> 00:05:38,589

registration stuff and we can go and ask

167

00:05:41,869 --> 00:05:40,089

them what was there something definite

168

00:05:44,399 --> 00:05:41,879

going on during the talk out here and

169

00:05:45,659 --> 00:05:44,409

she would of course say well yes there

170

00:05:47,010 --> 00:05:45,669

was something definite going on here

171

00:05:49,260 --> 00:05:47,020

during the talk ten minutes ago I was

172

00:05:52,469 --> 00:05:49,270

writing and I was gathering pens for the

173

00:05:54,179 --> 00:05:52,479

next session and elma so all we know

174

00:05:55,649 --> 00:05:54,189

from these two arguments though is that

175

00:05:57,389 --> 00:05:55,659

when we do make an observation of the

176

00:06:00,269 --> 00:05:57,399

outside world the unobserved world is

177

00:06:01,800 --> 00:06:00,279

that we get a definite result and if we

178

00:06:04,290 --> 00:06:01,810

make a retroactive observation we get a

179

00:06:06,959 --> 00:06:04,300

definite result but I really like to ask

180

00:06:08,309 --> 00:06:06,969

you a sort of an honest assessment is

181

00:06:10,139 --> 00:06:08,319

there any way to know that right now

182

00:06:11,700 --> 00:06:10,149

outside the walls of this room there is

183

00:06:13,050 --> 00:06:11,710

a definite result without measuring it

184

00:06:16,110 --> 00:06:13,060

either in the present or retro actively

185

00:06:17,820 --> 00:06:16,120

I want to propose that there really is

186

00:06:20,040 --> 00:06:17,830

no what no logical way it's really just

187

00:06:23,309 --> 00:06:20,050

a logical argument a positivist argument

188

00:06:24,869 --> 00:06:23,319

as I put it that that's it's just

189

00:06:27,059 --> 00:06:24,879

information that we cannot gain about

190

00:06:29,010 --> 00:06:27,069

the world and so it's a bad assumption

191

00:06:30,869 --> 00:06:29,020

to make the assumption that the world

192

00:06:34,769 --> 00:06:30,879

outside this observed reality is

193

00:06:36,600 --> 00:06:34,779

definite so thought experiment be and

194

00:06:37,649 --> 00:06:36,610

this is just very simplistic and

195

00:06:39,450 --> 00:06:37,659

sure you can find a lot of holes in it

196

00:06:41,520 --> 00:06:39,460

but I think we'll make my point let's

197

00:06:42,990 --> 00:06:41,530

say I'm person p I'm standing in this

198

00:06:45,959 --> 00:06:43,000

room and there's t-bills door one in

199

00:06:48,029 --> 00:06:45,969

door to that I could leave by and let's

200

00:06:49,350 --> 00:06:48,039

say person s is some individual who's

201
00:06:51,659 --> 00:06:49,360
not in the room right now they're

202
00:06:54,209 --> 00:06:51,669
outside walking around and but for some

203
00:06:57,179 --> 00:06:54,219
reason there would be a meaningful

204
00:06:58,800 --> 00:06:57,189
coincidence if I ran into person s so

205
00:07:00,540 --> 00:06:58,810
maybe I run into them I walk out door

206
00:07:02,040 --> 00:07:00,550
one and i run into person s and i have a

207
00:07:03,570 --> 00:07:02,050
conversation about what i'm interested

208
00:07:05,760 --> 00:07:03,580
in this topic and and it actually

209
00:07:07,050 --> 00:07:05,770
changes my views of my research and I go

210
00:07:08,790 --> 00:07:07,060
off in a different direction and it

211
00:07:10,320 --> 00:07:08,800
affects my life in the in the long run

212
00:07:12,089 --> 00:07:10,330
so that's some kind of meaningful

213
00:07:12,959 --> 00:07:12,099

coincidence or maybe they're a friend of

214

00:07:15,330 --> 00:07:12,969

mine that I haven't seen in a long time

215

00:07:16,860 --> 00:07:15,340

and I run into them we can all probably

216

00:07:18,330 --> 00:07:16,870

relate to the idea of meaningful

217

00:07:19,800 --> 00:07:18,340

coincidences at least to some extent

218

00:07:23,129 --> 00:07:19,810

even if we don't believe that they're

219

00:07:25,140 --> 00:07:23,139

truly meaningful so the question I want

220

00:07:26,820 --> 00:07:25,150

to ask you is is it possible to make a

221

00:07:29,490 --> 00:07:26,830

free world choice and miss my faded

222

00:07:31,140 --> 00:07:29,500

experience the favorite experience i

223

00:07:32,610 --> 00:07:31,150

just described happened at door one but

224

00:07:35,159 --> 00:07:32,620

what if i were to choose to walk out of

225

00:07:38,999 --> 00:07:35,169

door too well would I what I completely

226

00:07:40,529 --> 00:07:39,009

miss person s or can the favorite

227

00:07:43,200 --> 00:07:40,539

experience happen regardless of the

228

00:07:45,119 --> 00:07:43,210

choice I make and if so I want to

229

00:07:48,089 --> 00:07:45,129

understand how so going back to this

230

00:07:50,219 --> 00:07:48,099

diagram we can see just with the very

231

00:07:52,619 --> 00:07:50,229

idea of mqs states that person s can be

232

00:07:54,899 --> 00:07:52,629

drawn with two possible superposition

233

00:07:57,749 --> 00:07:54,909

states now again I'm not observing them

234

00:07:59,640 --> 00:07:57,759

so I cannot say that their indefinite

235

00:08:01,050 --> 00:07:59,650

state and if I can't say that they're in

236

00:08:02,070 --> 00:08:01,060

a definite state I shouldn't assume that

237

00:08:04,140 --> 00:08:02,080

they're in a definite state and

238

00:08:07,589 --> 00:08:04,150

therefore this model of having two

239

00:08:11,670 --> 00:08:07,599

possible macroscopic states is equally

240

00:08:13,019 --> 00:08:11,680

valid so if I if I then can see that

241

00:08:14,519 --> 00:08:13,029

there's a possibility that if I choose

242

00:08:16,409 --> 00:08:14,529

door one I could run into a person acid

243

00:08:18,119 --> 00:08:16,419

or one if I choose door to I could run

244

00:08:19,709 --> 00:08:18,129

into person s at door two and there

245

00:08:22,079 --> 00:08:19,719

could be a thousand other possible

246

00:08:24,899 --> 00:08:22,089

histories that would unfold I've only

247

00:08:27,510 --> 00:08:24,909

chosen to for this example and that's

248

00:08:29,010 --> 00:08:27,520

the basic point I want to make person q

249

00:08:30,929 --> 00:08:29,020

just to complete the picture is some

250

00:08:33,360 --> 00:08:30,939

third person observer who might know me

251

00:08:35,540 --> 00:08:33,370

and my no person s and makes an

252

00:08:37,529 --> 00:08:35,550

observation of person as before I do and

253

00:08:38,519 --> 00:08:37,539

we're going to see in relational quantum

254

00:08:40,170 --> 00:08:38,529

mechanics that that means that their

255

00:08:42,839 --> 00:08:40,180

state is correlated to person s estate

256

00:08:44,250 --> 00:08:42,849

so from my point of view person key one

257

00:08:46,350 --> 00:08:44,260

person s are now both in a quantum

258

00:08:48,180 --> 00:08:46,360

superposition state one in which person

259

00:08:49,820 --> 00:08:48,190

key measure person s indoor at door one

260

00:08:51,020 --> 00:08:49,830

and a person

261

00:08:53,570 --> 00:08:51,030

was also at door one so they're

262

00:08:55,190 --> 00:08:53,580

consistent in their in their stories the

263

00:08:57,320 --> 00:08:55,200

other which person q measured person s

264

00:08:58,460 --> 00:08:57,330

at door two and person s was at door two

265

00:09:02,930 --> 00:08:58,470

so there's a consistency with their

266

00:09:04,160 --> 00:09:02,940

stories so moving through of that two

267

00:09:07,010 --> 00:09:04,170

postulates would summarize what we just

268

00:09:09,830 --> 00:09:07,020

talked about only events that one as

269

00:09:11,530 --> 00:09:09,840

observes exists in a definite state and

270

00:09:13,580 --> 00:09:11,540

only from that individuals perspective

271

00:09:15,140 --> 00:09:13,590

so this room around you is all that

272

00:09:16,940 --> 00:09:15,150

you're observing right now from your

273

00:09:19,820 --> 00:09:16,950

perspective and everything outside of it

274

00:09:20,810 --> 00:09:19,830

is in an indefinite State do the first

275

00:09:24,110 --> 00:09:20,820

argument that I was trying to make

276

00:09:26,360 --> 00:09:24,120

earlier the second partial is important

277

00:09:27,920 --> 00:09:26,370

to avoid paradox the real world can only

278

00:09:29,390 --> 00:09:27,930

be meaningfully described from one

279

00:09:32,930 --> 00:09:29,400

single perspective or framework at a

280

00:09:35,000 --> 00:09:32,940

time there was no objective overview so

281

00:09:36,620 --> 00:09:35,010

the only way you avoid the paradox of me

282

00:09:39,350 --> 00:09:36,630

saying I'm in a definite state in person

283

00:09:41,060 --> 00:09:39,360

s saying he's what he's saying he's in

284

00:09:42,680 --> 00:09:41,070

the indefinite state he would say

285

00:09:44,360 --> 00:09:42,690

opposite that he's in a definite state

286

00:09:46,310 --> 00:09:44,370

because he's observing himself and that

287

00:09:47,900 --> 00:09:46,320

I'm an indefinite state the only way to

288

00:09:49,760 --> 00:09:47,910

avoid that is to only look at one

289

00:09:50,570 --> 00:09:49,770

perspective at a time so i can really

290

00:09:52,790 --> 00:09:50,580

describe the world through my

291

00:09:54,980 --> 00:09:52,800

perspective and you can do the same that

292

00:09:56,450 --> 00:09:54,990

you can't compare the two this is known

293

00:09:58,370 --> 00:09:56,460

as a single framework will inconsistent

294

00:10:00,590 --> 00:09:58,380

histories so I'm going to try and go

295

00:10:02,390 --> 00:10:00,600

faster these to get some questions in

296

00:10:04,160 --> 00:10:02,400

relational quantum mechanics carlo

297

00:10:06,110 --> 00:10:04,170

rovelli basically says the state of any

298

00:10:09,110 --> 00:10:06,120

system is relative to the observer not

299

00:10:10,490 --> 00:10:09,120

absolute so what we have here is drawn

300

00:10:12,590 --> 00:10:10,500

from peace perspective we have two

301
00:10:13,910 --> 00:10:12,600
possible histories at the bottom person

302
00:10:15,890 --> 00:10:13,920
s makes a choice they go down history

303
00:10:17,480 --> 00:10:15,900
one or just 32 when person Q makes a

304
00:10:19,720 --> 00:10:17,490
measurement they get correlated so that

305
00:10:24,050 --> 00:10:19,730
they end up in both histories as well

306
00:10:25,880 --> 00:10:24,060
now consists in histories Griffis

307
00:10:27,500 --> 00:10:25,890
especially is what i've read event

308
00:10:29,090 --> 00:10:27,510
chains branch off into various possible

309
00:10:30,950 --> 00:10:29,100
histories so we've already looked at

310
00:10:32,300 --> 00:10:30,960
that the firm work of history's depends

311
00:10:34,520 --> 00:10:32,310
on the way in which we describe the

312
00:10:36,350 --> 00:10:34,530
experiment very important and subtle

313
00:10:37,730 --> 00:10:36,360

argument we can describe any given

314

00:10:39,950 --> 00:10:37,740

experiment with with any number of

315

00:10:41,390 --> 00:10:39,960

frameworks of histories but we have to

316

00:10:43,340 --> 00:10:41,400

stick with one in order to avoid

317

00:10:45,560 --> 00:10:43,350

inconsistencies in order to avoid

318

00:10:47,120 --> 00:10:45,570

paradox so in other words we have to

319

00:10:48,380 --> 00:10:47,130

choose a point of view in other words my

320

00:10:50,710 --> 00:10:48,390

point of view or your point of view a

321

00:10:53,630 --> 00:10:50,720

particular description and stick with it

322

00:10:55,940 --> 00:10:53,640

this is the mathematics in simplified

323

00:10:57,230 --> 00:10:55,950

form of consistent histories we have it

324

00:10:59,030 --> 00:10:57,240

that at the left hand side a single

325

00:11:00,470 --> 00:10:59,040

initial state of s q and p the branches

326

00:11:02,060 --> 00:11:00,480

off into history one at the top and

327

00:11:02,440 --> 00:11:02,070

history two on the bottom and you can

328

00:11:04,330 --> 00:11:02,450

see that

329

00:11:07,570 --> 00:11:04,340

the history remains consistent so that s

330

00:11:08,470 --> 00:11:07,580

two leads to q2 leads to pee too but i

331

00:11:10,450 --> 00:11:08,480

really want to point out here is that

332

00:11:12,400 --> 00:11:10,460

when p makes his measurement and gets

333

00:11:13,390 --> 00:11:12,410

history too let's see he makes

334

00:11:15,370 --> 00:11:13,400

measurement he could get either history

335

00:11:17,320 --> 00:11:15,380

right we don't know which history he'll

336

00:11:21,070 --> 00:11:17,330

get but let's say he makes a measurement

337

00:11:22,150 --> 00:11:21,080

gets history too until that point both

338

00:11:24,010 --> 00:11:22,160

histories were in a soup onnum

339

00:11:26,530 --> 00:11:24,020

superposition state and this is part of

340

00:11:28,120 --> 00:11:26,540

consistent histories so it's only at

341

00:11:29,860 --> 00:11:28,130

this point at the very end that Porsha

342

00:11:32,320 --> 00:11:29,870

person p makes a measurement that not

343

00:11:34,330 --> 00:11:32,330

only the end result is determined but

344

00:11:36,460 --> 00:11:34,340

also the previous events at time one two

345

00:11:39,400 --> 00:11:36,470

three and four also fall back into place

346

00:11:40,930 --> 00:11:39,410

retro actively they weren't determined

347

00:11:44,980 --> 00:11:40,940

until this point of measurement at time

348

00:11:47,040 --> 00:11:44,990

T equals five so this diagram I hope is

349

00:11:49,180 --> 00:11:47,050

is an entryway to understanding how a

350

00:11:51,370 --> 00:11:49,190

measurement at time five can retro

351
00:11:54,730 --> 00:11:51,380
actively affect the events at time T

352
00:11:56,590 --> 00:11:54,740
equals one two three and four so a

353
00:11:58,480 --> 00:11:56,600
visual diagram of that is like this we

354
00:12:00,520 --> 00:11:58,490
have the initial state earlier before

355
00:12:01,750 --> 00:12:00,530
the measurement on the left when person

356
00:12:03,100 --> 00:12:01,760
s is divided into two different

357
00:12:04,630 --> 00:12:03,110
histories and person key was also in

358
00:12:06,880 --> 00:12:04,640
those histories person p makes a

359
00:12:09,610 --> 00:12:06,890
measurement and gets a definite result

360
00:12:11,290 --> 00:12:09,620
and therefore the history one which was

361
00:12:13,630 --> 00:12:11,300
only a mathematical construct to begin

362
00:12:15,430 --> 00:12:13,640
with ceases to have any meaning history

363
00:12:18,310 --> 00:12:15,440

to is the one that is real and retro

364

00:12:21,270 --> 00:12:18,320

actively history as state the state of Q

365

00:12:23,350 --> 00:12:21,280

in the state of s become determined now

366

00:12:24,730 --> 00:12:23,360

obviously from essence perspective this

367

00:12:25,780 --> 00:12:24,740

diagram of totally different because the

368

00:12:27,640 --> 00:12:25,790

masses perspective everything he

369

00:12:31,150 --> 00:12:27,650

observes is definite but from peas

370

00:12:33,430 --> 00:12:31,160

perspective this is the way it looks so

371

00:12:35,440 --> 00:12:33,440

conclusion things don't actually happen

372

00:12:38,710 --> 00:12:35,450

at the time that they happen there's a

373

00:12:40,450 --> 00:12:38,720

retroactive event determination events

374

00:12:42,550 --> 00:12:40,460

fall into place retro actively in order

375

00:12:44,200 --> 00:12:42,560

to align themselves with the with what

376

00:12:45,580 --> 00:12:44,210

we observe in the world so when I

377

00:12:47,230 --> 00:12:45,590

observe someone walking out of that door

378

00:12:49,300 --> 00:12:47,240

the history that led them to that point

379

00:12:53,530 --> 00:12:49,310

is is falling into place according to

380

00:12:55,600 --> 00:12:53,540

this process of consistent histories you

381

00:12:56,980 --> 00:12:55,610

will also have to sort of a look at the

382

00:12:59,590 --> 00:12:56,990

fact that there's no universally defined

383

00:13:01,390 --> 00:12:59,600

present moment the present moment is

384

00:13:02,620 --> 00:13:01,400

defined by me in what I'm observing

385

00:13:06,480 --> 00:13:02,630

right now but everything else outside of

386

00:13:08,800 --> 00:13:06,490

that is is not yet fallen into place and

387

00:13:10,960 --> 00:13:08,810

again my conclusion fake follows free

388

00:13:12,640 --> 00:13:10,970

will I haven't had time to talk about

389

00:13:14,020 --> 00:13:12,650

experiments I've got a couple ideas here

390

00:13:15,070 --> 00:13:14,030

you can read while I take questions and

391

00:13:15,790 --> 00:13:15,080

if you want to ask about experiments I'd

392

00:13:31,180 --> 00:13:15,800

be happy to talk about

393

00:13:38,770 --> 00:13:34,960

start with a hard one I'm sure it seems

394

00:13:43,000 --> 00:13:38,780

to me that underneath most of your

395

00:13:45,280 --> 00:13:43,010

discussion the the old chestnut of the

396

00:13:48,280 --> 00:13:45,290

other minds problem of philosophy has

397

00:13:51,400 --> 00:13:48,290

been sort of of lurking in a tacit way

398

00:13:53,290 --> 00:13:51,410

and it virtually becomes explicit in

399

00:13:56,440 --> 00:13:53,300

your posture lat to which seems to me

400

00:13:58,540 --> 00:13:56,450

like a restatement of solipsism but with

401
00:14:01,000 --> 00:13:58,550
definite substituted in for where a

402
00:14:03,760 --> 00:14:01,010
solipsist would say real I wonder if you

403
00:14:05,920 --> 00:14:03,770
could comment on this on the basic

404
00:14:08,140 --> 00:14:05,930
concept of solo facism it's it's eerily

405
00:14:09,370 --> 00:14:08,150
part of this but I will summarize and

406
00:14:11,530 --> 00:14:09,380
say no I don't believe this is a

407
00:14:14,920 --> 00:14:11,540
solipsistic view and I don't believe the

408
00:14:16,150 --> 00:14:14,930
world is just based around my view i can

409
00:14:17,980 --> 00:14:16,160
describe the world from my view but

410
00:14:19,960 --> 00:14:17,990
that's not the only consistent framework

411
00:14:21,910 --> 00:14:19,970
that i can describe using the consistent

412
00:14:23,920 --> 00:14:21,920
histories process every single other

413
00:14:26,040 --> 00:14:23,930

individuals view in this room is equally

414

00:14:29,380 --> 00:14:26,050

valid to mine so it doesn't make any

415

00:14:30,670 --> 00:14:29,390

greater importance on my view but it

416

00:14:32,410 --> 00:14:30,680

does say that the world is only

417

00:14:34,360 --> 00:14:32,420

definitely described from my view and

418

00:14:35,590 --> 00:14:34,370

everything outside of my view is is not

419

00:14:37,540 --> 00:14:35,600

that it doesn't exist it's very

420

00:14:39,220 --> 00:14:37,550

important it does exist but it's in some

421

00:14:43,360 --> 00:14:39,230

kind of mathematical macroscopic

422

00:14:44,230 --> 00:14:43,370

superposition until we observe it I hope

423

00:14:48,370 --> 00:14:44,240

that answers your question a little bit

424

00:14:51,850 --> 00:14:48,380

ok sky yeah um yes a quick question and

425

00:14:53,110 --> 00:14:51,860

is your view of things or model you have

426

00:14:54,430 --> 00:14:53,120

here is it consistent with other

427

00:14:56,920 --> 00:14:54,440

interpretations of quantum mechanics

428

00:15:00,360 --> 00:14:56,930

let's say like the relational let's say

429

00:15:02,500 --> 00:15:00,370

the Copenhagen interpretation or

430

00:15:05,610 --> 00:15:02,510

transactional or other ones or is that

431

00:15:07,000 --> 00:15:05,620

is it at odds with certain other

432

00:15:09,970 --> 00:15:07,010

interpretations of quantum mechanics

433

00:15:11,860 --> 00:15:09,980

confession no I happen to think that on

434

00:15:13,120 --> 00:15:11,870

all of the contributions of quantum

435

00:15:16,079 --> 00:15:13,130

mechanics are essentially correct in

436

00:15:18,310 --> 00:15:16,089

some in some way and some methods so I

437

00:15:19,750 --> 00:15:18,320

do summer I know better than others I

438

00:15:22,230 --> 00:15:19,760

think it's very similar to Copenhagen a

439

00:15:25,300 --> 00:15:22,240

lot of ways and I have huge respect for

440

00:15:28,180 --> 00:15:25,310

the developers of Copenhagen as you know

441

00:15:29,620 --> 00:15:28,190

icons and and I think it's very similar

442

00:15:31,740 --> 00:15:29,630

to those and I think it does fall in a

443

00:15:33,040 --> 00:15:31,750

place with the majority of the

444

00:15:34,390 --> 00:15:33,050

interpretations I don't know

445

00:15:36,720 --> 00:15:34,400

transactional as well but i think i

446

00:15:38,950 --> 00:15:36,730

would i'd like to see experiments done

447

00:15:40,510 --> 00:15:38,960

some of which i've seen here at this

448

00:15:42,490 --> 00:15:40,520

talk that could be done retro actively

449

00:15:44,530 --> 00:15:42,500

in order to show that these effects are

450

00:15:55,330 --> 00:15:44,540

true retro actively that would be

451
00:15:58,510 --> 00:15:55,340
the prediction of this makes on the same

452
00:15:59,950 --> 00:15:58,520
level do insect do my quote the question

453
00:16:01,650 --> 00:15:59,960
is do animals and microbes and insects

454
00:16:04,390 --> 00:16:01,660
have viewpoints on the same level I

455
00:16:06,760 --> 00:16:04,400
haven't shown this to be true but my

456
00:16:08,590 --> 00:16:06,770
view in developing this theory is that

457
00:16:10,990 --> 00:16:08,600
every single object is treated as a

458
00:16:12,850 --> 00:16:11,000
perspective so a rock has equal

459
00:16:14,830 --> 00:16:12,860
perspective to a human being as an

460
00:16:16,150 --> 00:16:14,840
insect or or any of these things there's

461
00:16:22,360 --> 00:16:16,160
no preferential treatment of

462
00:16:27,250 --> 00:16:22,370
consciousness can use a microphone

463
00:16:28,750 --> 00:16:27,260

please multiple viewpoint pantheistic

464

00:16:33,760 --> 00:16:28,760

solipsism might have to dissect that

465

00:16:35,340 --> 00:16:33,770

statement but again I think I agree to

466

00:16:38,020 --> 00:16:35,350

some extent with Oliver theories of

467

00:16:39,370 --> 00:16:38,030

quantum mechanics including many worlds

468

00:16:40,870 --> 00:16:39,380

to some extent the difference between

469

00:16:43,210 --> 00:16:40,880

many worlds and and what I'm proposing

470

00:16:45,400 --> 00:16:43,220

is that there aren't really many worlds

471

00:16:47,350 --> 00:16:45,410

that definitely exist there's there's

472

00:16:48,850 --> 00:16:47,360

one present right now and there's many

473

00:16:50,680 --> 00:16:48,860

possible worlds in which it can branch

474

00:16:52,330 --> 00:16:50,690

off too but there don't exist physically

475

00:16:54,820 --> 00:16:52,340

there's only one physical world that

476
00:16:56,230 --> 00:16:54,830
exists and therefore one way actually we

477
00:16:57,760 --> 00:16:56,240
feel like we're affecting the past we're

478
00:16:59,200 --> 00:16:57,770
not actually it's not retroactive

479
00:17:00,430 --> 00:16:59,210
causation because we're not changing

480
00:17:03,250 --> 00:17:00,440
anything that has physically happened

481
00:17:04,960 --> 00:17:03,260
we're actually changing or affecting or

482
00:17:07,090 --> 00:17:04,970
determining retro actively things that

483
00:17:09,520 --> 00:17:07,100
have not yet been determined so there's

484
00:17:11,050 --> 00:17:09,530
nothing physical that's being affected

485
00:17:18,460 --> 00:17:11,060
by the choices or the changes that we

486
00:17:19,720 --> 00:17:18,470
make are there other questions thank you