

1
00:00:00,000 --> 00:00:04,559
today it's really an honor to be here

2
00:00:01,409 --> 00:00:09,209
and to talk with you about this work so

3
00:00:04,559 --> 00:00:11,099
the short title for my talk is a fate

4
00:00:09,210 --> 00:00:12,839
follows free will and I'd like to amend

5
00:00:11,099 --> 00:00:14,609
that a little bit out of humility the

6
00:00:12,839 --> 00:00:16,500
title should really be fake could follow

7
00:00:14,609 --> 00:00:18,600
for you well I'm going to explain how

8
00:00:16,500 --> 00:00:19,800
this could be the case I'm not going to

9
00:00:18,600 --> 00:00:21,689
go so far as to say that it is the case

10
00:00:19,800 --> 00:00:24,089
or to prove that but I'm going to try

11
00:00:21,689 --> 00:00:26,579
and give a model for it the way it works

12
00:00:24,089 --> 00:00:28,500
using two theories to current theories

13
00:00:26,579 --> 00:00:29,639
of quantum mechanics consistent

14
00:00:28,500 --> 00:00:31,559
histories and relational quantum

15
00:00:29,640 --> 00:00:33,420
mechanics so it's called retroactive

16
00:00:31,559 --> 00:00:35,100
event determination in the

17
00:00:33,420 --> 00:00:36,630
interpretation of macroscopic quantum

18
00:00:35,100 --> 00:00:37,800
superposition States inconsistent

19
00:00:36,630 --> 00:00:43,320
histories and relational quantum

20
00:00:37,799 --> 00:00:45,000
mechanics so my goal today is described

21
00:00:43,320 --> 00:00:47,939
an interpretation of macroscopic quantum

22
00:00:45,000 --> 00:00:49,409
superposition States the proposed that

23
00:00:47,939 --> 00:00:53,789
mq's dates are all around you all the

24
00:00:49,409 --> 00:00:56,308
time including right now and examine the

25
00:00:53,789 --> 00:00:57,660
flow of time I in the process of doing

26
00:00:56,308 --> 00:01:00,030
that we're gonna have to relook at the

27
00:00:57,659 --> 00:01:01,439
flow of time and and of course in

28
00:01:00,030 --> 00:01:03,090
keeping with the topic of this

29

00:01:01,439 --> 00:01:05,069
conference where that will affect our

30
00:01:03,090 --> 00:01:07,170
flow of energy so might be something to

31
00:01:05,069 --> 00:01:08,489
keep in mind I'd like to receive

32
00:01:07,170 --> 00:01:10,170
feedback about possible experiments and

33
00:01:08,489 --> 00:01:11,339
I'll give you a few experiments but I've

34
00:01:10,170 --> 00:01:13,228
thought of or the other people have done

35
00:01:11,340 --> 00:01:17,159
that could be performed to to

36
00:01:13,228 --> 00:01:18,780
demonstrate this and as it said earlier

37
00:01:17,159 --> 00:01:20,509
I'm unaffiliated and I'm not proud of

38
00:01:18,780 --> 00:01:23,400
that I'd like to find collaborators or

39
00:01:20,509 --> 00:01:26,430
especially in a mathematical geniuses

40
00:01:23,400 --> 00:01:27,868
would be great I might come from a

41
00:01:26,430 --> 00:01:29,610
physics background I went to Berkeley

42
00:01:27,868 --> 00:01:33,140
and I was a high school teacher for

43
00:01:29,609 --> 00:01:35,700

about 10 years so that's my background

44

00:01:33,140 --> 00:01:37,890

so getting the macroscopic quantum

45

00:01:35,700 --> 00:01:39,269

superposition states by the way I'd like

46

00:01:37,890 --> 00:01:41,219

to say I would very much like your

47

00:01:39,269 --> 00:01:42,298

feedback on the presentation I give the

48

00:01:41,219 --> 00:01:43,828

form out of the presentation and the

49

00:01:42,299 --> 00:01:46,320

topic so please feel free to give me

50

00:01:43,828 --> 00:01:49,949

feedback I'm here to learn macroscopic

51

00:01:46,319 --> 00:01:51,179

quantum superposition States a quantum

52

00:01:49,950 --> 00:01:52,200

superposition state for those of you who

53

00:01:51,180 --> 00:01:54,060

aren't so familiar with quantum

54

00:01:52,200 --> 00:01:56,130

mechanics is one of the central features

55

00:01:54,060 --> 00:01:58,439

that make quantum mechanics weird it's

56

00:01:56,129 --> 00:01:59,908

the concept which I'll try and describe

57

00:01:58,438 --> 00:02:05,039

very briefly but will not do it justice

58
00:01:59,909 --> 00:02:08,280
is that for quantum systems like

59
00:02:05,040 --> 00:02:10,939
electrons and protons they can be in

60
00:02:08,280 --> 00:02:12,099
what we call in determine States

61
00:02:10,939 --> 00:02:13,449
everybody

62
00:02:12,099 --> 00:02:15,159
in this room is obviously in a

63
00:02:13,449 --> 00:02:16,449
determined state because they're in a

64
00:02:15,159 --> 00:02:18,129
single place they have a single energy

65
00:02:16,449 --> 00:02:20,709
if you were to measure their energy they

66
00:02:18,129 --> 00:02:23,049
have single values for every measurement

67
00:02:20,710 --> 00:02:25,659
you can make of them but quantum systems

68
00:02:23,050 --> 00:02:26,890
can take multiple values until you make

69
00:02:25,659 --> 00:02:28,060
a measurement so they can be in what are

70
00:02:26,889 --> 00:02:30,099
called superposition states that you

71
00:02:28,060 --> 00:02:31,750
cannot predict the outcome until you

72
00:02:30,099 --> 00:02:35,289
actually make a measurement and get a

73
00:02:31,750 --> 00:02:36,430
definite result so macroscopic quantum

74
00:02:35,289 --> 00:02:38,889
superposition states are actually a

75
00:02:36,430 --> 00:02:40,599
prediction of modern quantum theory not

76
00:02:38,889 --> 00:02:41,500
an unfortunate byproduct but they're

77
00:02:40,599 --> 00:02:42,699
often treated as an unfortunate

78
00:02:41,500 --> 00:02:45,280
by-product because people don't

79
00:02:42,699 --> 00:02:47,229
understand how they could possibly exist

80
00:02:45,280 --> 00:02:49,719
in the world so I'm going to read you a

81
00:02:47,229 --> 00:02:53,409
couple of quotes from Griffiths so you

82
00:02:49,719 --> 00:02:54,819
just listen to me if one supposes it the

83
00:02:53,409 --> 00:02:57,490
Hilbert space structure of quantum

84
00:02:54,819 --> 00:02:59,229
mechanics is correct then mqs dates will

85
00:02:57,490 --> 00:03:00,939
be present in the theory because

86

00:02:59,229 --> 00:03:03,250
essentially a Hilbert space is a linear

87
00:03:00,939 --> 00:03:04,599
vector space in any combination of any

88
00:03:03,250 --> 00:03:07,840
linear combination of two possible

89
00:03:04,599 --> 00:03:10,840
States is also a valid state so mqs

90
00:03:07,840 --> 00:03:14,379
states are equally valid to microscopic

91
00:03:10,840 --> 00:03:16,870
quantum superpositions the reason we get

92
00:03:14,379 --> 00:03:19,299
paradoxes such as the delay choice

93
00:03:16,870 --> 00:03:20,890
experiment paradox is from the process

94
00:03:19,300 --> 00:03:23,530
of implicitly choosing families which

95
00:03:20,889 --> 00:03:25,389
contain no mqs states will make the

96
00:03:23,530 --> 00:03:26,500
assumption that there's no mqs states

97
00:03:25,389 --> 00:03:28,389
because they don't have any physical

98
00:03:26,500 --> 00:03:30,699
reality in our minds we think that and

99
00:03:28,389 --> 00:03:32,199
then inferring from this assumption that

100
00:03:30,699 --> 00:03:33,189

the future influences the past or that

101

00:03:32,199 --> 00:03:35,409
there are mysterious a non-local

102

00:03:33,189 --> 00:03:37,329
influences so Griffith shows that

103

00:03:35,409 --> 00:03:38,859
through the ideas of consistent

104

00:03:37,330 --> 00:03:41,350
histories all of these paradoxes can be

105

00:03:38,860 --> 00:03:43,900
described but you do have to include mqs

106

00:03:41,349 --> 00:03:45,359
states as part of the theory and then of

107

00:03:43,900 --> 00:03:47,680
course most physicists do not have any

108

00:03:45,360 --> 00:03:50,590
intuitive idea as to what mqs states

109

00:03:47,680 --> 00:03:52,300
mean and so we we try to write them out

110

00:03:50,590 --> 00:03:53,379
of the theory I'm going to try and give

111

00:03:52,300 --> 00:03:56,980
you an idea of what they could mean

112

00:03:53,379 --> 00:03:58,419
today so far experiment a if you'll do

113

00:03:56,979 --> 00:04:00,459
me a favor and think about this first

114

00:03:58,419 --> 00:04:04,119
statement is it possible to know right

115
00:04:00,460 --> 00:04:06,750
now without observation of it what is

116
00:04:04,120 --> 00:04:09,730
going on outside the walls of this room

117
00:04:06,750 --> 00:04:11,560
so we have a certain bounded area that

118
00:04:09,729 --> 00:04:12,549
we can observe right now and outside the

119
00:04:11,560 --> 00:04:13,960
walls of this room I think we would all

120
00:04:12,550 --> 00:04:15,580
agree we can't tell what's going on

121
00:04:13,960 --> 00:04:16,930
except through observation now the

122
00:04:15,580 --> 00:04:18,520
observation could take a number of

123
00:04:16,930 --> 00:04:20,500
different forms we could have a video

124
00:04:18,519 --> 00:04:21,699
camera with a live feed into the room

125
00:04:20,500 --> 00:04:23,139
and so we could actually be observing

126
00:04:21,699 --> 00:04:24,310
what's going on out there by gaining

127
00:04:23,139 --> 00:04:26,620
Nation about it through a video camera

128
00:04:24,310 --> 00:04:27,939
we could pull it a cell phone and make a

129
00:04:26,620 --> 00:04:30,129
phone call to somebody that's outside

130
00:04:27,939 --> 00:04:32,110
another way of gaining information about

131
00:04:30,129 --> 00:04:33,729
what's going on outside this room but

132
00:04:32,110 --> 00:04:35,229
without any of those things I think we'd

133
00:04:33,728 --> 00:04:36,158
all agree that we if we have no

134
00:04:35,228 --> 00:04:38,019
information from an

135
00:04:36,158 --> 00:04:39,639
information-theoretic point of view we

136
00:04:38,019 --> 00:04:43,149
can't know what's going on outside the

137
00:04:39,639 --> 00:04:45,430
wall of the walls of this room so the

138
00:04:43,149 --> 00:04:46,718
answer is no now the second question I'd

139
00:04:45,430 --> 00:04:48,968
like to go just a little bit deeper is

140
00:04:46,718 --> 00:04:51,939
it possible to know right now without

141
00:04:48,968 --> 00:04:53,589
observation of it whether something

142
00:04:51,939 --> 00:04:57,250
definite is going on outside the walls

143

00:04:53,589 --> 00:04:58,658
of this room and I think if you think

144
00:04:57,250 --> 00:05:00,278
about it most of us would probably say

145
00:04:58,658 --> 00:05:01,839
well I don't know what's going on but

146
00:05:00,278 --> 00:05:03,699
yes there's something definite going on

147
00:05:01,839 --> 00:05:04,750
and there's a few reasons why we say

148
00:05:03,699 --> 00:05:06,250
that there's definitely something

149
00:05:04,750 --> 00:05:07,060
definite going on outside the walls of

150
00:05:06,250 --> 00:05:08,978
this room even though we're not

151
00:05:07,060 --> 00:05:10,569
observing it the reasons for that

152
00:05:08,978 --> 00:05:12,938
essentially are every time we have

153
00:05:10,569 --> 00:05:15,158
observed it in the past it's obviously

154
00:05:12,939 --> 00:05:16,389
been definite so anytime we make an

155
00:05:15,158 --> 00:05:18,069
observation is something there's there's

156
00:05:16,389 --> 00:05:19,389
always a definite result one hundred

157
00:05:18,069 --> 00:05:21,039

percent of the time in our lives so

158

00:05:19,389 --> 00:05:22,629

we've got a perfect track record showing

159

00:05:21,038 --> 00:05:24,818

us that whenever you know that there's

160

00:05:22,629 --> 00:05:26,740

something definitely going on outside we

161

00:05:24,819 --> 00:05:28,689

can also retro actively go outside the

162

00:05:26,740 --> 00:05:31,740

door after this talk you could walk out

163

00:05:28,689 --> 00:05:34,750

there and ask maybe somebody's out there

164

00:05:31,740 --> 00:05:36,689

with doing the the front table with

165

00:05:34,750 --> 00:05:38,588

papers and working on some of the

166

00:05:36,689 --> 00:05:40,088

registration stuff and we can go and ask

167

00:05:38,588 --> 00:05:41,879

them what was there something definite

168

00:05:40,088 --> 00:05:44,408

going on during the talk out here and

169

00:05:41,879 --> 00:05:45,669

she would of course say well yes there

170

00:05:44,408 --> 00:05:47,019

was something definite going on here

171

00:05:45,668 --> 00:05:49,269

during the talk ten minutes ago I was

172
00:05:47,019 --> 00:05:52,478
writing and I was gathering pens for the

173
00:05:49,269 --> 00:05:54,188
next session and elma so all we know

174
00:05:52,478 --> 00:05:55,658
from these two arguments though is that

175
00:05:54,189 --> 00:05:57,399
when we do make an observation of the

176
00:05:55,658 --> 00:06:00,278
outside world the unobserved world is

177
00:05:57,399 --> 00:06:01,810
that we get a definite result and if we

178
00:06:00,278 --> 00:06:04,300
make a retroactive observation we get a

179
00:06:01,810 --> 00:06:06,968
definite result but I really like to ask

180
00:06:04,300 --> 00:06:08,319
you a sort of an honest assessment is

181
00:06:06,968 --> 00:06:10,149
there any way to know that right now

182
00:06:08,319 --> 00:06:11,710
outside the walls of this room there is

183
00:06:10,149 --> 00:06:13,060
a definite result without measuring it

184
00:06:11,709 --> 00:06:16,120
either in the present or retro actively

185
00:06:13,060 --> 00:06:17,829
I want to propose that there really is

186
00:06:16,120 --> 00:06:20,050
no what no logical way it's really just

187
00:06:17,829 --> 00:06:23,318
a logical argument a positivist argument

188
00:06:20,050 --> 00:06:24,879
as I put it that that's it's just

189
00:06:23,319 --> 00:06:27,069
information that we cannot gain about

190
00:06:24,879 --> 00:06:29,020
the world and so it's a bad assumption

191
00:06:27,069 --> 00:06:30,879
to make the assumption that the world

192
00:06:29,019 --> 00:06:34,778
outside this observed reality is

193
00:06:30,879 --> 00:06:36,610
definite so thought experiment be and

194
00:06:34,778 --> 00:06:37,658
this is just very simplistic and

195
00:06:36,610 --> 00:06:39,460
sure you can find a lot of holes in it

196
00:06:37,658 --> 00:06:41,529
but I think we'll make my point let's

197
00:06:39,459 --> 00:06:43,000
say I'm person p I'm standing in this

198
00:06:41,529 --> 00:06:45,968
room and there's t-bills door one in

199
00:06:43,000 --> 00:06:48,038
door to that I could leave by and let's

200

00:06:45,968 --> 00:06:49,360
say person s is some individual who's

201
00:06:48,038 --> 00:06:51,668
not in the room right now they're

202
00:06:49,360 --> 00:06:54,218
outside walking around and but for some

203
00:06:51,668 --> 00:06:57,188
reason there would be a meaningful

204
00:06:54,218 --> 00:06:58,810
coincidence if I ran into person s so

205
00:06:57,189 --> 00:07:00,550
maybe I run into them I walk out door

206
00:06:58,810 --> 00:07:02,050
one and i run into person s and i have a

207
00:07:00,550 --> 00:07:03,579
conversation about what i'm interested

208
00:07:02,050 --> 00:07:05,770
in this topic and and it actually

209
00:07:03,579 --> 00:07:07,060
changes my views of my research and I go

210
00:07:05,769 --> 00:07:08,799
off in a different direction and it

211
00:07:07,060 --> 00:07:10,329
affects my life in the in the long run

212
00:07:08,800 --> 00:07:12,098
so that's some kind of meaningful

213
00:07:10,329 --> 00:07:12,968
coincidence or maybe they're a friend of

214
00:07:12,098 --> 00:07:15,339

mine that I haven't seen in a long time

215

00:07:12,968 --> 00:07:16,870

and I run into them we can all probably

216

00:07:15,339 --> 00:07:18,339

relate to the idea of meaningful

217

00:07:16,870 --> 00:07:19,810

coincidences at least to some extent

218

00:07:18,339 --> 00:07:23,138

even if we don't believe that they're

219

00:07:19,810 --> 00:07:25,149

truly meaningful so the question I want

220

00:07:23,139 --> 00:07:26,829

to ask you is is it possible to make a

221

00:07:25,149 --> 00:07:29,500

free world choice and miss my faded

222

00:07:26,829 --> 00:07:31,149

experience the favorite experience i

223

00:07:29,500 --> 00:07:32,620

just described happened at door one but

224

00:07:31,149 --> 00:07:35,168

what if i were to choose to walk out of

225

00:07:32,620 --> 00:07:39,009

door too well would I what I completely

226

00:07:35,168 --> 00:07:40,538

miss person s or can the favorite

227

00:07:39,009 --> 00:07:43,210

experience happen regardless of the

228

00:07:40,538 --> 00:07:45,128

choice I make and if so I want to

229
00:07:43,209 --> 00:07:48,098
understand how so going back to this

230
00:07:45,129 --> 00:07:50,229
diagram we can see just with the very

231
00:07:48,098 --> 00:07:52,628
idea of mqs states that person s can be

232
00:07:50,228 --> 00:07:54,908
drawn with two possible superposition

233
00:07:52,629 --> 00:07:57,759
states now again I'm not observing them

234
00:07:54,908 --> 00:07:59,649
so I cannot say that their indefinite

235
00:07:57,759 --> 00:08:01,060
state and if I can't say that they're in

236
00:07:59,649 --> 00:08:02,079
a definite state I shouldn't assume that

237
00:08:01,060 --> 00:08:04,149
they're in a definite state and

238
00:08:02,079 --> 00:08:07,598
therefore this model of having two

239
00:08:04,149 --> 00:08:11,679
possible macroscopic states is equally

240
00:08:07,598 --> 00:08:13,028
valid so if I if I then can see that

241
00:08:11,680 --> 00:08:14,528
there's a possibility that if I choose

242
00:08:13,028 --> 00:08:16,418
door one I could run into a person acid

243
00:08:14,528 --> 00:08:18,129
or one if I choose door to I could run

244
00:08:16,418 --> 00:08:19,718
into person s at door two and there

245
00:08:18,129 --> 00:08:22,088
could be a thousand other possible

246
00:08:19,718 --> 00:08:24,908
histories that would unfold I've only

247
00:08:22,088 --> 00:08:27,519
chosen to for this example and that's

248
00:08:24,908 --> 00:08:29,019
the basic point I want to make person q

249
00:08:27,519 --> 00:08:30,938
just to complete the picture is some

250
00:08:29,019 --> 00:08:33,370
third person observer who might know me

251
00:08:30,939 --> 00:08:35,550
and my no person s and makes an

252
00:08:33,370 --> 00:08:37,538
observation of person as before I do and

253
00:08:35,549 --> 00:08:38,528
we're going to see in relational quantum

254
00:08:37,538 --> 00:08:40,179
mechanics that that means that their

255
00:08:38,528 --> 00:08:42,849
state is correlated to person s estate

256
00:08:40,179 --> 00:08:44,259
so from my point of view person key one

257

00:08:42,849 --> 00:08:46,360
person s are now both in a quantum

258
00:08:44,259 --> 00:08:48,189
superposition state one in which person

259
00:08:46,360 --> 00:08:49,830
key measure person s indoor at door one

260
00:08:48,190 --> 00:08:51,030
and a person

261
00:08:49,830 --> 00:08:53,580
was also at door one so they're

262
00:08:51,029 --> 00:08:55,199
consistent in their in their stories the

263
00:08:53,580 --> 00:08:57,330
other which person q measured person s

264
00:08:55,200 --> 00:08:58,470
at door two and person s was at door two

265
00:08:57,330 --> 00:09:02,940
so there's a consistency with their

266
00:08:58,470 --> 00:09:04,170
stories so moving through of that two

267
00:09:02,940 --> 00:09:07,020
postulates would summarize what we just

268
00:09:04,169 --> 00:09:09,839
talked about only events that one as

269
00:09:07,019 --> 00:09:11,539
observes exists in a definite state and

270
00:09:09,840 --> 00:09:13,590
only from that individuals perspective

271
00:09:11,539 --> 00:09:15,149

so this room around you is all that

272

00:09:13,590 --> 00:09:16,950

you're observing right now from your

273

00:09:15,149 --> 00:09:19,829

perspective and everything outside of it

274

00:09:16,950 --> 00:09:20,820

is in an indefinite State do the first

275

00:09:19,830 --> 00:09:24,120

argument that I was trying to make

276

00:09:20,820 --> 00:09:26,370

earlier the second partial is important

277

00:09:24,120 --> 00:09:27,929

to avoid paradox the real world can only

278

00:09:26,370 --> 00:09:29,399

be meaningfully described from one

279

00:09:27,929 --> 00:09:32,939

single perspective or framework at a

280

00:09:29,399 --> 00:09:35,009

time there was no objective overview so

281

00:09:32,940 --> 00:09:36,630

the only way you avoid the paradox of me

282

00:09:35,009 --> 00:09:39,360

saying I'm in a definite state in person

283

00:09:36,629 --> 00:09:41,070

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

284

00:09:39,360 --> 00:09:42,690

the indefinite state he would say

285

00:09:41,070 --> 00:09:44,370

opposite that he's in a definite state

286
00:09:42,690 --> 00:09:46,320
because he's observing himself and that

287
00:09:44,370 --> 00:09:47,909
I'm an indefinite state the only way to

288
00:09:46,320 --> 00:09:49,770
avoid that is to only look at one

289
00:09:47,909 --> 00:09:50,579
perspective at a time so i can really

290
00:09:49,769 --> 00:09:52,799
describe the world through my

291
00:09:50,580 --> 00:09:54,990
perspective and you can do the same that

292
00:09:52,799 --> 00:09:56,459
you can't compare the two this is known

293
00:09:54,990 --> 00:09:58,379
as a single framework will inconsistent

294
00:09:56,460 --> 00:10:00,600
histories so I'm going to try and go

295
00:09:58,379 --> 00:10:02,399
faster these to get some questions in

296
00:10:00,600 --> 00:10:04,170
relational quantum mechanics carlo

297
00:10:02,399 --> 00:10:06,120
rovelli basically says the state of any

298
00:10:04,169 --> 00:10:09,120
system is relative to the observer not

299
00:10:06,120 --> 00:10:10,500
absolute so what we have here is drawn

300
00:10:09,120 --> 00:10:12,600
from peace perspective we have two

301
00:10:10,500 --> 00:10:13,919
possible histories at the bottom person

302
00:10:12,600 --> 00:10:15,899
s makes a choice they go down history

303
00:10:13,919 --> 00:10:17,490
one or just 32 when person Q makes a

304
00:10:15,899 --> 00:10:19,730
measurement they get correlated so that

305
00:10:17,490 --> 00:10:24,060
they end up in both histories as well

306
00:10:19,730 --> 00:10:25,889
now consists in histories Griffis

307
00:10:24,059 --> 00:10:27,509
especially is what i've read event

308
00:10:25,889 --> 00:10:29,100
chains branch off into various possible

309
00:10:27,509 --> 00:10:30,960
histories so we've already looked at

310
00:10:29,100 --> 00:10:32,310
that the firm work of history's depends

311
00:10:30,960 --> 00:10:34,530
on the way in which we describe the

312
00:10:32,309 --> 00:10:36,359
experiment very important and subtle

313
00:10:34,529 --> 00:10:37,740
argument we can describe any given

314

00:10:36,360 --> 00:10:39,960
experiment with with any number of

315
00:10:37,740 --> 00:10:41,399
frameworks of histories but we have to

316
00:10:39,960 --> 00:10:43,350
stick with one in order to avoid

317
00:10:41,399 --> 00:10:45,569
inconsistencies in order to avoid

318
00:10:43,350 --> 00:10:47,129
paradox so in other words we have to

319
00:10:45,570 --> 00:10:48,390
choose a point of view in other words my

320
00:10:47,129 --> 00:10:50,720
point of view or your point of view a

321
00:10:48,389 --> 00:10:53,639
particular description and stick with it

322
00:10:50,720 --> 00:10:55,950
this is the mathematics in simplified

323
00:10:53,639 --> 00:10:57,240
form of consistent histories we have it

324
00:10:55,950 --> 00:10:59,040
that at the left hand side a single

325
00:10:57,240 --> 00:11:00,480
initial state of s q and p the branches

326
00:10:59,039 --> 00:11:02,069
off into history one at the top and

327
00:11:00,480 --> 00:11:02,450
history two on the bottom and you can

328
00:11:02,070 --> 00:11:04,340

see that

329

00:11:02,450 --> 00:11:07,580

the history remains consistent so that s

330

00:11:04,340 --> 00:11:08,480

two leads to q2 leads to pee too but i

331

00:11:07,580 --> 00:11:10,460

really want to point out here is that

332

00:11:08,480 --> 00:11:12,409

when p makes his measurement and gets

333

00:11:10,460 --> 00:11:13,400

history too let's see he makes

334

00:11:12,409 --> 00:11:15,379

measurement he could get either history

335

00:11:13,399 --> 00:11:17,329

right we don't know which history he'll

336

00:11:15,379 --> 00:11:21,080

get but let's say he makes a measurement

337

00:11:17,330 --> 00:11:22,160

gets history too until that point both

338

00:11:21,080 --> 00:11:24,020

histories were in a soup onnum

339

00:11:22,159 --> 00:11:26,539

superposition state and this is part of

340

00:11:24,019 --> 00:11:28,129

consistent histories so it's only at

341

00:11:26,539 --> 00:11:29,870

this point at the very end that Porsha

342

00:11:28,129 --> 00:11:32,330

person p makes a measurement that not

343
00:11:29,870 --> 00:11:34,340
only the end result is determined but

344
00:11:32,330 --> 00:11:36,470
also the previous events at time one two

345
00:11:34,340 --> 00:11:39,410
three and four also fall back into place

346
00:11:36,470 --> 00:11:40,940
retro actively they weren't determined

347
00:11:39,409 --> 00:11:44,990
until this point of measurement at time

348
00:11:40,940 --> 00:11:47,050
T equals five so this diagram I hope is

349
00:11:44,990 --> 00:11:49,190
is an entryway to understanding how a

350
00:11:47,049 --> 00:11:51,379
measurement at time five can retro

351
00:11:49,190 --> 00:11:54,740
actively affect the events at time T

352
00:11:51,379 --> 00:11:56,600
equals one two three and four so a

353
00:11:54,740 --> 00:11:58,490
visual diagram of that is like this we

354
00:11:56,600 --> 00:12:00,529
have the initial state earlier before

355
00:11:58,490 --> 00:12:01,759
the measurement on the left when person

356
00:12:00,529 --> 00:12:03,110
s is divided into two different

357
00:12:01,759 --> 00:12:04,639
histories and person key was also in

358
00:12:03,110 --> 00:12:06,889
those histories person p makes a

359
00:12:04,639 --> 00:12:09,620
measurement and gets a definite result

360
00:12:06,889 --> 00:12:11,299
and therefore the history one which was

361
00:12:09,620 --> 00:12:13,639
only a mathematical construct to begin

362
00:12:11,299 --> 00:12:15,439
with ceases to have any meaning history

363
00:12:13,639 --> 00:12:18,319
to is the one that is real and retro

364
00:12:15,440 --> 00:12:21,280
actively history as state the state of Q

365
00:12:18,320 --> 00:12:23,360
in the state of s become determined now

366
00:12:21,279 --> 00:12:24,740
obviously from essence perspective this

367
00:12:23,360 --> 00:12:25,789
diagram of totally different because the

368
00:12:24,740 --> 00:12:27,649
masses perspective everything he

369
00:12:25,789 --> 00:12:31,159
observes is definite but from peas

370
00:12:27,649 --> 00:12:33,439
perspective this is the way it looks so

371

00:12:31,159 --> 00:12:35,449
conclusion things don't actually happen

372
00:12:33,440 --> 00:12:38,720
at the time that they happen there's a

373
00:12:35,450 --> 00:12:40,460
retroactive event determination events

374
00:12:38,720 --> 00:12:42,560
fall into place retro actively in order

375
00:12:40,460 --> 00:12:44,210
to align themselves with the with what

376
00:12:42,559 --> 00:12:45,589
we observe in the world so when I

377
00:12:44,210 --> 00:12:47,240
observe someone walking out of that door

378
00:12:45,590 --> 00:12:49,310
the history that led them to that point

379
00:12:47,240 --> 00:12:53,539
is is falling into place according to

380
00:12:49,309 --> 00:12:55,609
this process of consistent histories you

381
00:12:53,539 --> 00:12:56,990
will also have to sort of a look at the

382
00:12:55,610 --> 00:12:59,600
fact that there's no universally defined

383
00:12:56,990 --> 00:13:01,399
present moment the present moment is

384
00:12:59,600 --> 00:13:02,629
defined by me in what I'm observing

385
00:13:01,399 --> 00:13:06,490

right now but everything else outside of

386

00:13:02,629 --> 00:13:08,809

that is is not yet fallen into place and

387

00:13:06,490 --> 00:13:10,970

again my conclusion fake follows free

388

00:13:08,809 --> 00:13:12,649

will I haven't had time to talk about

389

00:13:10,970 --> 00:13:14,029

experiments I've got a couple ideas here

390

00:13:12,649 --> 00:13:15,079

you can read while I take questions and

391

00:13:14,029 --> 00:13:15,799

if you want to ask about experiments I'd

392

00:13:15,080 --> 00:13:18,459

be happy to talk about

393

00:13:15,799 --> 00:13:18,458

thank you

394

00:13:31,190 --> 00:13:38,780

start with a hard one I'm sure it seems

395

00:13:34,970 --> 00:13:43,009

to me that underneath most of your

396

00:13:38,779 --> 00:13:45,289

discussion the the old chestnut of the

397

00:13:43,009 --> 00:13:48,289

other minds problem of philosophy has

398

00:13:45,289 --> 00:13:51,409

been sort of of lurking in a tacit way

399

00:13:48,289 --> 00:13:53,299

and it virtually becomes explicit in

400
00:13:51,409 --> 00:13:56,449
your posture lat to which seems to me

401
00:13:53,299 --> 00:13:58,549
like a restatement of solipsism but with

402
00:13:56,450 --> 00:14:01,009
definite substituted in for where a

403
00:13:58,549 --> 00:14:03,769
solipsist would say real I wonder if you

404
00:14:01,009 --> 00:14:05,929
could comment on this on the basic

405
00:14:03,769 --> 00:14:08,149
concept of solo facism it's it's eerily

406
00:14:05,929 --> 00:14:09,379
part of this but I will summarize and

407
00:14:08,149 --> 00:14:11,539
say no I don't believe this is a

408
00:14:09,379 --> 00:14:14,929
solipsistic view and I don't believe the

409
00:14:11,539 --> 00:14:16,159
world is just based around my view i can

410
00:14:14,929 --> 00:14:17,989
describe the world from my view but

411
00:14:16,159 --> 00:14:19,969
that's not the only consistent framework

412
00:14:17,990 --> 00:14:21,919
that i can describe using the consistent

413
00:14:19,970 --> 00:14:23,930
histories process every single other

414
00:14:21,919 --> 00:14:26,049
individuals view in this room is equally

415
00:14:23,929 --> 00:14:29,389
valid to mine so it doesn't make any

416
00:14:26,049 --> 00:14:30,679
greater importance on my view but it

417
00:14:29,389 --> 00:14:32,419
does say that the world is only

418
00:14:30,679 --> 00:14:34,370
definitely described from my view and

419
00:14:32,419 --> 00:14:35,599
everything outside of my view is is not

420
00:14:34,370 --> 00:14:37,549
that it doesn't exist it's very

421
00:14:35,600 --> 00:14:39,230
important it does exist but it's in some

422
00:14:37,549 --> 00:14:43,370
kind of mathematical macroscopic

423
00:14:39,230 --> 00:14:44,240
superposition until we observe it I hope

424
00:14:43,370 --> 00:14:48,379
that answers your question a little bit

425
00:14:44,240 --> 00:14:51,860
ok sky yeah um yes a quick question and

426
00:14:48,379 --> 00:14:53,120
is your view of things or model you have

427
00:14:51,860 --> 00:14:54,440
here is it consistent with other

428

00:14:53,120 --> 00:14:56,929
interpretations of quantum mechanics

429
00:14:54,440 --> 00:15:00,370
let's say like the relational let's say

430
00:14:56,929 --> 00:15:02,509
the Copenhagen interpretation or

431
00:15:00,370 --> 00:15:05,620
transactional or other ones or is that

432
00:15:02,509 --> 00:15:07,009
is it at odds with certain other

433
00:15:05,620 --> 00:15:09,980
interpretations of quantum mechanics

434
00:15:07,009 --> 00:15:11,870
confession no I happen to think that on

435
00:15:09,980 --> 00:15:13,129
all of the contributions of quantum

436
00:15:11,870 --> 00:15:16,089
mechanics are essentially correct in

437
00:15:13,129 --> 00:15:18,320
some in some way and some methods so I

438
00:15:16,089 --> 00:15:19,760
do summer I know better than others I

439
00:15:18,320 --> 00:15:22,240
think it's very similar to Copenhagen a

440
00:15:19,759 --> 00:15:25,309
lot of ways and I have huge respect for

441
00:15:22,240 --> 00:15:28,190
the developers of Copenhagen as you know

442
00:15:25,309 --> 00:15:29,629

icons and and I think it's very similar

443

00:15:28,190 --> 00:15:31,750

to those and I think it does fall in a

444

00:15:29,629 --> 00:15:33,049

place with the majority of the

445

00:15:31,750 --> 00:15:34,399

interpretations I don't know

446

00:15:33,049 --> 00:15:36,729

transactional as well but i think i

447

00:15:34,399 --> 00:15:38,959

would i'd like to see experiments done

448

00:15:36,730 --> 00:15:40,519

some of which i've seen here at this

449

00:15:38,960 --> 00:15:42,500

talk that could be done retro actively

450

00:15:40,519 --> 00:15:44,539

in order to show that these effects are

451

00:15:42,500 --> 00:15:55,340

true retro actively that would be

452

00:15:44,539 --> 00:15:58,519

the prediction of this makes on the same

453

00:15:55,340 --> 00:15:59,960

level do insect do my quote the question

454

00:15:58,519 --> 00:16:01,659

is do animals and microbes and insects

455

00:15:59,960 --> 00:16:04,400

have viewpoints on the same level I

456

00:16:01,659 --> 00:16:06,769

haven't shown this to be true but my

457
00:16:04,399 --> 00:16:08,600
view in developing this theory is that

458
00:16:06,769 --> 00:16:11,000
every single object is treated as a

459
00:16:08,600 --> 00:16:12,860
perspective so a rock has equal

460
00:16:11,000 --> 00:16:14,840
perspective to a human being as an

461
00:16:12,860 --> 00:16:16,159
insect or or any of these things there's

462
00:16:14,840 --> 00:16:22,370
no preferential treatment of

463
00:16:16,159 --> 00:16:27,259
consciousness can use a microphone

464
00:16:22,370 --> 00:16:28,759
please multiple viewpoint pantheistic

465
00:16:27,259 --> 00:16:33,769
solipsism might have to dissect that

466
00:16:28,759 --> 00:16:35,350
statement but again I think I agree to

467
00:16:33,769 --> 00:16:38,029
some extent with Oliver theories of

468
00:16:35,350 --> 00:16:39,379
quantum mechanics including many worlds

469
00:16:38,029 --> 00:16:40,879
to some extent the difference between

470
00:16:39,379 --> 00:16:43,220
many worlds and and what I'm proposing

471
00:16:40,879 --> 00:16:45,409
is that there aren't really many worlds

472
00:16:43,220 --> 00:16:47,360
that definitely exist there's there's

473
00:16:45,409 --> 00:16:48,860
one present right now and there's many

474
00:16:47,360 --> 00:16:50,690
possible worlds in which it can branch

475
00:16:48,860 --> 00:16:52,340
off too but there don't exist physically

476
00:16:50,690 --> 00:16:54,830
there's only one physical world that

477
00:16:52,340 --> 00:16:56,240
exists and therefore one way actually we

478
00:16:54,830 --> 00:16:57,770
feel like we're affecting the past we're

479
00:16:56,240 --> 00:16:59,210
not actually it's not retroactive

480
00:16:57,769 --> 00:17:00,439
causation because we're not changing

481
00:16:59,210 --> 00:17:03,259
anything that has physically happened

482
00:17:00,440 --> 00:17:04,970
we're actually changing or affecting or

483
00:17:03,259 --> 00:17:07,099
determining retro actively things that

484
00:17:04,970 --> 00:17:09,529
have not yet been determined so there's

485

00:17:07,099 --> 00:17:11,059
nothing physical that's being affected

486
00:17:09,529 --> 00:17:18,470
by the choices or the changes that we

487
00:17:11,059 --> 00:17:19,730
make are there other questions thank you

488
00:17:18,470 --> 00:17:22,210
very much sky thank you very much

489
00:17:19,730 --> 00:17:22,210
appreciated