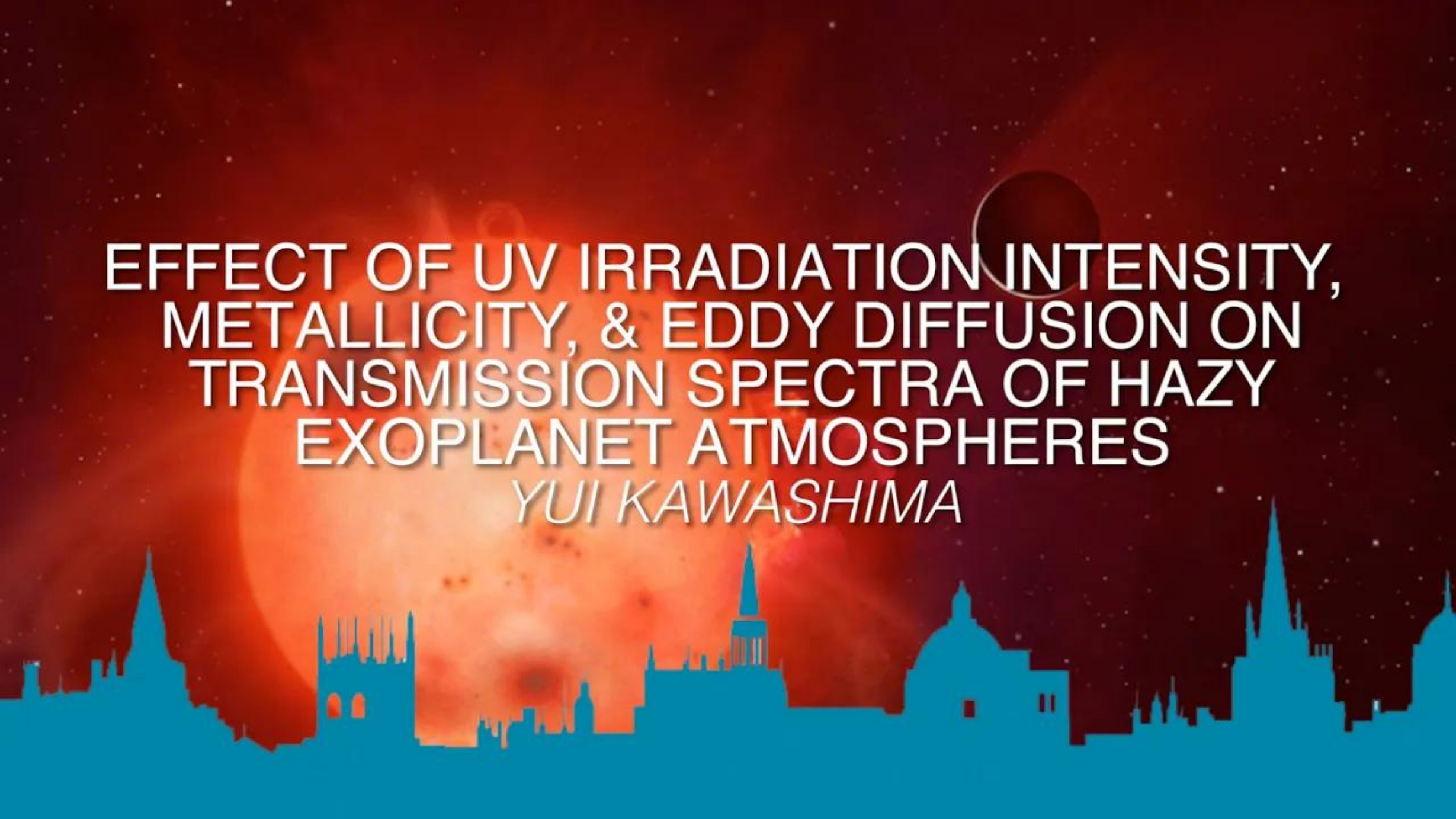
EFFECT OF UV IRRADIATION INTENSITY, METALLICITY, & EDDY DIFFUSION ON TRANSMISSION SPECTRA OF HAZY EXOPLANET ATMOSPHERES

YUI KAWASHIMA



1
00:00:09,629 --> 00:00:07,009
[Music]

2
00:00:10,320 --> 00:00:09,639
huge have a simmer from a throne in the

3
00:00:12,330 --> 00:00:10,330
Netherlands

4
00:00:14,640 --> 00:00:12,340
first I'd like to thank the organizers

5
00:00:17,640 --> 00:00:14,650
for giving me an opportunity to talk

6
00:00:19,710 --> 00:00:17,650
here today today I attract talk about us

7
00:00:22,139 --> 00:00:19,720
effects of UV radiation intensity

8
00:00:23,999 --> 00:00:22,149
metallicity and at a diffusion on

9
00:00:30,030 --> 00:00:24,009
transmission spectre of raising the

10
00:00:32,040 --> 00:00:30,040
point atmosphere first as you know this

11
00:00:33,840 --> 00:00:32,050
end of elevation of transmission Spectre

12
00:00:36,720 --> 00:00:33,850
reveal the diversity of transmission

13
00:00:39,750 --> 00:00:36,730

spectrum this is a figure from simulator

14
00:00:42,479 --> 00:00:39,760
2016 and this shows the transmission

15
00:00:44,430 --> 00:00:42,489
spectrum 10 hot Jupiters region peroxide

16
00:00:46,500 --> 00:00:44,440
shows a variance in micron avoid the

17
00:00:49,829 --> 00:00:46,510
body car access to the normalized

18
00:00:52,590 --> 00:00:49,839
hundred tips you can see that some of

19
00:00:55,229 --> 00:00:52,600
the top comments show the various tax

20
00:00:56,910 --> 00:00:55,239
capturing slope in the optical on the

21
00:00:58,919 --> 00:00:56,920
other hand is an infrared wavelength

22
00:01:01,619 --> 00:00:58,929
change cumshaw very distinct molecular

23
00:01:04,049 --> 00:01:01,629
absorption features water or summer

24
00:01:07,260 --> 00:01:04,059
temperatures some spectrum a very flat

25
00:01:09,690 --> 00:01:07,270
of features this first has big trucks

26
00:01:12,300 --> 00:01:09,700
sedessa existence of also the anatomist

27
00:01:14,670 --> 00:01:12,310
feels an exact on it there are two types

28
00:01:16,980 --> 00:01:14,680
of errors on occasion crowds in the

29
00:01:20,750 --> 00:01:16,990
photochemical haze in this stop I'd like

30
00:01:23,340 --> 00:01:20,760
to focus on hydrocarbon hate particles

31
00:01:26,190 --> 00:01:23,350
this week we explain the production

32
00:01:28,050 --> 00:01:26,200
process of hydrocarbon haze first first

33
00:01:30,000 --> 00:01:28,060
because I Marie Curie's of hydrocarbon

34
00:01:32,340 --> 00:01:30,010
Heiser created through photochemical

35
00:01:34,830 --> 00:01:32,350
reaction triggered by the association of

36
00:01:38,430 --> 00:01:34,840
missing then particle growth takes place

37
00:01:41,280 --> 00:01:38,440
and desserts in large haze particles in

38
00:01:42,930 --> 00:01:41,290

calcium and liqui 2018 we models of heat

39
00:01:45,750 --> 00:01:42,940
formation processes was for the

40
00:01:48,090 --> 00:01:45,760
chemistry and math or physics fusing the

41
00:01:50,100 --> 00:01:48,100
photochemical model week we derive the

42
00:01:53,070 --> 00:01:50,110
distribution of the Crafar molecules of

43
00:01:55,710 --> 00:01:53,080
haze particles and also using the drive

44
00:01:58,080 --> 00:01:55,720
distribution of picasa workers we mode

45
00:02:02,130 --> 00:01:58,090
other we derive the haze distribution in

46
00:02:05,040 --> 00:02:02,140
the atmosphere also i model the

47
00:02:08,130 --> 00:02:05,050
transmission spectrum model in this talk

48
00:02:09,990 --> 00:02:08,140
I drag to explore the effect over in

49
00:02:12,599 --> 00:02:10,000
fact of UV radiation intensity

50
00:02:14,399 --> 00:02:12,609
me thirsty and Eddie diffusion because

51
00:02:16,259 --> 00:02:14,409
these three parameters are very

52
00:02:18,860 --> 00:02:16,269
important of hope haze formation

53
00:02:24,480 --> 00:02:21,420
let me describe our models briefly

54
00:02:26,430 --> 00:02:24,490
illustrate by directors so I will use

55
00:02:28,230 --> 00:02:26,440
the three model photochemical model

56
00:02:29,670 --> 00:02:28,240
microphysical model and trans solution

57
00:02:32,370 --> 00:02:29,680
Spectre which we developed in the

58
00:02:34,740 --> 00:02:32,380
previous paper Kojima and Akuma 2018

59
00:02:37,590 --> 00:02:34,750
first row photochemical model we

60
00:02:40,140 --> 00:02:37,600
consider 29 species compulsives height

61
00:02:43,560 --> 00:02:40,150
of how these five elements carbon

62
00:02:46,260 --> 00:02:43,570
hydrogen oxygen nitrogen and helium we

63
00:02:48,300 --> 00:02:46,270

consider 300 some chemical and 16 for

64
00:02:50,190 --> 00:02:48,310
the chemical reactions at four

65
00:02:53,699 --> 00:02:50,200
temperature pressure profile we used the

66
00:02:56,430 --> 00:02:53,709
analytical solution of giro 2010 and 4

67
00:02:59,040 --> 00:02:56,440
UV spectrum we use the constructed UV

68
00:03:03,030 --> 00:02:59,050
spectrum for digital 14 by majored by

69
00:03:04,800 --> 00:03:03,040
young broad I to 2016 who Android - math

70
00:03:07,620 --> 00:03:04,810
we take the solar beam element that

71
00:03:10,380 --> 00:03:07,630
abundance ratio from dota 2003 and ER

72
00:03:12,330 --> 00:03:10,390
for the diffusion coefficient we assume

73
00:03:15,630 --> 00:03:12,340
this body for the finish okay

74
00:03:17,400 --> 00:03:15,640
and next for Michael physical model

75
00:03:19,229 --> 00:03:17,410
really dives the distribution of hates

76
00:03:21,210 --> 00:03:19,239
particles of multiple sided by

77
00:03:24,360 --> 00:03:21,220
considering particle girls sedimentation

78
00:03:26,280 --> 00:03:24,370
and Eddy diffusion transport and former

79
00:03:28,259 --> 00:03:26,290
on production date so monomer is the

80
00:03:30,630 --> 00:03:28,269
minimum size of the particles considered

81
00:03:32,610 --> 00:03:30,640
inside the model we consider no

82
00:03:35,250 --> 00:03:32,620
production rate as a sum of the photo

83
00:03:37,940 --> 00:03:35,260
sociation lays of his precursors machine

84
00:03:40,440 --> 00:03:37,950
HC and an c2h2

85
00:03:42,300 --> 00:03:40,450
finally for transmission spectrum we

86
00:03:44,820 --> 00:03:42,310
culture 800 steps at each wavelength

87
00:03:46,530 --> 00:03:44,830
with this equation we calculate the

88
00:03:48,870 --> 00:03:46,540

opacity of each molecule using the

89
00:03:50,850 --> 00:03:48,880
hydrent database and for disrupting the

90
00:03:56,310 --> 00:03:50,860
subpage particles we use a measured

91
00:03:58,350 --> 00:03:56,320
value of Kure atoll 1984 before going to

92
00:04:00,690 --> 00:03:58,360
the details of the results I direct the

93
00:04:02,670 --> 00:04:00,700
first explain the show the results for

94
00:04:04,470 --> 00:04:02,680
the whole chemical reaction certificates

95
00:04:07,920 --> 00:04:04,480
to chemical calculations for the video

96
00:04:10,110 --> 00:04:07,930
showcase so the left here shows the

97
00:04:12,180 --> 00:04:10,120
distribution of oil mixing ratio each

98
00:04:14,430 --> 00:04:12,190
molecule as a function Christian in

99
00:04:16,229 --> 00:04:14,440
Perth in the light high gear shows the

100
00:04:19,289 --> 00:04:16,239
free association rate of each molecule

101
00:04:22,560 --> 00:04:19,299
also as a functional pearl you can see

102
00:04:24,630 --> 00:04:22,570
that hydrogen Co 800 and NH 3 are the

103
00:04:29,100 --> 00:04:24,640
major Serfdom observers via for

104
00:04:30,350 --> 00:04:29,110
dissociation or so amudha hate

105
00:04:33,740 --> 00:04:30,360
precursors and

106
00:04:34,969 --> 00:04:33,750
mission at she and and c2h2 city like to

107
00:04:37,339 --> 00:04:34,979
photo because it most

108
00:04:40,040 --> 00:04:37,349
in spite of with lowest abundance this

109
00:04:41,920 --> 00:04:40,050
is because unlike missing an HCl Seto

110
00:04:47,629 --> 00:04:41,930
Eckstein can use lower energy photons

111
00:04:50,089 --> 00:04:47,639
for its photodissociation next I drag

112
00:04:51,860 --> 00:04:50,099
move on to the show the results of the

113
00:04:55,100 --> 00:04:51,870

dependence of the transmission Specter

114
00:04:56,779 --> 00:04:55,110
on UV radiation intensity first so these

115
00:04:58,939 --> 00:04:56,789
two figures shows the distribution of

116
00:05:00,950 --> 00:04:58,949
Gaza species for high UV radiation

117
00:05:04,279 --> 00:05:00,960
intensity case and low UV radiation

118
00:05:06,529 --> 00:05:04,289
intensity case as you expect for high UV

119
00:05:08,990 --> 00:05:06,539
radiation intensity case but chemistry

120
00:05:11,179 --> 00:05:09,000
occurs very efficiently on the other

121
00:05:13,339 --> 00:05:11,189
hand for low UV radiation intensity case

122
00:05:15,950 --> 00:05:13,349
for chemistry occurs very is very

123
00:05:17,929 --> 00:05:15,960
inefficient and the very mixing ratio of

124
00:05:22,909 --> 00:05:17,939
each molecules are almost determined by

125
00:05:25,100 --> 00:05:22,919
mixing and as for the presentation light

126
00:05:27,559 --> 00:05:25,110
of this dissociation rate of each

127
00:05:29,450 --> 00:05:27,569
molecule you see that the for the

128
00:05:31,429 --> 00:05:29,460
Association lights of each molecule is a

129
00:05:33,709 --> 00:05:31,439
larger for high UV radiation intensity

130
00:05:38,059 --> 00:05:33,719
case because of their larger incoming

131
00:05:39,680 --> 00:05:38,069
photon flux and for the free association

132
00:05:42,260 --> 00:05:39,690
lights of the haze precursor

133
00:05:44,360 --> 00:05:42,270
you see that for high UV radiation

134
00:05:46,070 --> 00:05:44,370
intensity case the production of the

135
00:05:48,709 --> 00:05:46,080
assertion late of rates because of the

136
00:05:50,689 --> 00:05:48,719
also larger so in summary production

137
00:05:52,850 --> 00:05:50,699
rate is magical you will high UV

138
00:05:57,709 --> 00:05:52,860

radiation intensity case and smaller for

139
00:05:59,329 --> 00:05:57,719
all UV radiation intensity and these two

140
00:06:01,249 --> 00:05:59,339
figures shows the distribution of haze

141
00:06:03,350 --> 00:06:01,259
particles for high UV radiation

142
00:06:05,990 --> 00:06:03,360
intensity case and low UV radiation test

143
00:06:08,600 --> 00:06:06,000
again first the vertical axis shows a

144
00:06:10,610 --> 00:06:08,610
pressure in bow and the mid range or the

145
00:06:12,559 --> 00:06:10,620
average particle radius so it orange

146
00:06:15,980 --> 00:06:12,569
rinds through the number density of a

147
00:06:17,809 --> 00:06:15,990
particle also I quote the green abnormal

148
00:06:19,999 --> 00:06:17,819
production rate with green lines and

149
00:06:23,300 --> 00:06:20,009
there must density of each particle size

150
00:06:25,490 --> 00:06:23,310
with built our country you see that for

151
00:06:27,529 --> 00:06:25,500
high UV radiation intensity case force

152
00:06:30,019 --> 00:06:27,539
the average radius and there must

153
00:06:32,029 --> 00:06:30,029
density are larger that is just because

154
00:06:34,879 --> 00:06:32,039
the mana production rate is higher for

155
00:06:36,170 --> 00:06:34,889
higher validation dense ticket on the

156
00:06:38,360 --> 00:06:36,180
other hand follow a bit oriental

157
00:06:40,070 --> 00:06:38,370
intensity case you see that for the

158
00:06:42,290 --> 00:06:40,080
radius and the mass density are very

159
00:06:43,820 --> 00:06:42,300
small because the Merle production rate

160
00:06:46,400 --> 00:06:43,830
is small

161
00:06:48,350 --> 00:06:46,410
there is abundant for high UV radiation

162
00:06:52,820 --> 00:06:48,360
intensification less abundant follow you

163
00:06:54,860 --> 00:06:52,830

with a new patient and this figure shows

164
00:06:57,409 --> 00:06:54,870
transmission spectrum for different new

165
00:06:59,540 --> 00:06:57,419
validation intense tickets from the UV

166
00:07:01,909 --> 00:06:59,550
radiation intensity case to high UV

167
00:07:03,529 --> 00:07:01,919
radiation intensity case you see that

168
00:07:05,869 --> 00:07:03,539
the differences in you'll be duration

169
00:07:07,670 --> 00:07:05,879
intensity can explain is recently

170
00:07:10,999 --> 00:07:07,680
observed diversity of transmission

171
00:07:13,610 --> 00:07:11,009
spectra so in the optical wavelength

172
00:07:15,830 --> 00:07:13,620
lens the load to model gob duration

173
00:07:18,409 --> 00:07:15,840
intensity shows the ladies scattering

174
00:07:20,600 --> 00:07:18,419
drop in the optical on the other hand is

175
00:07:23,480 --> 00:07:20,610
a near-infrared wavelengths range from

176
00:07:25,159 --> 00:07:23,490
low UV radiation intensity culture of

177
00:07:27,499 --> 00:07:25,169
social features endured in their

178
00:07:29,809 --> 00:07:27,509
spectrum on the other hand high UV

179
00:07:35,029 --> 00:07:29,819
radiation in testicles the spectrum are

180
00:07:37,309 --> 00:07:35,039
very feature a soft next I'd reckon will

181
00:07:40,249 --> 00:07:37,319
bone to the second parameter atmospheric

182
00:07:41,839 --> 00:07:40,259
matter is the effect so these two

183
00:07:44,450 --> 00:07:41,849
figures show distribution of got a

184
00:07:45,290 --> 00:07:44,460
species for once our case and 100

185
00:07:47,899 --> 00:07:45,300
Sorachi

186
00:07:49,879 --> 00:07:47,909
as you expect the indicator one

187
00:07:51,469 --> 00:07:49,889
hundredth or a meter stick case for you

188
00:07:54,939 --> 00:07:51,479

mixing reaches of all the molecules

189
00:07:59,420 --> 00:07:54,949
other than hydrogen helium are increased

190
00:08:01,189 --> 00:07:59,430
and next to these two figures show the

191
00:08:03,709 --> 00:08:01,199
distribution of water association rates

192
00:08:07,279 --> 00:08:03,719
of each molecule for one surah and 100

193
00:08:09,680 --> 00:08:07,289
kilometers decayed you see that in 100

194
00:08:11,089 --> 00:08:09,690
solar matter istic case the carbon

195
00:08:13,850 --> 00:08:11,099
monoxide and nh3

196
00:08:16,040 --> 00:08:13,860
h2o and hydrogen and OH - OH -

197
00:08:17,839 --> 00:08:16,050
dissociation rate the larger competitor

198
00:08:20,659 --> 00:08:17,849
one Caracas because their their

199
00:08:23,480 --> 00:08:20,669
abundances I increased so for his

200
00:08:26,300 --> 00:08:23,490
precursors put on ceiling the effects by

201
00:08:29,059 --> 00:08:26,310
these molecules so water carbon monoxide

202
00:08:30,559 --> 00:08:29,069
a CO 2 and also existing Qatar higher

203
00:08:34,670 --> 00:08:30,569
altitudes and the highest rates

204
00:08:37,100 --> 00:08:34,680
precursors are increased so because of

205
00:08:38,899 --> 00:08:37,110
this photon serving the effect we found

206
00:08:41,600 --> 00:08:38,909
that for the Association late of his

207
00:08:43,730 --> 00:08:41,610
precursor the smaller for 100 surah met

208
00:08:47,060 --> 00:08:43,740
Arista case even though their burner has

209
00:08:50,060 --> 00:08:47,070
increased so we found the production

210
00:08:52,160 --> 00:08:50,070
rate of the heat precursors are smaller

211
00:08:57,199 --> 00:08:52,170
for higher me thirsty even though the

212
00:08:58,699 --> 00:08:57,209
abundances are increased and this figure

213
00:09:01,100 --> 00:08:58,709

solution spectrum for different

214
00:09:03,889 --> 00:09:01,110
atmospheric metallicity so the Green

215
00:09:06,889 --> 00:09:03,899
Line shows that once order tensor 100

216
00:09:09,559 --> 00:09:06,899
surah and 1000 kilometer is dictated and

217
00:09:11,480 --> 00:09:09,569
the secret show that the sector for the

218
00:09:14,389 --> 00:09:11,490
hazy case where the field lines should

219
00:09:16,160 --> 00:09:14,399
have return with haste free cake in the

220
00:09:18,319 --> 00:09:16,170
horizontal axis of the wavelength in

221
00:09:21,109 --> 00:09:18,329
micron why the vertical axis upon the

222
00:09:22,460 --> 00:09:21,119
depth in percent we find that a little

223
00:09:25,609 --> 00:09:22,470
reshot wavelength

224
00:09:27,739 --> 00:09:25,619
I mean arrest and a few micron we found

225
00:09:29,569 --> 00:09:27,749
that absorption features are more the

226
00:09:33,230 --> 00:09:29,579
largest for moderate matter stick such

227
00:09:35,540 --> 00:09:33,240
as 100 kilometer ski this is because of

228
00:09:37,129 --> 00:09:35,550
the two competing effect one is for

229
00:09:39,829 --> 00:09:37,139
action lake and the other one is of

230
00:09:41,389 --> 00:09:39,839
atmospheric scale height because we

231
00:09:44,030 --> 00:09:41,399
found that the birth of production leg

232
00:09:47,090 --> 00:09:44,040
and the atmospheric scale height as Mora

233
00:09:49,040 --> 00:09:47,100
for high emitter st so because of this

234
00:09:51,259 --> 00:09:49,050
true effect we found that there Adam

235
00:09:53,150 --> 00:09:51,269
absorption features are the largest for

236
00:09:56,900 --> 00:09:53,160
the moderate emitters to such as 100

237
00:09:58,249 --> 00:09:56,910
kilometers decays or so further on the

238
00:10:00,290 --> 00:09:58,259

other hand for the long wavelength

239
00:10:02,660 --> 00:10:00,300
region we found the dependence is his

240
00:10:04,429 --> 00:10:02,670
daughter simple because a hates particle

241
00:10:06,350 --> 00:10:04,439
does not affect the long wavelength so

242
00:10:08,949 --> 00:10:06,360
much we just found their absorption

243
00:10:13,100 --> 00:10:08,959
features a larger for though I'm thirsty

244
00:10:15,259 --> 00:10:13,110
and so you might have a real writer

245
00:10:16,999 --> 00:10:15,269
dependence we have found it and opposite

246
00:10:19,400 --> 00:10:17,009
from that those found recently found

247
00:10:21,470 --> 00:10:19,410
from the experiments so this thing is

248
00:10:24,559 --> 00:10:21,480
shows this figure is from horse data

249
00:10:26,210 --> 00:10:24,569
2080 and they conducted their experiment

250
00:10:28,789 --> 00:10:26,220
and major the production rate of hates

251
00:10:30,949 --> 00:10:28,799
particles inside the chamber as a

252
00:10:33,139 --> 00:10:30,959
function of temperature enemy turistic

253
00:10:34,999 --> 00:10:33,149
they found that the production rate of

254
00:10:37,939 --> 00:10:35,009
each particle States particles are

255
00:10:40,160 --> 00:10:37,949
higher for high emitters T on the other

256
00:10:42,439 --> 00:10:40,170
hand we showed that the production

257
00:10:45,109 --> 00:10:42,449
ladies as more of a higher me thirsty

258
00:10:47,119 --> 00:10:45,119
this is because of the production the

259
00:10:49,999 --> 00:10:47,129
mechanism weakens considered or taking

260
00:10:52,699 --> 00:10:50,009
place is different so for first for

261
00:10:54,889 --> 00:10:52,709
chemistry or the chemistry of currying

262
00:10:56,780 --> 00:10:54,899
the inn's experiments are very complex

263
00:10:59,449 --> 00:10:56,790

on the other hand the chemistry we can

264
00:11:02,059 --> 00:10:59,459
model either wrote a simple I would say

265
00:11:04,039 --> 00:11:02,069
and also on the other hand was a

266
00:11:06,379 --> 00:11:04,049
vertical effect which we found it's very

267
00:11:09,949 --> 00:11:06,389
important and is not considered need in

268
00:11:10,620 --> 00:11:09,959
experiment and we found the director for

269
00:11:13,410 --> 00:11:10,630
the mothering

270
00:11:15,390 --> 00:11:13,420
consider these effects so I drag the

271
00:11:17,490 --> 00:11:15,400
point about her point out the combining

272
00:11:19,350 --> 00:11:17,500
both experiments and mutterings are very

273
00:11:21,120 --> 00:11:19,360
important even though it's not so easy

274
00:11:23,340 --> 00:11:21,130
to combine these two different

275
00:11:28,280 --> 00:11:23,350
approaches so we have to seek out a way

276
00:11:33,170 --> 00:11:30,750
next I drag to move on to the third

277
00:11:35,400 --> 00:11:33,180
parameter so Eddy diffusion coefficient

278
00:11:38,460 --> 00:11:35,410
these two figures show the distribution

279
00:11:40,260 --> 00:11:38,470
of hates particles further fiducial ad

280
00:11:43,170 --> 00:11:40,270
diffusion coefficient case and write a

281
00:11:45,450 --> 00:11:43,180
diffusion coefficient case again the

282
00:11:47,820 --> 00:11:45,460
vertical axis shows the pressure in bar

283
00:11:49,830 --> 00:11:47,830
and the red line shows average particle

284
00:11:51,780 --> 00:11:49,840
radius and the orange rinds for the

285
00:11:53,490 --> 00:11:51,790
average number of density they also

286
00:11:55,470 --> 00:11:53,500
brought the mass production 100

287
00:11:58,050 --> 00:11:55,480
production rate with green lines and

288
00:12:01,560 --> 00:11:58,060

must dance field hates particles of each

289
00:12:04,110 --> 00:12:01,570
height with a blue car culture you see

290
00:12:07,020 --> 00:12:04,120
that therefore larger the diffusion

291
00:12:09,270 --> 00:12:07,030
coefficient case we found that a balsam

292
00:12:11,640 --> 00:12:09,280
reached radius and the mass density of

293
00:12:14,010 --> 00:12:11,650
its particles are smaller this is

294
00:12:15,660 --> 00:12:14,020
because of the ad diffusion transport we

295
00:12:17,370 --> 00:12:15,670
found that the efficient dating huge of

296
00:12:21,180 --> 00:12:17,380
time diffusion transpose a Higgs

297
00:12:23,130 --> 00:12:21,190
particle downward rocketry so it means

298
00:12:27,390 --> 00:12:23,140
are it remove the particles from the

299
00:12:29,790 --> 00:12:27,400
upper atmosphere we also know there's a

300
00:12:31,500 --> 00:12:29,800
transmission spectrum whatever so there

301
00:12:33,540 --> 00:12:31,510
again the horizontal axis shows the

302
00:12:35,760 --> 00:12:33,550
wavelength in my chrome and vertical

303
00:12:38,700 --> 00:12:35,770
axis of the front legs in percent and

304
00:12:40,650 --> 00:12:38,710
the Green Line shows a spectrum for the

305
00:12:44,070 --> 00:12:40,660
future Eddy diffusion coefficient case

306
00:12:46,710 --> 00:12:44,080
for a purple range other smaller any

307
00:12:48,720 --> 00:12:46,720
diffusion coefficient we found for the

308
00:12:51,000 --> 00:12:48,730
large I diffusion coefficient case it

309
00:12:53,580 --> 00:12:51,010
produces a very distinct very scattering

310
00:12:55,290 --> 00:12:53,590
slope in the optical this comes from the

311
00:12:56,460 --> 00:12:55,300
very steep gradient of the mixing

312
00:12:59,310 --> 00:12:56,470
Malaysia for his part according

313
00:13:00,960 --> 00:12:59,320

atmosphere also you see that there are

314
00:13:03,660 --> 00:13:00,970
not so much difference between the

315
00:13:06,240 --> 00:13:03,670
dispositional case and Lloyd case this

316
00:13:07,740 --> 00:13:06,250
is because for this for these barriers

317
00:13:09,930 --> 00:13:07,750
with any diffusion coefficient D

318
00:13:14,610 --> 00:13:09,940
diffusion transport that not pray alone

319
00:13:17,100 --> 00:13:14,620
for the resolution of his particles so

320
00:13:19,050 --> 00:13:17,110
I'd rather summarize my talk we explored

321
00:13:21,540 --> 00:13:19,060
expectable UV radiation intensity

322
00:13:23,860 --> 00:13:21,550
metallicity and edit region transmission

323
00:13:26,600 --> 00:13:23,870
spectral hastings opponent atmosphere

324
00:13:28,550 --> 00:13:26,610
first for a new regeneration intensity

325
00:13:30,680 --> 00:13:28,560
we found that the differences in UV

326
00:13:32,960 --> 00:13:30,690
radiation intensity can explain the

327
00:13:36,230 --> 00:13:32,970
diversity of transmission spectra

328
00:13:37,970 --> 00:13:36,240
next for Atmospheric mattress T we found

329
00:13:40,100 --> 00:13:37,980
that our social features are the

330
00:13:43,340 --> 00:13:40,110
brightest for modern mattress T at short

331
00:13:45,230 --> 00:13:43,350
wavelength but we have to me I have to

332
00:13:47,090 --> 00:13:45,240
project a point out that we need to

333
00:13:50,269 --> 00:13:47,100
combine both experiments and modernise

334
00:13:52,370 --> 00:13:50,279
very carefully and they're finally for

335
00:13:53,930 --> 00:13:52,380
the diffusion coefficient we have found

336
00:13:56,000 --> 00:13:53,940
that extended in each region produce

337
00:14:22,160 --> 00:13:56,010
very discreet Rayleigh scattering syrup

338
00:14:24,620 --> 00:14:22,170

in the optical thanks so talk have

339
00:14:28,480 --> 00:14:24,630
actually two small questions so firstly

340
00:14:31,010 --> 00:14:28,490
when you change the solar flux intensity

341
00:14:34,340 --> 00:14:31,020
did you do it in a steady state

342
00:14:37,579 --> 00:14:34,350
conditions did it try to model like

343
00:14:39,949 --> 00:14:37,589
pulse like increases in in solar

344
00:14:43,460 --> 00:14:39,959
radiation and if so does it have any

345
00:14:46,160 --> 00:14:43,470
lasting effects on the composition so I

346
00:14:49,940 --> 00:14:46,170
just as from the steady-state conditions

347
00:14:51,800 --> 00:14:49,950
so but I want so I think there are

348
00:14:53,810 --> 00:14:51,810
chemical timescale for height formation

349
00:14:55,699 --> 00:14:53,820
it's very small so if they're like the

350
00:14:58,910 --> 00:14:55,709
days are like free of a coaster I think

351
00:15:00,680 --> 00:14:58,920
it can affect time to a chemistry to

352
00:15:03,410 --> 00:15:00,690
some extent but I found the distribution

353
00:15:05,180 --> 00:15:03,420
of haze particles are it take the time

354
00:15:09,079 --> 00:15:05,190
scale for the height particle goes that

355
00:15:11,689 --> 00:15:09,089
much larger so I think are so I think

356
00:15:14,930 --> 00:15:11,699
that it takes about almost one year from

357
00:15:17,590 --> 00:15:14,940
the top rope atmosphere to Delta at the

358
00:15:20,650 --> 00:15:17,600
lower atmosphere so I think

359
00:15:23,449 --> 00:15:20,660
unfortunately so for haze particles

360
00:15:25,850 --> 00:15:23,459
unless the production rate is very large

361
00:15:28,430 --> 00:15:25,860
I think they're where you be free does

362
00:15:31,880 --> 00:15:28,440
not impact the spectra so much and

363
00:15:37,340 --> 00:15:31,890

actually on the timescale question is

364
00:15:40,040 --> 00:15:37,350
the is using a de diffusion

365
00:15:43,550 --> 00:15:40,050
a good approximation for such model in

366
00:15:46,759 --> 00:15:43,560
terms of what are they timescales of

367
00:15:50,930 --> 00:15:46,769
diffusion versus the you know UV

368
00:15:52,639 --> 00:15:50,940
irradiation for this atmosphere so they

369
00:15:54,829 --> 00:15:52,649
do different transport times care is

370
00:15:57,680 --> 00:15:54,839
very large compared to the Michael time

371
00:16:09,439 --> 00:15:57,690
scale so it's like the Muslim in one

372
00:16:11,059 --> 00:16:09,449
year or so it's very large thank you

373
00:16:14,329 --> 00:16:11,069
that was really interesting work so is

374
00:16:16,970 --> 00:16:14,339
that do we know the the UV fluxes from

375
00:16:19,400 --> 00:16:16,980
the stars and the sing at all sample and

376
00:16:20,990 --> 00:16:19,410
is the variance in UV flux so the star

377
00:16:25,309 --> 00:16:21,000
is comparable to what you did in your

378
00:16:27,499 --> 00:16:25,319
simulations so you basically showed that

379
00:16:29,420 --> 00:16:27,509
you could explain the sing the variance

380
00:16:33,019 --> 00:16:29,430
in the transmission spectra from the

381
00:16:35,740 --> 00:16:33,029
sing it all paper by varying the UV

382
00:16:39,340 --> 00:16:35,750
irradiation and do we know the UV flux

383
00:16:42,259 --> 00:16:39,350
impinging on those different planets so

384
00:16:44,269 --> 00:16:42,269
currently we only know the likes of town

385
00:16:46,819 --> 00:16:44,279
what's one thing we know that you

386
00:16:48,470 --> 00:16:46,829
respect them for only 10 foresters then

387
00:16:51,680 --> 00:16:48,480
for any

388
00:16:54,500 --> 00:16:51,690

hoster of 10 watts the planets or so so

389
00:16:56,600 --> 00:16:54,510
we don't so we cannot over the UV

390
00:17:00,110 --> 00:16:56,610
spectrum for the very distinct distinct

391
00:17:02,990 --> 00:17:00,120
stir stir but I think there if there so

392
00:17:05,059 --> 00:17:03,000
if the test discover the nearest

393
00:17:08,539 --> 00:17:05,069
exponents very much I think we can I

394
00:17:10,280 --> 00:17:08,549
think the sample through poster the UV

395
00:17:13,159 --> 00:17:10,290
spectrum sebacean we do increased so I

396
00:17:19,220 --> 00:17:13,169
think we can export more about so you be

397
00:17:21,500 --> 00:17:19,230
effect hi this is really interesting

398
00:17:24,559 --> 00:17:21,510
effect that you see the rivers were in

399
00:17:26,809 --> 00:17:24,569
the in the experiments mama tht means

400
00:17:30,710 --> 00:17:26,819
more haze and in the rivers in the mall

401
00:17:33,049 --> 00:17:30,720
do you think it's due to the more

402
00:17:35,600 --> 00:17:33,059
complex chemistry or do you think it's

403
00:17:38,090 --> 00:17:35,610
more due to a shielding effect from the

404
00:17:41,899 --> 00:17:38,100
upper atmosphere that is not in the

405
00:17:44,180 --> 00:17:41,909
experiment so I think further I think

406
00:17:46,520 --> 00:17:44,190
that there's several effects being is

407
00:17:49,280 --> 00:17:46,530
possible for the different of Jack's

408
00:17:50,960 --> 00:17:49,290
odour first I'd like to say that for

409
00:17:52,850 --> 00:17:50,970
experiments sure there

410
00:17:54,650 --> 00:17:52,860
production rate is higher for higher

411
00:17:56,630 --> 00:17:54,660
metallicity and this means our

412
00:17:59,090 --> 00:17:56,640
conversion efficiencies the conversion

413
00:18:01,340 --> 00:17:59,100

rate since I counted missing two final

414
00:18:04,370 --> 00:18:01,350
hydrocarbon highs are higher Roger for

415
00:18:06,440 --> 00:18:04,380
Roger for higher metallicity and this

416
00:18:08,930 --> 00:18:06,450
thing because we cannot are in this in

417
00:18:11,030 --> 00:18:08,940
our motoring we just assume they're 100%

418
00:18:13,940 --> 00:18:11,040
cover under and conversion efficiency

419
00:18:16,190 --> 00:18:13,950
because we don't know their dependence

420
00:18:18,650 --> 00:18:16,200
on their metallicity and also i'd like

421
00:18:20,720 --> 00:18:18,660
to say the third for the body core

422
00:18:22,910 --> 00:18:20,730
effect cannot be considering in the

423
00:18:24,940 --> 00:18:22,920
experiment so the further but photon

424
00:18:27,410 --> 00:18:24,950
shielding effect i found it either

425
00:18:29,990 --> 00:18:27,420
larger for hi Amit aristov so i think

426
00:18:31,670 --> 00:18:30,000
this is a opposite completing effects so