

Illustrations



1
00:00:04,640 --> 00:00:02,840
NASA's Hubble Space Telescope has looked

2
00:00:06,710 --> 00:00:04,650
for evidence of atmospheres around

3
00:00:09,350 --> 00:00:06,720
several earth sized planets in the

4
00:00:11,299 --> 00:00:09,360
Trappist one system including three that

5
00:00:13,610 --> 00:00:11,309
are in the star's habitable zone where

6
00:00:16,310 --> 00:00:13,620
liquid water could exist on the surface

7
00:00:18,650 --> 00:00:16,320
a lot of astronomers and space

8
00:00:20,660 --> 00:00:18,660
enthusiasts were very excited by the

9
00:00:22,609 --> 00:00:20,670
discovery of the seven earth sized

10
00:00:24,800 --> 00:00:22,619
planets of the Trappist warning system

11
00:00:26,990 --> 00:00:24,810
the prends orbit an ultra-cool dwarf

12
00:00:29,029 --> 00:00:27,000
star about 40 light years away

13
00:00:30,679 --> 00:00:29,039

scientists have theories about what

14

00:00:32,630 --> 00:00:30,689

these plants may be like and whether

15

00:00:34,490 --> 00:00:32,640

they could support life but we won't

16

00:00:36,110 --> 00:00:34,500

know for sure until we get more

17

00:00:38,420 --> 00:00:36,120

comprehensive observations of this

18

00:00:41,299 --> 00:00:38,430

system including data on the planets

19

00:00:43,190 --> 00:00:41,309

atmospheres as a planet in the Travis

20

00:00:45,440 --> 00:00:43,200

one system passes between us and the

21

00:00:47,540 --> 00:00:45,450

star it blocks out a small portion of

22

00:00:49,369 --> 00:00:47,550

the star's light telescopes like Hubble

23

00:00:51,500 --> 00:00:49,379

can look at changes in specific

24

00:00:53,420 --> 00:00:51,510

wavelengths of light which provide clues

25

00:00:55,819 --> 00:00:53,430

to the composition in size of the

26

00:00:59,930 --> 00:00:55,829

planet's atmosphere Hubble observations

27

00:01:01,880 --> 00:00:59,940

in May 2016 of Travis one B and C showed

28

00:01:04,600 --> 00:01:01,890

that these planets do not seem to have

29

00:01:07,219 --> 00:01:04,610

thick puffy hydrogen-rich atmosphere

30

00:01:09,140 --> 00:01:07,229

this indicates a higher chance that they

31

00:01:12,770 --> 00:01:09,150

are rocky terrestrial planets

32

00:01:15,950 --> 00:01:12,780

rather than many gas giants Hubble then

33

00:01:19,429 --> 00:01:15,960

observed planets d e f and g in december

34

00:01:22,210 --> 00:01:19,439

2016 in january 2017 in near-infrared

35

00:01:25,490 --> 00:01:22,220

wavelengths and the results were similar

36

00:01:27,770 --> 00:01:25,500

Hubble found no sign of thick puffy

37

00:01:29,870 --> 00:01:27,780

hydrogen-rich atmosphere for any of the

38

00:01:31,460 --> 00:01:29,880

four planets the data suggests that

39

00:01:34,609 --> 00:01:31,470

there is not this gas giant like

40

00:01:36,289 --> 00:01:34,619

atmosphere for planets D E and F and the

41

00:01:38,600 --> 00:01:36,299

data from this round of observations was

42

00:01:40,039 --> 00:01:38,610

not as strong for planet G so while

43

00:01:42,380 --> 00:01:40,049

there's no evidence for a thick

44

00:01:44,469 --> 00:01:42,390

hydrogen-rich atmosphere on G the

45

00:01:47,359 --> 00:01:44,479

researchers are not yet ruling it out

46

00:01:48,889 --> 00:01:47,369

planets e F and G orbit at distances

47

00:01:51,289 --> 00:01:48,899

where temperatures would allow for

48

00:01:53,450 --> 00:01:51,299

liquid water while D is likely a little

49

00:01:55,249 --> 00:01:53,460

too hot Hubble is yet to take

50

00:01:57,719 --> 00:01:55,259

observations of Planet H which is

51
00:02:00,450 --> 00:01:57,729
outside the system's habitable zone

52
00:02:02,039 --> 00:02:00,460
to summarize Hubble has not seen

53
00:02:06,090 --> 00:02:02,049
evidence of thick hydrogen-rich

54
00:02:09,089 --> 00:02:06,100
atmosphere for planets b c d e and f and

55
00:02:12,000 --> 00:02:09,099
of those five planets E&S are in the

56
00:02:14,400 --> 00:02:12,010
habitable zone planet needs more data

57
00:02:16,680 --> 00:02:14,410
and Hubble is not yet looked at planet H

58
00:02:17,970 --> 00:02:16,690
it's worth noting though that even

59
00:02:20,580 --> 00:02:17,980
though planets outside the habitable

60
00:02:22,410 --> 00:02:20,590
zone still might be able to have liquid

61
00:02:24,570 --> 00:02:22,420
water somewhere on its surface in

62
00:02:26,190 --> 00:02:24,580
certain conditions it's also worth

63
00:02:28,710 --> 00:02:26,200

noting that if any of these planets have

64

00:02:30,780 --> 00:02:28,720

high-altitude clouds and Hayes's that

65

00:02:33,330 --> 00:02:30,790

would block couples ability to detect a

66

00:02:35,400 --> 00:02:33,340

thick hydrogen-rich atmosphere but such

67

00:02:37,949 --> 00:02:35,410

an atmosphere is not likely to exist on

68

00:02:39,479 --> 00:02:37,959

these planets many possibilities remain

69

00:02:41,880 --> 00:02:39,489

for what types of atmospheres these

70

00:02:44,520 --> 00:02:41,890

planets have or whether they even have

71

00:02:46,860 --> 00:02:44,530

atmospheres the Travis one planets could

72

00:02:50,100 --> 00:02:46,870

have compact atmosphere similar to Mars

73

00:02:52,199 --> 00:02:50,110

Venus Earth or something entirely

74

00:02:54,360 --> 00:02:52,209

different researchers hope to use

75

00:02:55,920 --> 00:02:54,370

Hubble's ultraviolet capabilities to

76

00:02:58,229 --> 00:02:55,930

look for evidence of water vapour or

77

00:03:00,150 --> 00:02:58,239

methane and NASA's upcoming James Webb

78

00:03:02,129 --> 00:03:00,160

Space Telescope will look in the far

79

00:03:04,860 --> 00:03:02,139

infrared to further characterize these

80

00:03:06,420 --> 00:03:04,870

atmospheres future telescopes also hope

81

00:03:08,309 --> 00:03:06,430

to look for hints of whether the planets

82

00:03:11,099 --> 00:03:08,319

are habitable and if life could be

83

00:03:13,440 --> 00:03:11,109

present the Travis one system provides

84

00:03:16,590 --> 00:03:13,450

the best opportunity we currently have

85

00:03:18,270 --> 00:03:16,600

to study earth-sized exoplanet over the

86

00:03:20,160 --> 00:03:18,280

next few years Hubble and other

87

00:03:22,860 --> 00:03:20,170

telescopes will work together each

88

00:03:25,199 --> 00:03:22,870

contributing important observations so

89

00:03:27,150 --> 00:03:25,209

for the first time ever we will have an

90

00:03:29,190 --> 00:03:27,160

in-depth understanding of a set of