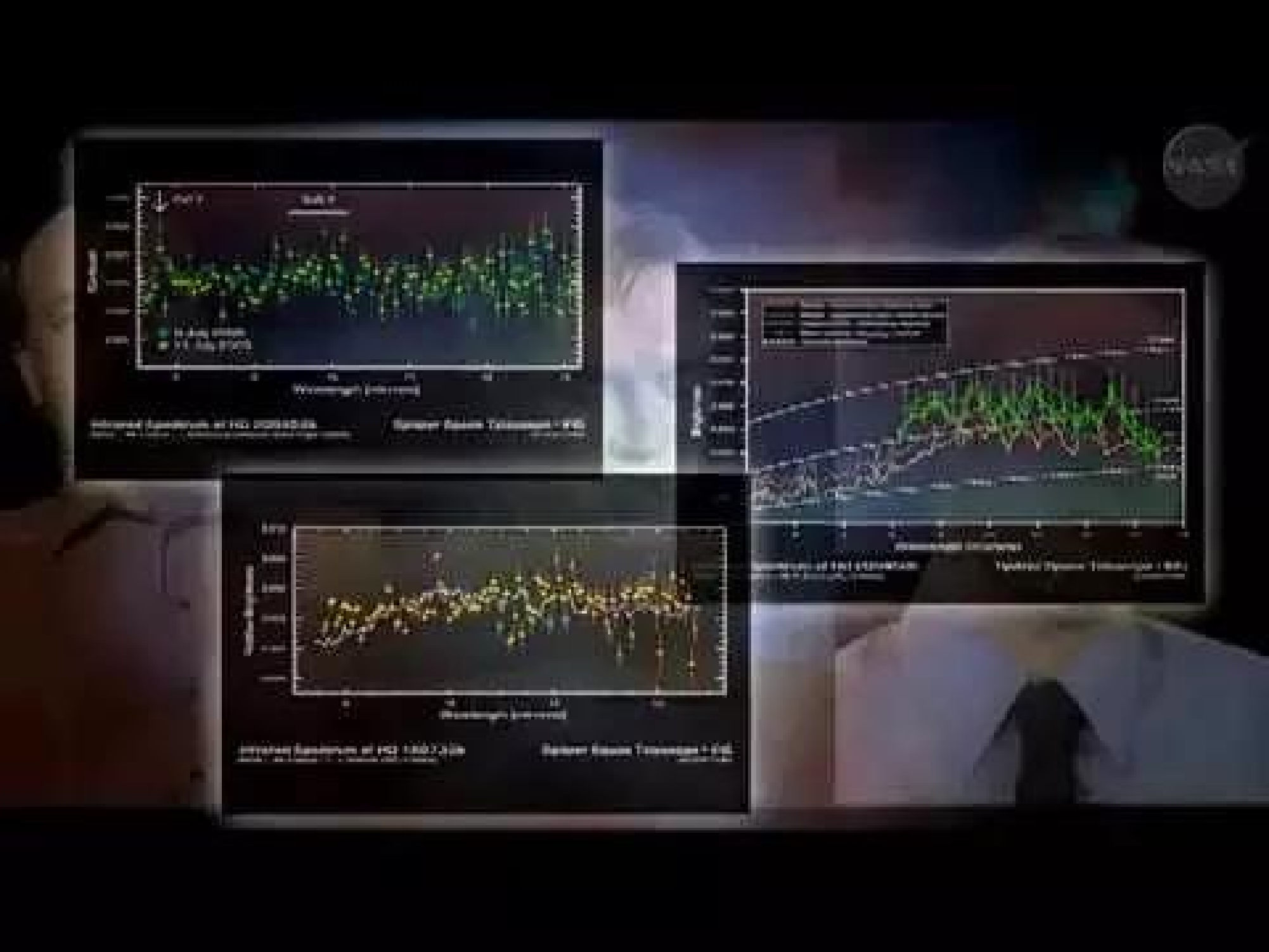

1
00:00:13,549 --> 00:00:10,910
NASA's Spitzer Space Telescope wasn't

2
00:00:15,620 --> 00:00:13,559
designed to be an exoplanet super-sleuth

3
00:00:18,920 --> 00:00:15,630
but it's proving to be an amazing

4
00:00:21,140 --> 00:00:18,930
infrared detective tool Spitzer has

5
00:00:23,390 --> 00:00:21,150
split open the light from two alien

6
00:00:26,660 --> 00:00:23,400
worlds to planets outside of our solar

7
00:00:29,689 --> 00:00:26,670
system the resulting data called spectra

8
00:00:31,820 --> 00:00:29,699
reveal clues about their atmospheres we

9
00:00:33,650 --> 00:00:31,830
wanted to measure the spectrum of the

10
00:00:35,090 --> 00:00:33,660
planet because that tells us what

11
00:00:37,040 --> 00:00:35,100
molecules are present in the planet's

12
00:00:41,090 --> 00:00:37,050
atmosphere two different actually three

13
00:00:44,000 --> 00:00:41,100

different teams basically found the

14
00:00:47,000 --> 00:00:44,010
first real spectrum of a planet around a

15
00:00:47,450 --> 00:00:47,010
different star and that's a pretty big

16
00:00:49,940 --> 00:00:47,460
deal

17
00:00:52,700 --> 00:00:49,950
Grell mayer Swain and a third team

18
00:00:59,569 --> 00:00:52,710
headed by dr. Jeremy Richardson studied

19
00:01:03,799 --> 00:00:59,579
two planets HD 2094 58b and HD 1897 33 B

20
00:01:07,340 --> 00:01:03,809
- hot Jupiters or gas giants that orbit

21
00:01:10,039 --> 00:01:07,350
close to their Suns 300 to 900 trillion

22
00:01:12,289 --> 00:01:10,049
miles from Earth well you've heard the

23
00:01:13,760 --> 00:01:12,299
analogy that looking at a planet around

24
00:01:15,800 --> 00:01:13,770
another star is kind of like seeing a

25
00:01:18,109 --> 00:01:15,810
firefly next to a searchlight it's a

26
00:01:20,270 --> 00:01:18,119
very very faint object next to something

27
00:01:22,039 --> 00:01:20,280
extremely bright so how do you look at

28
00:01:24,260 --> 00:01:22,049
that in order to take this spectrum what

29
00:01:26,960 --> 00:01:24,270
we have to do is we have to let the

30
00:01:29,359 --> 00:01:26,970
planet be clipped by its star so we

31
00:01:31,520 --> 00:01:29,369
can't see the planet anymore and then we

32
00:01:33,140 --> 00:01:31,530
subtract the spectra that were taken

33
00:01:35,120 --> 00:01:33,150
inside of eclipse from the specter that

34
00:01:36,590 --> 00:01:35,130
were taken outside of Eclipse and then

35
00:01:37,820 --> 00:01:36,600
we're left with what the planet

36
00:01:39,860 --> 00:01:37,830
contributed

37
00:01:42,200 --> 00:01:39,870
some astronomers predicted there would

38
00:01:44,690 --> 00:01:42,210

have been water and to their surprise

39
00:01:47,810 --> 00:01:44,700
they found no hint of it in either

40
00:01:51,530 --> 00:01:47,820
atmosphere that could mean the water is

41
00:01:53,210 --> 00:01:51,540
hiding under a blanket of high clouds if

42
00:01:55,640 --> 00:01:53,220
the clouds are at high elevation they

43
00:01:57,740 --> 00:01:55,650
may just obscure the atmosphere of the

44
00:01:59,840 --> 00:01:57,750
planet the lower atmosphere where the

45
00:02:01,630 --> 00:01:59,850
strong water signature might exist I

46
00:02:04,100 --> 00:02:01,640
think it's premature to say

47
00:02:05,230 --> 00:02:04,110
Richardson's team however did spot

48
00:02:08,480 --> 00:02:05,240
something else

49
00:02:11,090 --> 00:02:08,490
silicon's there was a feature that we

50
00:02:13,490 --> 00:02:11,100
saw in the spectrum that is probably due

51
00:02:16,640 --> 00:02:13,500
to silicate mission and silicates are

52
00:02:19,100 --> 00:02:16,650
like molecules that have silicon and

53
00:02:22,670 --> 00:02:19,110
oxygen and typically some other metal in

54
00:02:25,010 --> 00:02:22,680
them and what that means is that that

55
00:02:26,840 --> 00:02:25,020
there's likely a cloud that's pretty

56
00:02:29,570 --> 00:02:26,850
high in the atmosphere that could be

57
00:02:32,570 --> 00:02:29,580
made of these silicate grains basically

58
00:02:34,430 --> 00:02:32,580
dust grains Spitzer astronomers hope to

59
00:02:36,860 --> 00:02:34,440
study the two planets more in the future

60
00:02:38,720 --> 00:02:36,870
and to use this technique on a handful

61
00:02:41,360 --> 00:02:38,730
of other transiting planets that orbit

62
00:02:43,850 --> 00:02:41,370
stars outside of our solar system I

63
00:02:45,500 --> 00:02:43,860

think this will ultimately be one of the

64
00:02:46,699 --> 00:02:45,510
most important legacies of the of the

65
00:02:48,860 --> 00:02:46,709
spitzer space telescope and

66
00:02:50,690 --> 00:02:48,870
unanticipated as it was before launch I

67
00:02:52,820 --> 00:02:50,700
think it will become extremely important

68
00:02:55,750 --> 00:02:52,830
in the future this is a stepping stone

69
00:02:58,250 --> 00:02:55,760
to eventually studying signs of life on

70
00:03:00,440 --> 00:02:58,260
worlds where life could exist the

71
00:03:02,330 --> 00:03:00,450
habitable worlds which were hoping to

72
00:03:05,090 --> 00:03:02,340
discover in the near future a step