1
00:00:06,309 --> 00:00:03,429
nasa's kepler spacecraft has discovered

2
00:00:08,470 --> 00:00:06,319
kepler-10b its first confirmed rocky

3
00:00:11,030 --> 00:00:08,480
planet and the smallest transiting

4
00:00:14,310 --> 00:00:11,040
exoplanet discovered to date

5
00:00:17,349 --> 00:00:14,320
kepler-10b is only 1.4 times the size of

6
00:00:20,310 --> 00:00:17,359
earth and has an average density of 8.8

7
00:00:22,310 --> 00:00:20,320
grams per cubic centimeter similar to

8
00:00:25,349 --> 00:00:22,320
that of an iron dumbbell

9
00:00:27,990 --> 00:00:25,359
the planet orbits its star in only 0.84

10
00:00:50,630 --> 00:00:28,000
days and is not in the habitable zone

11
00:00:55,189 --> 00:00:52,709
this rocky planet is not like any of the

12
00:00:57,350 --> 00:00:55,199
rocky planets in our own solar system it

13
00:01:00,630 --> 00:00:57,360

orbits its parent star with a period of

14
00:01:02,790 --> 00:01:00,640
less than one day only 0.8 days is what

15
00:01:05,350 --> 00:01:02,800
it takes to orbit the star once

16
00:01:06,469 --> 00:01:05,360
and because it's so close to its parent

17
00:01:09,270 --> 00:01:06,479
star

18
00:01:12,390 --> 00:01:09,280
the the day the day side of that planet

19
00:01:15,830 --> 00:01:12,400
is scorching hot it's about 1800 degrees

20
00:01:17,749 --> 00:01:15,840
kelvin which is hot enough to uh melt

21
00:01:20,070 --> 00:01:17,759
the rocks on the surface so that day

22
00:01:21,749 --> 00:01:20,080
side of the planet is is quite molten we

23
00:01:23,910 --> 00:01:21,759
believe the other thing that makes this

24
00:01:25,749 --> 00:01:23,920
such a special result is that we've got

25
00:01:28,230 --> 00:01:25,759
all the best capabilities of kepler

26
00:01:30,069 --> 00:01:28,240
converging on this one discovery we've

27
00:01:32,390 --> 00:01:30,079
got the very high precision photometry

28
00:01:34,950 --> 00:01:32,400
from the spacecraft we've got the

29
00:01:36,710 --> 00:01:34,960
highest possible precision doppler

30
00:01:38,149 --> 00:01:36,720
measurements from our our ground-based

31
00:01:40,469 --> 00:01:38,159
telescopes and we've got the

32
00:01:42,069 --> 00:01:40,479
astroseismic analysis which allows us to

33
00:01:44,149 --> 00:01:42,079
pin down the properties of the star with

34
00:01:46,149 --> 00:01:44,159
very high precision this discovery is a

35
00:01:47,749 --> 00:01:46,159
milestone not just for our team because

36
00:01:50,310 --> 00:01:47,759
it's our first rocky planet but it

37
00:01:53,510 --> 00:01:50,320
really is a milestone for for humanity

38
00:01:55,990 --> 00:01:53,520

in in general and for exoplanet studies

39
00:01:58,870 --> 00:01:56,000
there's only one other object known to

40
00:02:00,950 --> 00:01:58,880
humanity which is kind of in this regime

41
00:02:03,190 --> 00:02:00,960
that we might that might be rocky but

42
00:02:06,870 --> 00:02:03,200
this is the first detection that really

43
00:02:09,109 --> 00:02:06,880
is unquestionably a rocky planet

44
00:02:11,990 --> 00:02:09,119
we measure the diameter of the planet by

45
00:02:14,869 --> 00:02:12,000
how much light is blocked as the planet

46
00:02:17,270 --> 00:02:14,879
blocks in the starlight we measure the

47
00:02:19,830 --> 00:02:17,280
mass of the planet by how strongly the

48
00:02:21,350 --> 00:02:19,840
planet yanks on the host star and

49
00:02:23,670 --> 00:02:21,360
putting those two together we learn the

50
00:02:26,710 --> 00:02:23,680
density of the planet this one planet

51
00:02:28,949 --> 00:02:26,720
kepler 10 has a density of 8 grams per

52
00:02:31,910 --> 00:02:28,959
cubic centimeter the earth in comparison

53
00:02:34,790 --> 00:02:31,920
is only 5.5 grams per cubic centimeter

54
00:02:36,710 --> 00:02:34,800
so you can see this kepler-10 planet has

55
00:02:38,790 --> 00:02:36,720
a density greater than that of the earth