1
00:00:00,000 --> 00:00:04,050
tone

2
00:00:04,070 --> 00:00:08,050
music

3
00:00:08,070 --> 00:00:12,230
As you get farther away from the sun, the temperature goes up.

4
00:00:12,250 --> 00:00:16,230
Now, this is counter intuitive. It's like if you are trying to heat a marshmallow on

5
00:00:16,250 --> 00:00:20,240
a fire, you put the marshmallow closer to the fire to heat it up

6
00:00:20,260 --> 00:00:24,250
not pull it farther away. This been a mystery for

7
00:00:24,270 --> 00:00:28,270
quite a while. According to the nanoflare heating theory of

8
00:00:28,290 --> 00:00:32,300
the solar corona, there are very many low

9
00:00:32,320 --> 00:00:36,300
energy nanoflare heating events. Energy is released

10
00:00:36,320 --> 00:00:40,330
in a nanoflare, it heats the local plasma to

11
00:00:40,350 --> 00:00:44,510
a very high temperature, around 10 million degrees

12
00:00:44,530 --> 00:00:48,520
and there's such a small amount of this very hot plasma,

13
00:00:48,540 --> 00:00:52,520

that we can't see the individual nanoflares, but

14
00:00:52,540 --> 00:00:56,530
as you cool down through the 2 million degree range,

15
00:00:56,550 --> 00:01:00,570
which happens fairly quickly, and as many of these events occur,

16
00:01:00,590 --> 00:01:04,700
we end up seeing the 2 million degree solar corona.

17
00:01:04,720 --> 00:01:08,720
that we're used to. One of the objectives of the EUNIS flight

18
00:01:08,740 --> 00:01:12,910
was to address this.

19
00:01:12,930 --> 00:01:16,920
EUNIS is an acronym for the Extreme Ultraviolet Normal Incident Spectragraph

20
00:01:16,940 --> 00:01:20,920
It's an instrument that we fly on a sounding rocket

21
00:01:20,940 --> 00:01:24,940
out of White Sands Missile Range, New Mexico.

22
00:01:24,960 --> 00:01:29,130
It reaches an altitude of about 320 kilometers

23
00:01:29,150 --> 00:01:33,130
which is about 200 miles. We record about

24
00:01:33,150 --> 00:01:37,150
6 minutes of observations of the sun, and then the instrument

25
00:01:37,170 --> 00:01:41,150
parachutes back down into the desert where we can retrieve it.

26
00:01:41,170 --> 00:01:45,160
Basically, it's 2 separate instruments, 2 spectrameters,

27
00:01:45,180 --> 00:01:49,170
pointed in the same area of the sun,

28
00:01:49,190 --> 00:01:53,170
so we can be observing a very wide wavelength range. Each

29
00:01:53,190 --> 00:01:57,180
of these channels is very rich in emission lines.

30
00:01:57,200 --> 00:02:01,180
There are lines from many different ionization stages of lots

31
00:02:01,200 --> 00:02:05,200
of different elements. For the purposes of this work, we are interested

32
00:02:05,220 --> 00:02:09,210
in the Fe XIX and the Fe XII emission.

33
00:02:09,230 --> 00:02:13,220
We can see faint emission at those temperatures that provide

34
00:02:13,240 --> 00:02:17,250
the further smoking gun evidence for the nanoflare heating

35
00:02:17,270 --> 00:02:21,260
theory. So, this is very exciting for astronomers