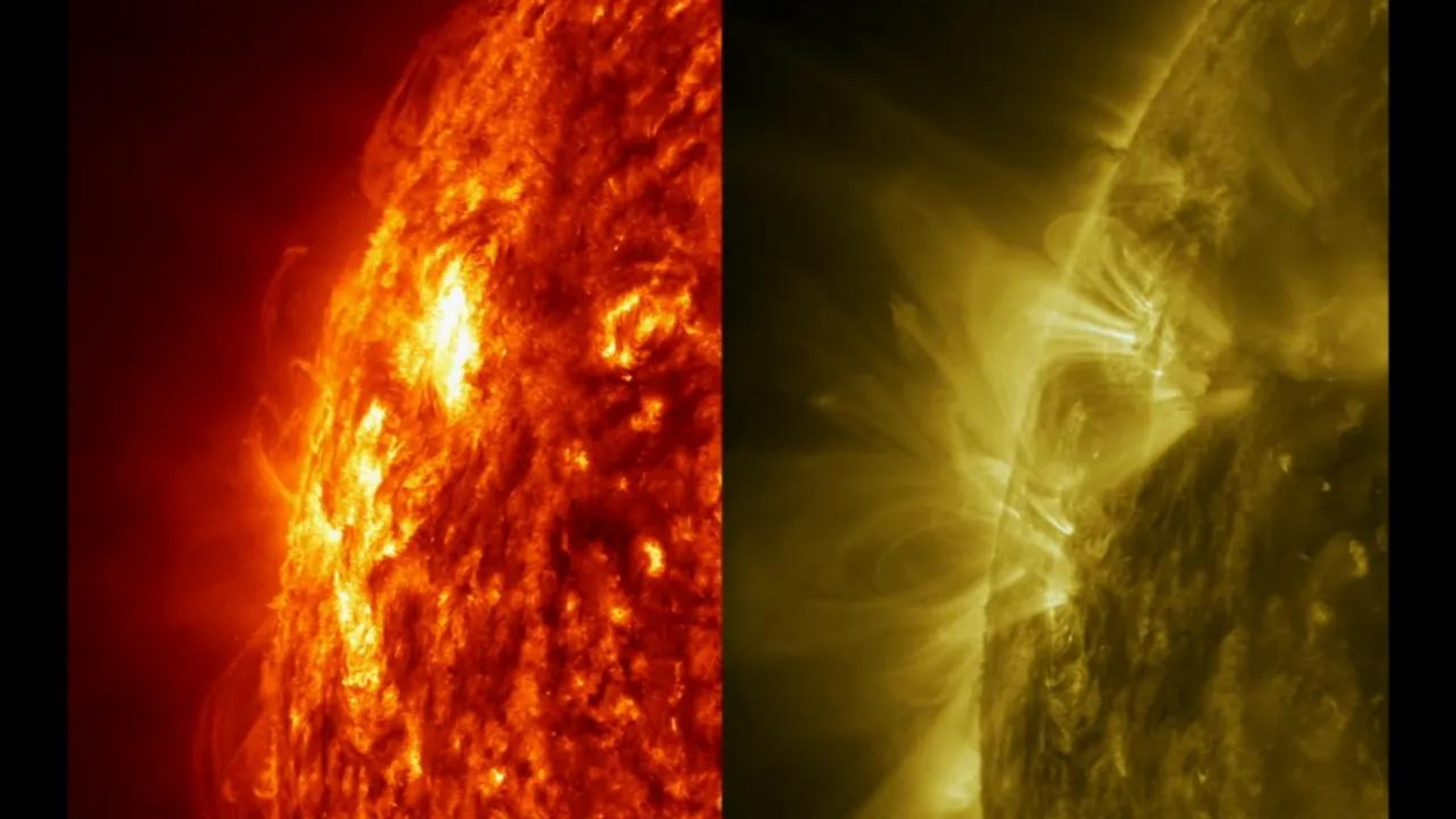

1
00:00:01,080 --> 00:00:05,080
[music throughout] In the scorching upper

2
00:00:05,080 --> 00:00:09,080
reaches of the Sun’s atmosphere, the corona, scientists have just seen a new type of magnetic

3
00:00:09,080 --> 00:00:13,080
explosion. The explosion known as forced or

4
00:00:13,080 --> 00:00:17,080
controlled magnetic reconnection, is triggered by an eruption on the Sun which causes

5
00:00:17,080 --> 00:00:21,080
tangled magnetic field lines to explosively snap and realign, shooting

6
00:00:21,080 --> 00:00:25,080
out particles and energy. The discovery may help

7
00:00:25,080 --> 00:00:29,080
scientists understand a key mystery about how the corona, the Sun’s outermost layer,

8
00:00:29,080 --> 00:00:33,080
is millions of degrees hotter than layers below it.

9
00:00:33,080 --> 00:00:37,080
Previously, scientists had only seen spontaneous reconnection.

10
00:00:37,080 --> 00:00:41,080
which is not necessarily linked to an eruption or external forcing on the Sun.

11
00:00:41,080 --> 00:00:45,080
The forced reconnection event was clearly visible

12
00:00:45,080 --> 00:00:49,080
when the scientists used observations from NASA’s Solar Dynamics Observatory

13
00:00:49,080 --> 00:00:53,080

to look at a wavelength of showing plasma heated to six million degrees.

14
00:00:53,080 --> 00:00:57,080
The data showed a prominence,

15
00:00:57,080 --> 00:01:01,080
a large loop of plasma moving up from the visible surface of the Sun, the photosphere

16
00:01:01,080 --> 00:01:05,080
In a series of images take over an hour, the

17
00:01:05,080 --> 00:01:09,080
prominence could be seen falling back into the photosphere.

18
00:01:09,080 --> 00:01:13,080
En route, the prominence ran into a snarl of magnetic field lines, causing them to

19
00:01:13,080 --> 00:01:17,080
reconnection in a distinct X shape. The data from the event

20
00:01:17,080 --> 00:01:21,080
showed that the prominence, which was fairly cool relative to the blistering corona,

21
00:01:21,080 --> 00:01:25,080
gained heat from the event. The temperature of the reconnection point was also

22
00:01:25,080 --> 00:01:29,080
elevated. This suggests that forced reconnection might be

23
00:01:29,080 --> 00:01:33,080
one way that the corona is heated locally.

24
00:01:33,080 --> 00:01:37,080
The scientists are continuing to look for more forced reconnection events.

25
00:01:37,080 --> 00:01:41,080
With more observations, they can begin to understand the mechanics behind the

26
00:01:41,080 --> 00:01:45,080
reconnection and how often it might happen.