1
00:00:00,070 --> 00:00:04,170
[music] In 1743, observers claimed

2
00:00:04,190 --> 00:00:08,230
to have seen a comet with 6 tails.

3
00:00:08,250 --> 00:00:12,390
Little did they know that the streaks behind the comet could be related to the origins

4
00:00:12,410 --> 00:00:16,590
of the solar system. In time,

5
00:00:16,610 --> 00:00:20,780
scientists theorized that the dust in a comet’s tail had been combed out into bands known as striae.

6
00:00:20,800 --> 00:00:24,970
How the striae formed, however, was still a mystery.

7
00:00:24,990 --> 00:00:29,160
How dust behaves in a comet’s tail is exciting

8
00:00:29,180 --> 00:00:33,360
because comets are the leftover building blocks of the solar system. By watching the material clump

9
00:00:33,380 --> 00:00:37,550
and fragment in the tail, we can gain insights

10
00:00:37,570 --> 00:00:41,670
into the same process that forms dust into planets, moons, or asteroids.

11
00:00:41,690 --> 00:00:45,810
In 2007, researchers were able to capture images of Comet McNaught

12
00:00:45,830 --> 00:00:50,010
with NASA and ESA’s SOHO and STEREO spacecraft.

13
00:00:50,030 --> 00:00:54,210

Today, researchers are introducing the latest step in

14
00:00:54,230 --> 00:00:58,240
analyzing footage like this: a new image mapping technique.

15
00:00:58,260 --> 00:01:02,320
When the technique is applied, it seamlessly combines perspectives from multiple

16
00:01:02,340 --> 00:01:06,420
spacecraft, giving us a clearer picture of how the dust trail changes over time.

17
00:01:06,440 --> 00:01:10,600
In the processed footage, we see the

18
00:01:10,620 --> 00:01:14,790
new striations form. Their alignment relative to the Sun

19
00:01:14,810 --> 00:01:18,980
indicates that the star might play a role in striae formation, as well

20
00:01:19,000 --> 00:01:23,070
as fragmentation. We can also see how the clean lines

21
00:01:23,090 --> 00:01:27,240
are disrupted when the comet crosses the current sheet, the boundary where the solar

22
00:01:27,260 --> 00:01:31,420
wind's magnetic field changes orientation. Notice

23
00:01:31,440 --> 00:01:35,600
how the defined lines become broken. This tells

24
00:01:35,620 --> 00:01:39,780
us that the dust is charged and that the characteristic lines of the magnetic field in the solar

25
00:01:39,800 --> 00:01:43,840
system are affecting it.

26
00:01:43,860 --> 00:01:47,910
Scientists can use the new processing tool to study dust behavior in other comets.

27
00:01:47,930 --> 00:01:52,010
When it comes to learning how comets can teach us about our origins,

28
00:01:52,030 --> 00:01:56,100
we've only just caught this by the tail.