1
00:00:00,083 --> 00:00:04,045
[Music throughout] Last summer, an amateur astronomer discovered

2
00:00:04,045 --> 00:00:09,676
the first interstellar comet zipping through our solar system – 2I/Borisov.

3
00:00:09,676 --> 00:00:14,097
It was clear from its path that the comet would dim from view within months,

4
00:00:14,097 --> 00:00:18,601
so scientists were quick to turn their telescopes towards the alien comet for a view.

5
00:00:18,601 --> 00:00:21,771
Among them was an international team led by NASA Goddard.

6
00:00:21,771 --> 00:00:27,569
They used the ALMA telescope array in northern Chile to probe 2I/Borisov while it was close by.

7
00:00:27,569 --> 00:00:33,658
Inside the halo of gas around the comet, they detected something peculiar.

8
00:00:33,658 --> 00:00:38,038
2I/Borisov was releasing a higher concentration of carbon monoxide

9
00:00:38,038 --> 00:00:41,332
than any comet observed at a similar distance from the Sun.

10
00:00:41,332 --> 00:00:45,378
NASA’s Hubble Space Telescope later confirmed this, too.

11
00:00:45,378 --> 00:00:50,842
Scientists wondered – Could this be our first glimpse of the chemistry of another planetary system?

12
00:00:50,842 --> 00:00:56,389
Or are we learning that there’s more chemical diversity among comets than we knew of?

13
00:00:56,389 --> 00:01:00,018

Carbon monoxide is one of the most abundant molecules in space.

14
00:01:00,018 --> 00:01:06,941
Scientists expect to see it inside all comets; yet, there’s a huge variation – which is puzzling

15
00:01:06,941 --> 00:01:10,779
Regardless, 2I/Borisov is off the charts.

16
00:01:10,779 --> 00:01:14,616
To preserve its carbon monoxide, the comet likely formed

17
00:01:14,616 --> 00:01:18,119
very far away from its star in one of the coldest environments known.

18
00:01:18,119 --> 00:01:21,623
In our solar system, this would have been in the vicinity of Neptune.

19
00:01:21,623 --> 00:01:27,170
When comets were forming, temperatures there could’ve reached -420 degrees Fahrenheit.

20
00:01:27,170 --> 00:01:32,383
Scientists think that gravitational disturbances from young, jostling planets may have thrown

21
00:01:32,383 --> 00:01:39,015
2I/Borisov out of its home star system and onto a cold, lonely voyage.

22
00:01:39,015 --> 00:01:43,520
Our solar system is tiny compared to the distances between star systems.

23
00:01:43,520 --> 00:01:48,108
It’s incredibly rare for an interstellar comet to pass within observable range.

24
00:01:48,108 --> 00:01:52,028
However, big, sophisticated telescopes are coming online,