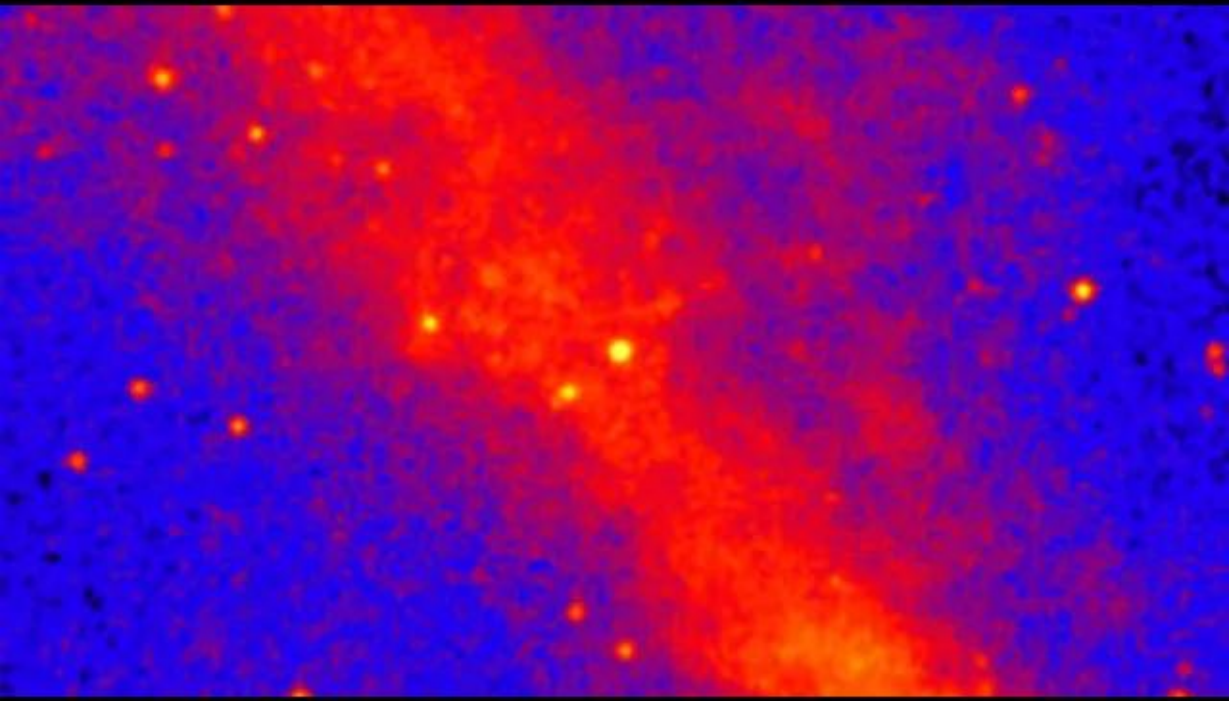

1
00:00:00,000 --> 00:00:04,000
Scientists using data from NASA's Fermi mission

2
00:00:04,000 --> 00:00:08,000
have pinpointed a “PeVatron,”

3
00:00:08,000 --> 00:00:12,000
an elusive source of cosmic ray particles here.

4
00:00:12,000 --> 00:00:16,000
Cosmic rays strike our atmosphere every day.

5
00:00:16,000 --> 00:00:20,000
They're mostly protons, and come in a broad range of energies.

6
00:00:20,000 --> 00:00:24,000
The highest-energy particles made within our own galaxy

7
00:00:24,000 --> 00:00:28,000
exceed 1,000 trillion electron volts (PeV).

8
00:00:28,000 --> 00:00:32,000
That's 10 times the energy reached by the world’s most powerful particle collider.

9
00:00:32,000 --> 00:00:36,000
Locating PeV sources, or PeVatrons, isn’t easy.

10
00:00:36,000 --> 00:00:40,000
music

11
00:00:40,000 --> 00:00:44,000
Like all cosmic rays, their paths to Earth become scrambled by magnetic fields.

12
00:00:44,000 --> 00:00:48,000
But when these particles strike other matter,

13
00:00:48,000 --> 00:00:52,000

they produce gamma rays,

14
00:00:52,000 --> 00:00:56,000
high-energy light that travels straight to us.

15
00:00:56,000 --> 00:01:00,000
This stellar wreckage

16
00:01:00,000 --> 00:01:04,000
was already a prime PeVatron suspect.

17
00:01:04,000 --> 00:01:08,000
Supernova remnant. PeVatron.

18
00:01:08,000 --> 00:01:12,000
Gas cloud.

19
00:01:12,000 --> 00:01:16,000
And with 12 years of Fermi data, the connection's even clearer.

20
00:01:16,000 --> 00:01:20,000
About 10,000 years ago,

21
00:01:20,000 --> 00:01:24,000
a powerful supernova exploded at this spot.

22
00:01:24,000 --> 00:01:28,000
What remains now is a bright gamma-ray pulsar

23
00:01:28,000 --> 00:01:32,000
and a blast wave that's still expanding into space.

24
00:01:32,000 --> 00:01:36,000
Protons ensnared in this blast wave keep gaining energy

25
00:01:36,000 --> 00:01:40,000
until they eventually break out.

26
00:01:40,000 --> 00:01:44,000
They eventually hit the gas cloud,

27
00:01:44,000 --> 00:01:48,000
producing the tell-tale gamma rays Fermi sees.