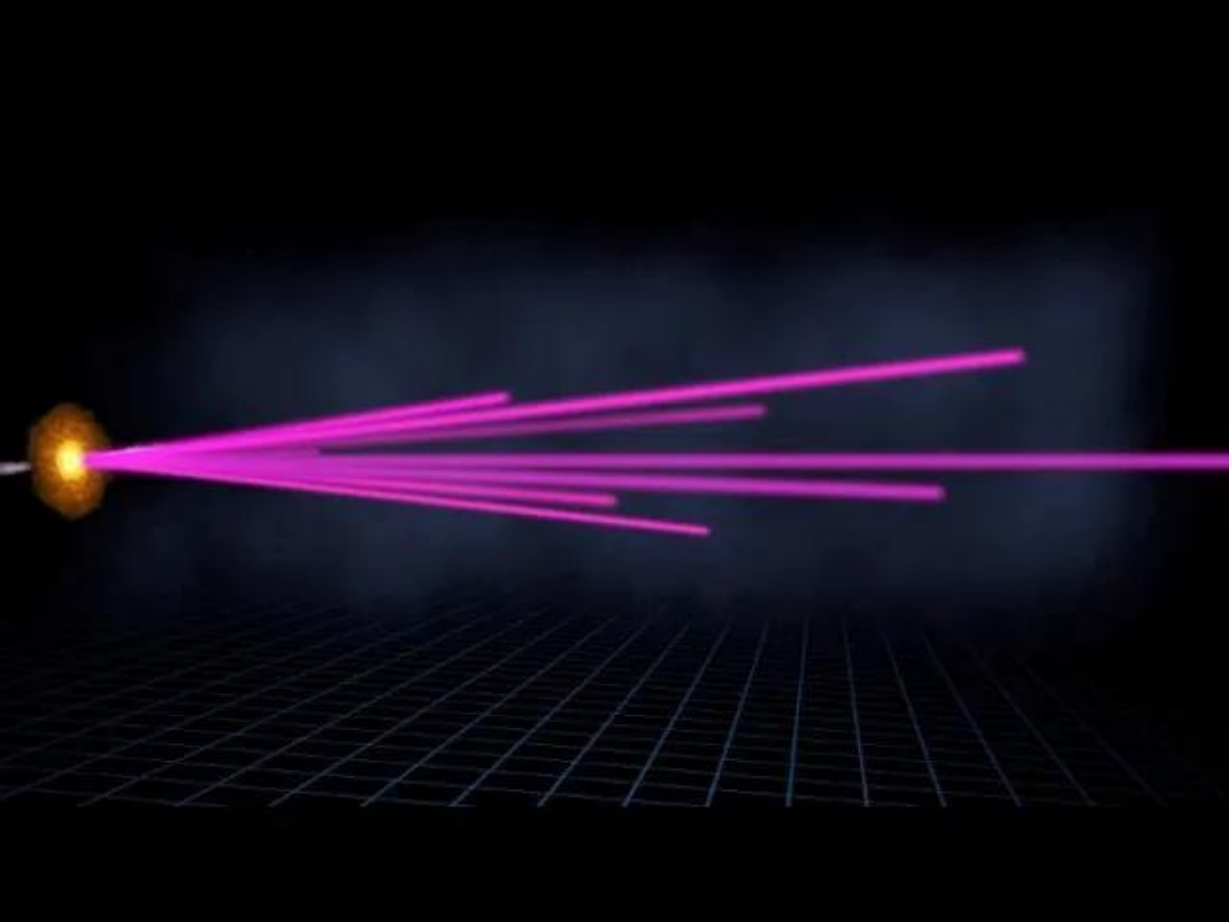

1
00:00:00,020 --> 00:00:04,090
[Music]

2
00:00:04,090 --> 00:00:08,200
Scientists have now traced all the starlight across

3
00:00:08,200 --> 00:00:12,320
ninety percent of cosmic history, thanks to NASA's Fermi Gamma-ray

4
00:00:12,320 --> 00:00:16,380
Space Telescope. Fermi studies the universe using gamma rays,

5
00:00:16,380 --> 00:00:20,470
the highest-energy form of light. Over the last 10 years,

6
00:00:20,470 --> 00:00:24,560
Fermi has measured gamma rays from nearly 2,000 blazars.

7
00:00:24,560 --> 00:00:28,580
These galaxies host supermassive black holes and produce

8
00:00:28,580 --> 00:00:32,710
jets of high-speed particles. Gamma rays from these blazars

9
00:00:32,710 --> 00:00:36,750
interact with starlight produced throughout the cosmos. Even after

10
00:00:36,750 --> 00:00:40,840
stars burn out, their light continues to travel across the universe,

11
00:00:40,840 --> 00:00:44,990
forming the extragalactic background light, or EBL.

12
00:00:44,990 --> 00:00:49,110
When a gamma ray collides with starlight, it transforms into two

13
00:00:49,110 --> 00:00:53,200

particles, an electron and a positron, in accordance with Einstein's

14
00:00:53,200 --> 00:00:57,270
famous equation. These collisions weaken a blazar's gamma-ray

15
00:00:57,270 --> 00:01:01,330
signal like fog dulling a car's headlights. The further back scientists

16
00:01:01,330 --> 00:01:05,450
look, the greater the EBL's dimming effect. A new study

17
00:01:05,450 --> 00:01:09,560
of the EBL peered back through 12 billion years of starlight,

18
00:01:09,560 --> 00:01:13,610
confirming that star formation in our universe peaked about

19
00:01:13,610 --> 00:01:17,800
10 billion years ago. Stars create most of the light in the universe

20
00:01:17,800 --> 00:01:21,820
and many of its heavy elements, like silicon and iron.

21
00:01:21,820 --> 00:01:25,970
Understanding how our cosmos came to be depends in large part on

22
00:01:25,970 --> 00:01:30,160
understanding how stars evolved. Thanks to Fermi,

23
00:01:30,160 --> 00:01:34,240
we're one step closer. [Music]

24
00:01:42,490 --> 00:01:38,370
[Music]