1
00:00:00,010 --> 00:00:04,010
Music

2
00:00:04,030 --> 00:00:08,030
Hi, I'm Elizabeth Hayes, a scientist working on NASA's

3
00:00:08,050 --> 00:00:12,050
Fermi Gamma-ray Space Telescope. Every 3 hours, the

4
00:00:12,070 --> 00:00:16,070
Large Area Telescope onboard Fermi builds up a picture of the sky in gamma-rays,

5
00:00:16,090 --> 00:00:20,100
the most energetic form of light. One thing it sees a lot of is

6
00:00:20,120 --> 00:00:24,130
blazars, active galaxies whose emissions are powered by supermassive black

7
00:00:24,150 --> 00:00:28,140
holes. Blazars are extremely active objects.

8
00:00:28,160 --> 00:00:32,150
Here's one of the most extreme Fermi has seen. It's been known to flare up so brightly

9
00:00:32,170 --> 00:00:36,190
that, for a few days, it outshines every other gamma-ray source.

10
00:00:36,210 --> 00:00:40,210
Considering that it's more than 7 billion light-years away, this is an immense

11
00:00:40,230 --> 00:00:44,230
energy output. At the core of an active galaxy is a supermassive

12
00:00:44,250 --> 00:00:48,250
black hole that powers jets of particles moving near the speed of light.

13
00:00:48,270 --> 00:00:52,280

We call it a blazar when one of the jets is pointed in our direction.

14
00:00:52,300 --> 00:00:56,280
This offers us the best view for seeing dramatic flares when there are changes along

15
00:00:56,300 --> 00:01:00,300
the jet. Fermi has found about a thousand gamma-ray blazars so far.

16
00:01:00,320 --> 00:01:04,320
Every day, the gamma-ray sky changes depending on which galaxies are

17
00:01:04,340 --> 00:01:08,370
in outburst and which are in a quiet phase. Because we're watching them all the time,

18
00:01:08,390 --> 00:01:12,390
we can track their activity and alert other telescopes to new flare-ups.

19
00:01:12,410 --> 00:01:16,430
As Fermi continues to watch the sky, it builds a more complete picture of the

20
00:01:16,450 --> 00:01:20,460
daily lives of these powerful objects. Some of the flares we

21
00:01:20,480 --> 00:01:24,490
see announce the presence of blazars we've never seen before. And sometimes

22
00:01:24,510 --> 00:01:28,520
we find a gamma-ray flare that is not from a blazar, which is very exciting.

23
00:01:28,540 --> 00:01:32,550
We hope to discover new types of gamma-ray-emitting objects that we don't yet know

24
00:01:32,570 --> 00:01:36,590
about. Right now, nearly one third of Fermi sources cannot be connected

25
00:01:36,600 --> 00:01:40,620
to any known type of gamma-ray source. Out there in the dark,

26
00:01:40,640 --> 00:01:44,650
what new discoveries await us?