



1
00:00:00,130 --> 00:00:04,230
[Music throughout]

2
00:00:04,230 --> 00:00:08,380
Eta Carinae is a massive binary system 7,500 light-years away.

3
00:00:08,380 --> 00:00:12,570
[X-ray view]

4
00:00:20,800 --> 00:00:27,000
Its two stars are 90 and 30 times the Sun's mass and orbit each other every 5.5 years.

5
00:00:30,130 --> 00:00:34,220
New X-ray observations from NASA's NusSTAR mission show that their interaction

6
00:00:34,220 --> 00:00:39,390
creates cosmic rays by accelerating particles to nearly the speed of light.

7
00:00:39,390 --> 00:00:46,590
Both stars are so hot and bright they shed matter in the form of outflows called stellar winds.

8
00:00:49,660 --> 00:00:55,740
The smaller star's faster, thinner wind carves a tunnel through the primary's slow, thick outflow.

9
00:00:55,740 --> 00:01:04,790
Where these winds collide, shockwaves accelerate particles, some of which crash into starlight.

10
00:01:08,880 --> 00:01:14,970
The collision ramps up the light's energy into X-ray or even gamma-ray territory.

11
00:01:14,970 --> 00:01:21,190
We detect cosmic ray particles at Earth. But because they're electrically charged

12
00:01:21,190 --> 00:01:27,310
they wander in the presence of magnetic fields. This means we can't tell where they're coming from.

13
00:01:30,370 --> 00:01:34,550

Now, thanks to NuSTAR, we know Eta Carinae is producing cosmic rays.

14

00:01:36,660 --> 00:01:39,800

It's more than a superstar.

15

00:01:45,030 --> 00:01:49,220

It's a cosmic ray gun.