

WHEN STARS GO BOOM

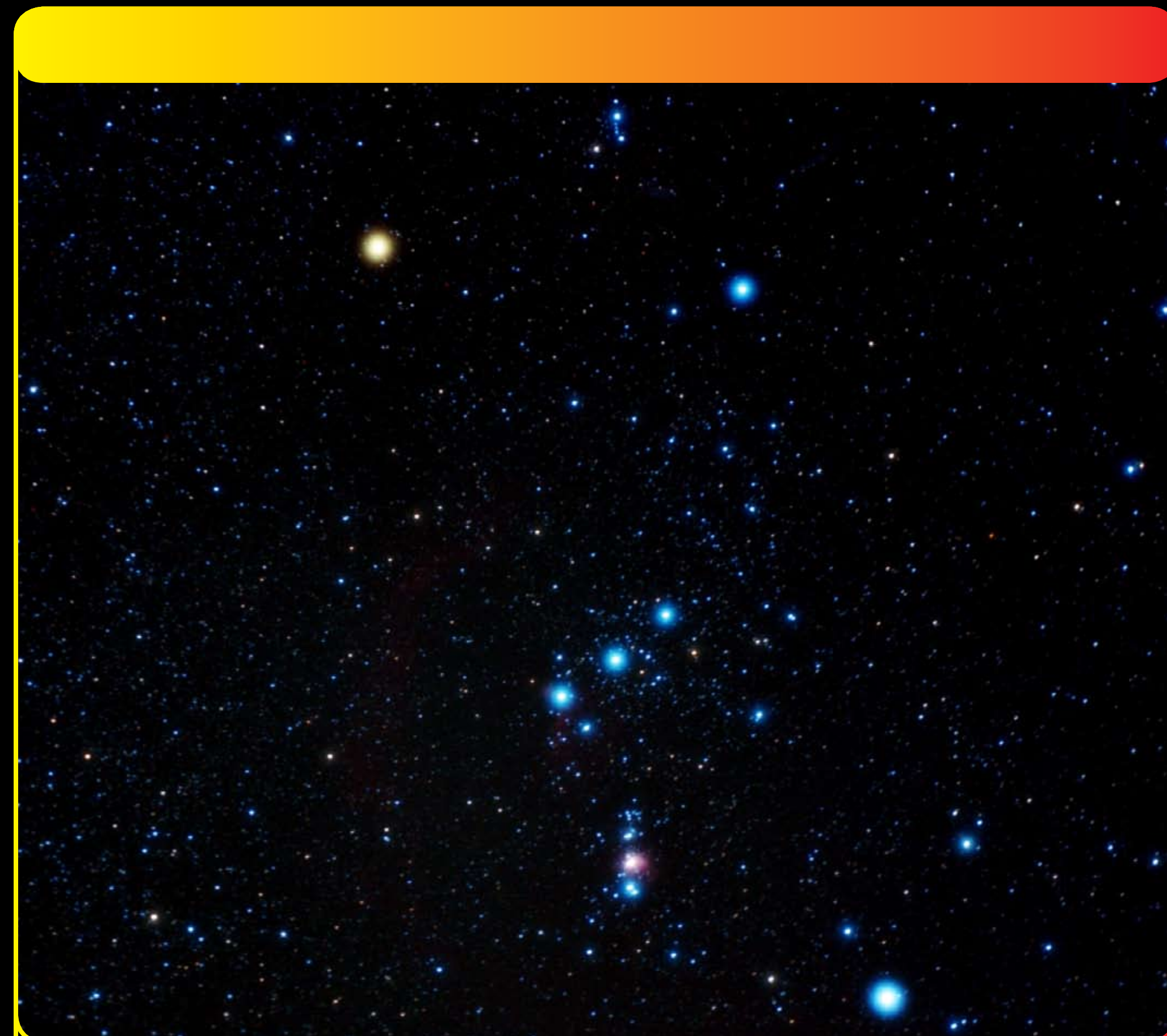


OUR SUN IS A STAR

It is the closest star we'll ever see. It is about **5 billion years old**, and will live for about 5 billion more years. But not all stars live this long. Really big stars, those 10–20 times bigger than the Sun, live only a few million years. And when they burn out, they go out with a bang!

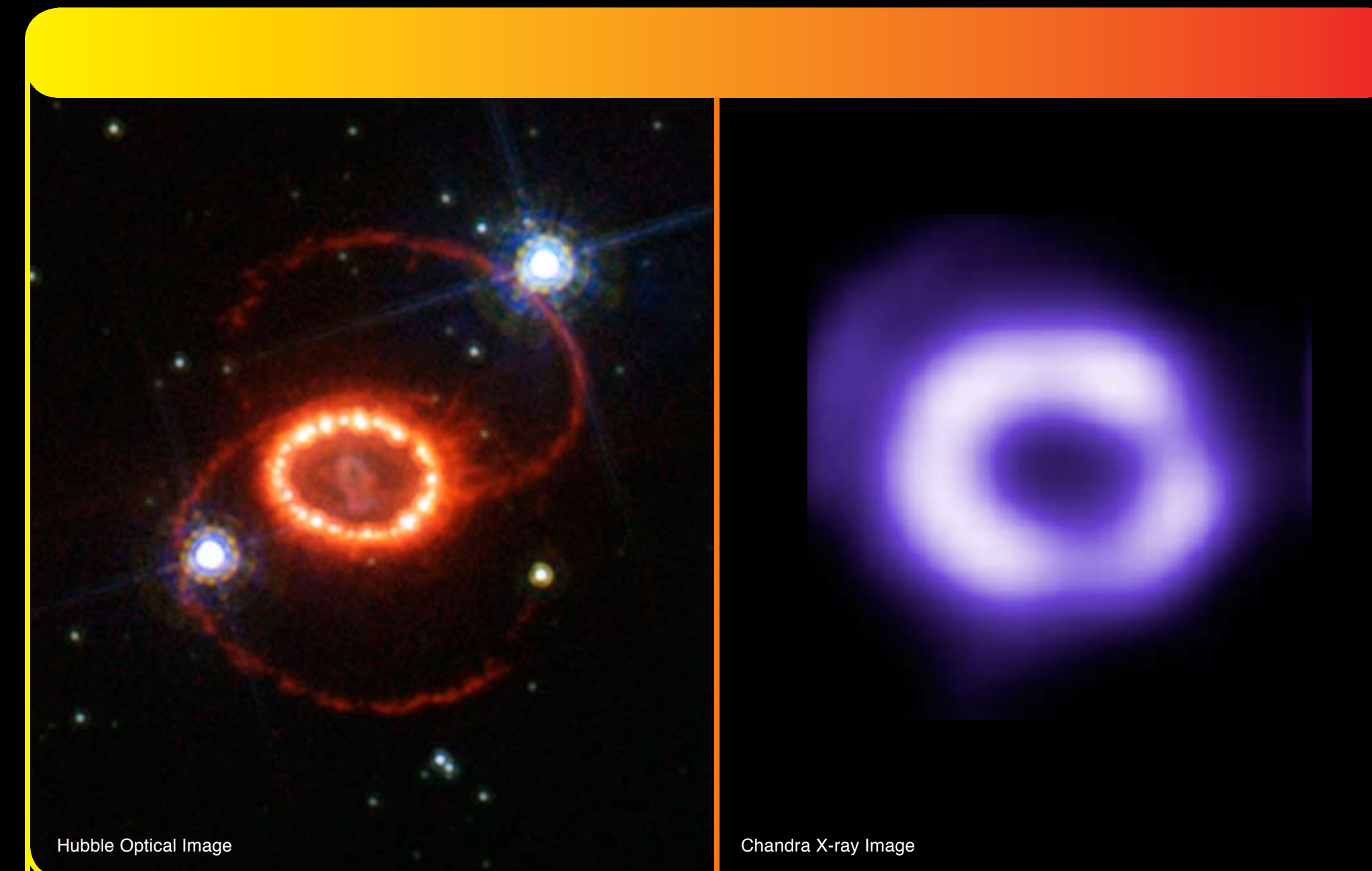
STOP
for science

<http://chandra.si.edu/edu/stop/>



RUNNING OUT OF GAS

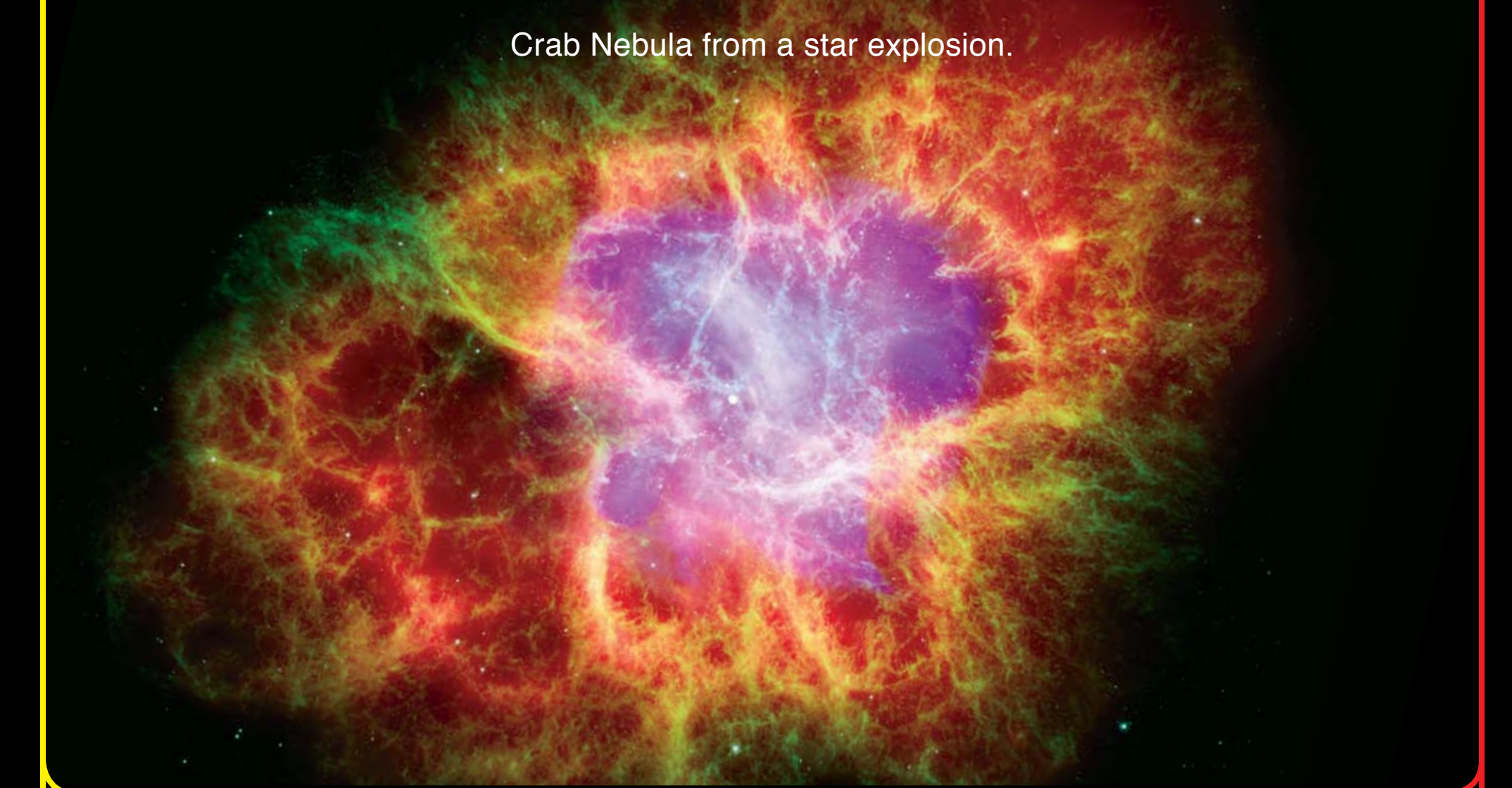
The energy from a star is the result of gravity, which pulls all of its matter toward its center. This compresses the center and makes it so hot that fuel there undergoes a process called nuclear fusion. This fusion releases energy that holds up the outside of the star against gravity. But when the center runs out of fuel, the outer layers come crashing down. Stars like the Sun get crushed to the size of the Earth in this process. For stars much larger than the Sun, this process causes a massive explosion. These **supernova explosions** blow the star apart and, for several days, generate more light than a billion stars.



SUPERNOVA 1987A

In February of 1987, a university student was working at a telescope in Chile. He looked at the pictures he had just taken with the telescope and saw a very bright object that he knew he hadn't seen before—and he knew this part of the sky very well. He went outside, looked up, and could see it with his naked eye. **He had discovered a supernova!** In this case, we actually have pictures of the star before it blew up. It was a giant blue star, and pictures of that region show the star is no longer there. But pictures with the *Hubble Space Telescope* show rings of matter that were thrown out from the star before the explosion. The outer rings were thrown out about 20,000 years ago. The *Chandra X-ray Observatory* shows us that the explosion is now reaching the inner ring, making it so hot that it glows in X-rays!

EXPLOSION TOOK PLACE LONG AGO



THE CRAB NEBULA

In 1054, Chinese astronomers recorded the sudden brightening of a star. It was so bright that it **could be seen during the day for months!** They had witnessed a supernova. The explosion in 1054 left behind the Crab Nebula, a bright fuzzy looking object with very energetic particles. The Crab Nebula can still be seen with a small telescope.

