Neutron Star

STRANGE MATTER

Manolo awoke from a long interstellar sleep. Captain Gamma and Kara were already up and busy. "What are we looking at?" he yawned.

"LGM-1," said Captain Gamma, pointing at a barely visible dot of light.

"This thing must have a glitch," Laura muttered at the Star Reader. "It's telling me that this star has a mass 1.5 times that of the Sun, but its diameter is barely 2 kilometers."

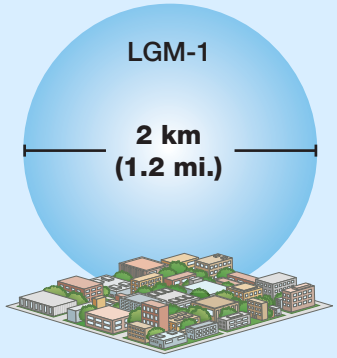
"Oh, it's a neutron star," Manolo chimed in, still drowsy. "When an enormous star runs out of fuel, its core completely collapses under its own gravity," he explained. "The gravity is so powerful that even the electrons and protons inside atoms crush together, making a ball of solid neutrons. It's like one giant atomic nucleus the size of my neighborhood back on Earth."

"It's not giving off much visible brightness, but it's blasting out dangerous X-rays," Captain Gamma warned. "This star's temperature is off the charts. We shouldn't stay long."

Manolo stared out the window as the *Stella* sailed away from the neutron star. "But I just woke up!"

Some neutron stars shoot out X-rays in narrow beams, or *jets*.

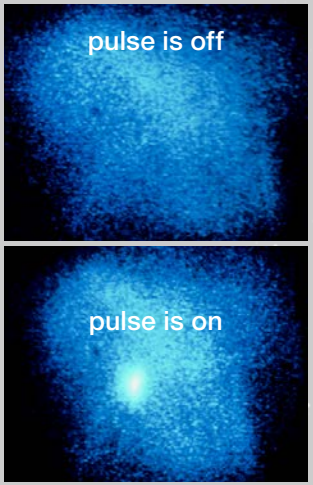
Wowser! Just a teaspoon of matter from a neutron star weighs more than Mount Everest!



The neutron star LGM-1 is only as wide as a few city blocks.

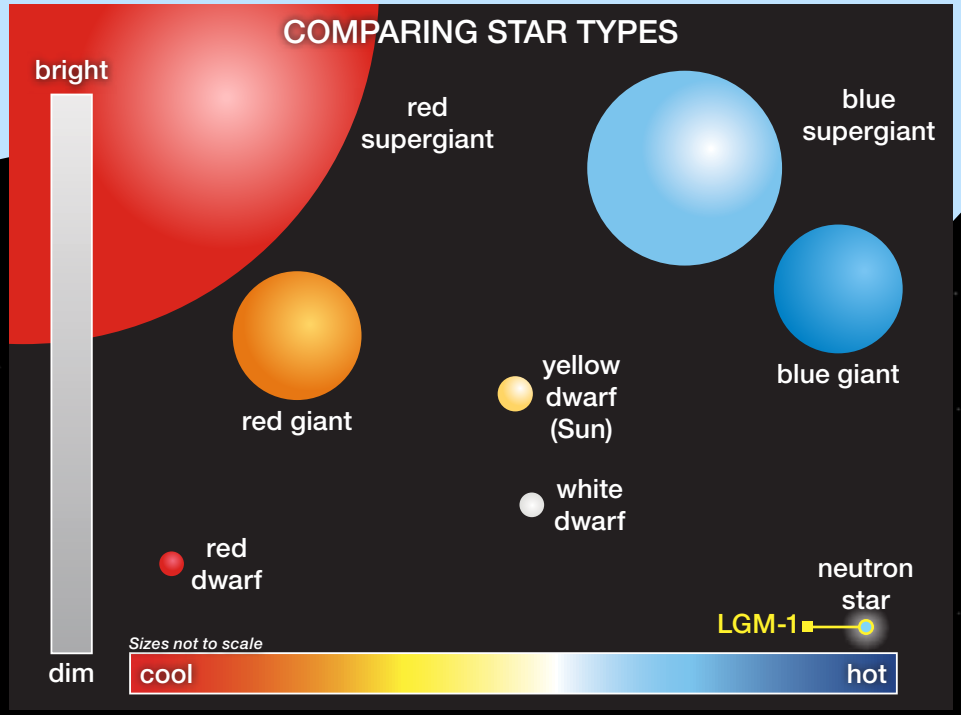
LITTLE GREEN MEN?

The star LGM-1 is a special kind of neutron star called a *pulsar*. A pulsar is a rotating neutron star that shoots out a narrow beam of energy, like the spinning light in a lighthouse. From Earth, this spinning light seems to flash at a steady rhythm, or "pulse." The star will spin for most of its life span—up to 300 million years! It releases energy left over from nuclear fusion that took place earlier in the star's history.

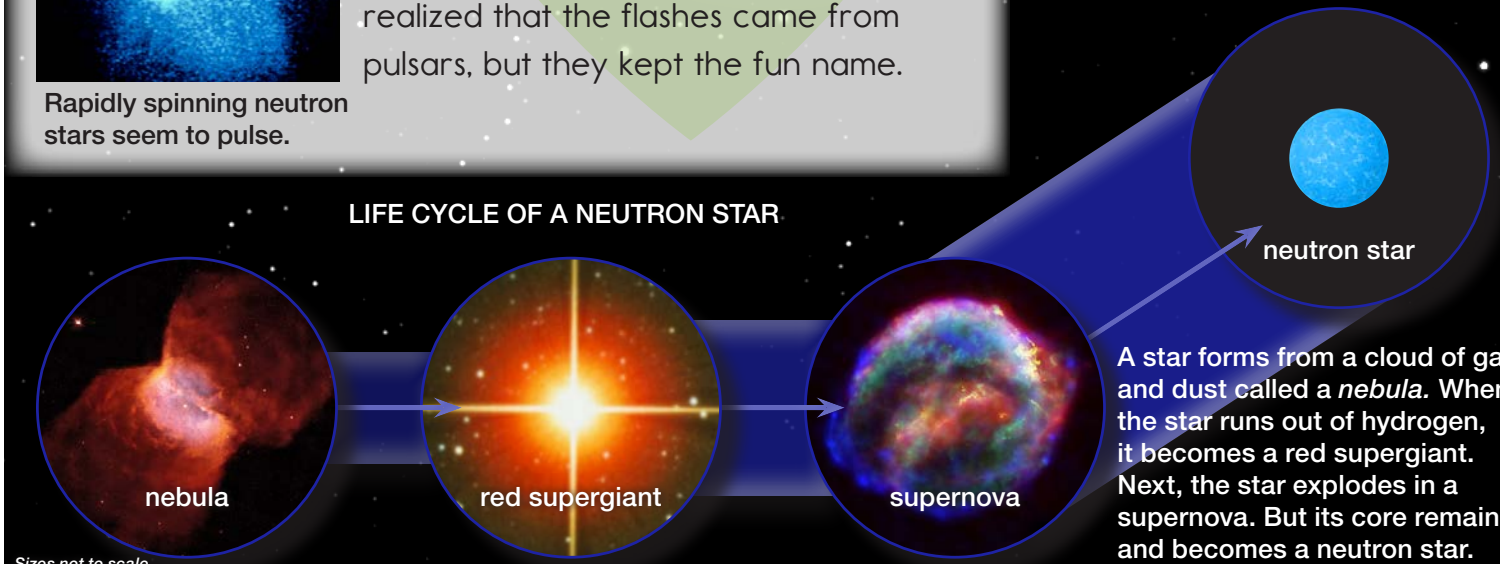


Rapidly spinning neutron stars seem to pulse.

When astronomers first spotted one of these pulsing beams, they were baffled by what could make such perfectly steady flashes. Some scientists wondered if the flashes were signals from an alien civilization. They jokingly named the flashing object "LGM," which stands for "little green men." Scientists quickly realized that the flashes came from pulsars, but they kept the fun name.



Neutron stars, such as LGM-1, look blue because they have very high temperatures. They release most of their energy as invisible radiation, so they are not very bright.



A star forms from a cloud of gas and dust called a *nebula.* When the star runs out of hydrogen, it becomes a red supergiant. Next, the star explodes in a supernova. But its core remains and becomes a neutron star.

Wowser!

When a giant star becomes a neutron star, it gets much smaller. As it shrinks, it spins faster and faster, like a skater pulling in her arms as she twirls. Some neutron stars get so small that they can spin in less than a second!

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