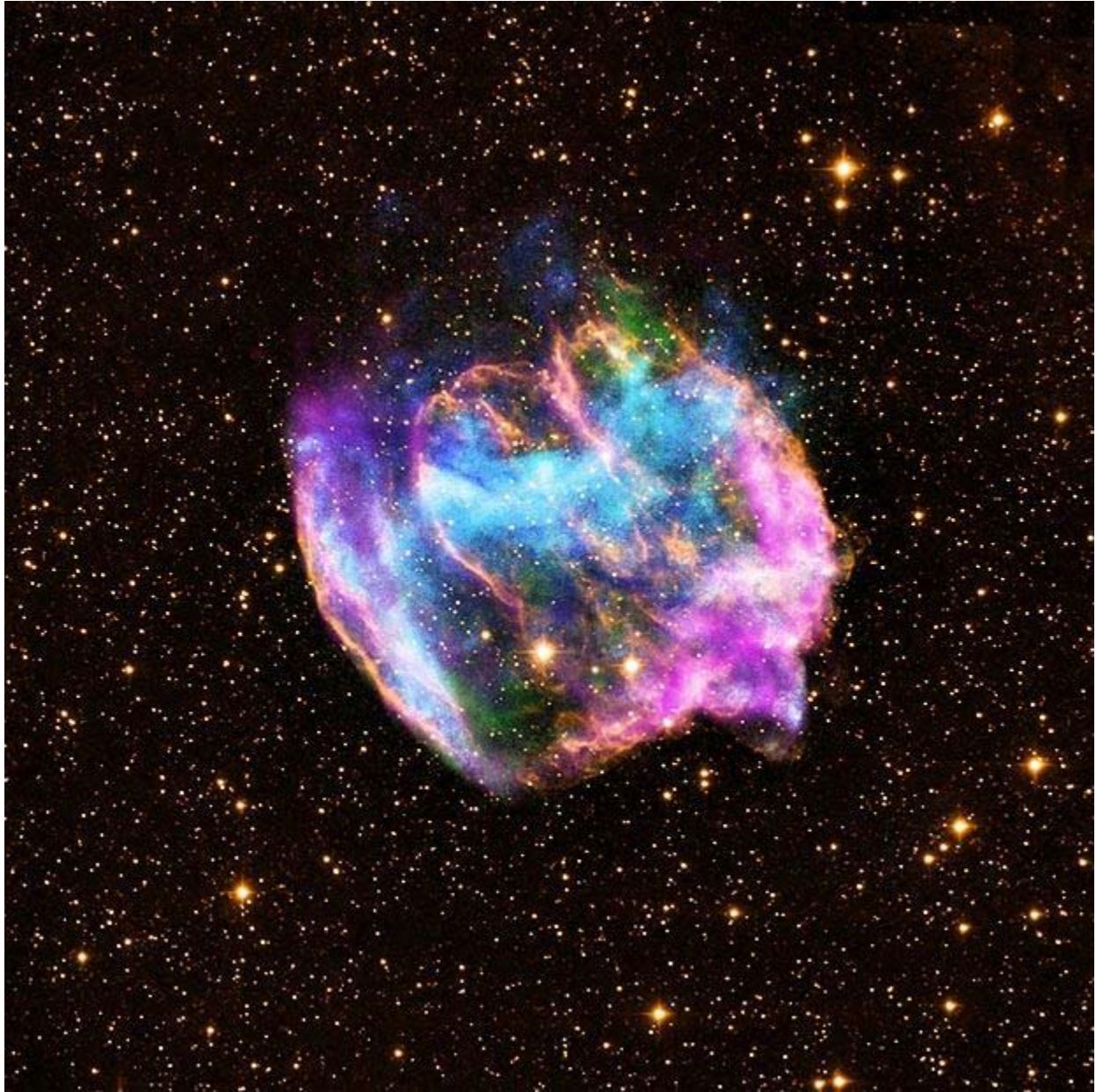


Scientists solve mystery of cosmic rays

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- Hayley Dixon
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Scientists have solved an astronomical mystery by discovering the source of cosmic rays.



Cosmic rays come from the explosion of supernovae, scientists have confirmed *Photo by: Photo: EPA/NASA / CXC / MIT / L. LOPEZ*

Cosmic rays – a form of high-energy radiation made up of fast-moving particles that constantly pummel our planet - come from the explosion of supernovae, new research confirms.

The discovery was made using a Telescope which records events up to 10,000 light years away.

The rays stream through the galaxy interacting with air molecules in Earth's upper atmosphere and creating showers of charged particles. Some of the showers reach the ground.

Austrian-born physicist Victor Franz Hess discovered a century ago that protons make up 90 percent of the rays that pelt Earth's atmosphere.

Since then scientists have suggested two possibilities for the origins of these protons – a supernovae explosions within our Milky Way galaxy or strong jets of energy from black holes elsewhere in the universe.

But despite many agreeing that supernovae remnants were the likely source the theory remained unproven, said Stefan Funk, astrophysicist at Stanford University and a co-author of the new findings.

"In the last century we've learned a lot about cosmic rays as they arrive here," Professor Funk said whose findings are published in the journal Science.

"We've even had strong suspicions about the source of their acceleration, but we haven't had unambiguous evidence to back them up until recently."

The energies of the protons are far beyond what the most powerful particle colliders on Earth can produce, he noted.

Using NASA's Fermi Gamma-ray Space Telescope, the team spent four years analysing data from two supernova remnants thousands of light years away, and found the proof they were looking for.

"For the first time we were able to detect the smoking gun feature of the accelerated protons," Professor Funk said.

"We are talking about the most gigantic explosions in our galaxy and they give energy to the tiniest things we know."

People on the grounds are protected from the ray's radiation by the atmosphere, but the further into the skies we go the higher the exposure, with astronauts being at the greater risk.

The researchers found that shock waves from the supernovas accelerated protons to nearly the speed of light, turning them into cosmic rays.

"When these energetic protons collided with static protons in gas or dust they gave rise to gamma rays with distinctive signatures, giving scientists the smoking-gun evidence they needed to finally verify the cosmic-ray nurseries," the authors added.

Still, as man spends more time in the higher atmosphere, questions remain.

"While we have demonstrated that supernova remnants accelerate cosmic rays, the next step will be to determine exactly how they do it, and also up to what energies they can do so," Professor Funk said.

In addition, he noted "there are suggestions that cosmic rays have provided early mutations that make life possible" and provide condensation droplets that create clouds.