

ASTRONOMY**New observatory captures cosmic rays from far away**

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BY TOM STATLER

Want a particle accelerator in your house? Well, you probably have one. Many TV sets produce beams of 50,000 electron-volt beta rays.

A TV picture tube accelerates subatomic particles (in this case, electrons) and makes them do something useful. The same principle is behind the Large Hadron Collider -- the "Big Bang machine" that poorly informed bloggers speculated could have destructive consequences for Earth.



The most energetic subatomic particles aren't created by machine. They're accelerated by natural processes far from Earth.

The highest-energy "cosmic rays" are atomic nuclei. Just one can carry as much energy as a tennis ball propelled by a strong forehand. A few strike Earth every minute.

Thanks to Earth's atmosphere, they don't make it to the ground. Instead, they produce showers of "secondary particles" and faint flashes of light. With ingenuity and technology, we can catch and analyze these telltale signs.

A new observatory, completed last month, is studying the subatomic debris from cosmic-ray hits.

The Pierre Auger Observatory doesn't look like a typical observatory. It consists of 1,600 3,000-gallon tanks of ultrapure water and 24 visible-light telescopes, over 1,200 square miles in Argentina.

It is the result of a collaboration involving more than 300 scientists from 17 countries.

Before it was finished, Auger found evidence that the highest-energy cosmic rays do not come from our galaxy. Instead, they come from parts of the sky occupied by concentrations of other galaxies in our general neighborhood.

What might these other galaxies have that we don't? Very large, supermassive black holes. The Milky Way has a black hole, but it's small by cosmic standards: only 3 million times the mass of the sun.

It appears that the truly huge black holes, responsible for the most powerful explosions in the universe, also might be making the most energetic cosmic rays.

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