

Physicists Find Evidence for Highest Energy Photons Ever Detected From Milky Way's Equator

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Physicists at nearly a dozen research institution have discovered evidence for very high energy gamma rays emitting from the Milky Way, marking the highest energies ever detected from the galactic equator. Their findings, published in the Dec. 16 issue of the *Physical Review of Letters*, were obtained using the Milagro Gamma Ray Observatory, a new detector located near Los Alamos, N.M., that allows monitoring of the northern sky on a 24-hour, 7-day-per-week basis.

Gamma rays are considered by scientists to be the best probe of cosmic rays outside the solar neighborhood.

The research team, which includes nearly 40 physicists, reported that Milagro, positioned at an altitude of 8600 feet in the Jemez Mountains, detected a signal along the galactic equator region and interpreted it as arising from gamma rays with a median energy of 3.5 trillion electron-volts, or 3500 times the mass-energy of a proton. Previous satellite experiments have seen gamma-ray emissions along the galactic equator reaching up to energies of only 30 billion electron-volts.

These emissions are understood to be produced by interactions of cosmic-ray particles with the abundant interstellar medium near the galactic equator. Previously, some researchers had speculated that additional mechanisms were needed to explain the large number of particles observed at high energies. However, the measurements by Milagro can be understood by assuming a cosmic ray energy spectrum near the galactic center similar to that in the solar system and the standard properties of particle interactions.

The results presented in the *Physical Review of Letters* paper were gathered over a three-year period, beginning in July 2000.

Source: New York University

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