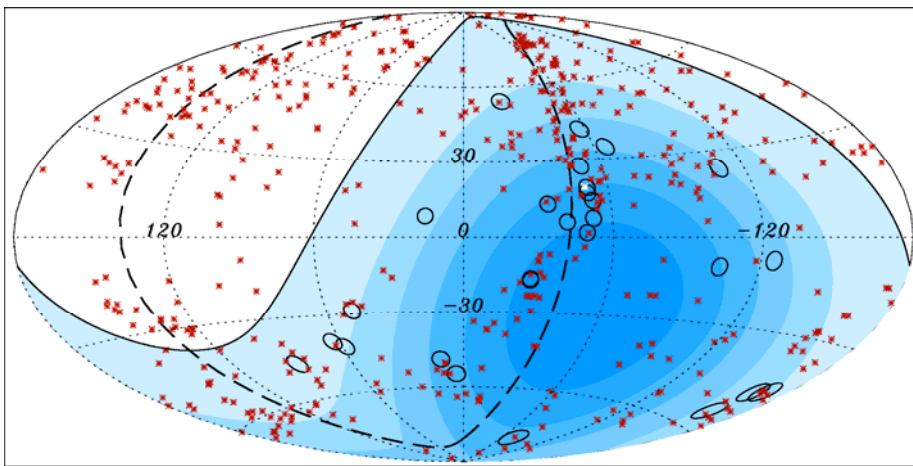


Auger Observatory closes in on long standing mystery, links highest-energy cosmic rays with violent black holes

Scientists of the Pierre Auger Collaboration announced today (8 Nov. 2007) that active galactic nuclei are the most likely candidate for the source of the highest-energy cosmic rays that hit Earth. Using the Pierre Auger Observatory in Argentina, the largest cosmic-ray observatory in the world, a team of scientists from 17 countries found that the sources of the highest-energy particles are not distributed uniformly across the sky. Instead, the Auger results link the origins of these mysterious particles to the locations of nearby galaxies that have active nuclei in their centers. The results appear in the Nov. 9 issue of the journal *Science*.

Active Galactic Nuclei (AGN) are thought to be powered by supermassive black holes that are devouring large amounts of matter. They have long been considered sites where high-energy particle production might take place. They swallow gas, dust and other matter from their host galaxies and spew out particles and energy. While most galaxies have black holes at their center, only a fraction of all galaxies have an AGN. The exact mechanism of how AGNs can accelerate particles to energies 100 million times higher than the most powerful particle accelerator on Earth is still a mystery.



The celestial sphere in galactic coordinates (Aitoff projection) showing the arrival directions of the 27 highest energy cosmic rays detected by Auger. The energies are greater than 57×10^{18} eV (57 EeV). These are shown as circles of radius 3.1° . The positions of 472 AGN within 75 megaparsecs are shown as red *'s. The blue region defines the field of view of Auger; deeper blue indicates larger exposure. The solid curve marks the boundary of the field of view, where the zenith angle equals 60° . The closest AGN, Centaurus A, is marked as a white *. Two of the 27 cosmic rays have arrival directions within 3° of this galaxy. The supergalactic plane is indicated by the dashed curve. This plane delineates a region where large numbers of nearby galaxies, including AGNs, are concentrated.

See http://www.auger.org/news/PRagn/AGN_correlation.html for more details