

Search for new cosmic-ray acceleration sites within the 4FGL catalog sources

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Cosmic rays are mostly composed by protons accelerated to relativistic speeds. When those protons encounter interstellar material, they produce neutral pions which in turn decay into gamma rays. This offers a compelling way to identify the acceleration sites of protons. A characteristic hadronic spectrum was detected in the gamma-ray spectra of four Supernovae Remnants (SNRs), IC 443, W44, W49B and W51C, with the Fermi Large Area Telescope. This detection provided direct evidence that cosmic-ray protons are (re-)accelerated in SNRs.

In this review, we present the results from a comprehensive search for low energy spectral breaks. We use 8 years of data from the Fermi Large Area Telescope between 50 MeV and 1 GeV. This search is based on the 4FGL catalog from which we extracted the unidentified sources or those associated to SNRs with a significance above 3sigma at low energy in both cases. Several SNRs, binaries and one star forming region as well as a handful of unidentified sources are detected with our search. These best candidates will be presented, thus enlarging our view to potential new cosmic-ray acceleration sites.

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