

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

Thursday 15 July 2021 18:00 (12 minutes)

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.

Keywords

gamma-ray; supernova remnants; Fermi-LAT; cosmic-rays

Collaboration

Fermi-LAT

other Collaboration

Subcategory

Experimental Results

Primary authors: LEMOINE-GOUMARD, Marianne (CENBG, Univ. Bordeaux, CNRS-IN2P3); Mr BALLEST, Jean (CEA)

Presenter: LEMOINE-GOUMARD, Marianne (CENBG, Univ. Bordeaux, CNRS-IN2P3)

Session Classification: Discussion

Track Classification: Scientific Field: GAD | Gamma Ray Direct