

Detection of Supernova Remnants in the Large Magellanic Cloud at energies higher than 6 GeV by means of cluster analysis

We applied a blind search for spatial photon clusters at energies higher than 6 and 10 GeV to sky maps of Fermi-LAT events collected in the first 12 years of operation.

We used the Minimum Spanning Tree and DBSCAN algorithms, which provided fully consistent results, detecting 13 clusters above 10 GeV. Six clusters have coordinates corresponding to known SNRs within a few arcminutes, in a very good agreement with the instrumental positional accuracy.

We confirmed the detection of the known remnants N157B, N63A, N49B and report three new detections, of N49, N186D, B040-693, and the complex N44 at energies higher than 6 GeV.

An analysis of the LMC SNR population shows that these remnants are the most luminous in the X-ray band and correspond to core-collapse supernovae with shock expanding in dense HII regions. This result suggests that the hadronic emission is the most relevant process for high-energy gamma-ray loud SNRs.

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