

G150.3+4.5: a new dynamically young SNR seen with the Fermi-LAT

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The supernova remnant (SNR) G150.3+4.5 was recently detected in radio and exhibits a shell-like morphology with an angular size of 3° , suggesting either an old or a nearby SNR. An extended Fermi-LAT source, spatially coincident with the radio SNR, was reported in the Fermi Galactic Extended Source Catalog. Using more than 10 years of Fermi-LAT data, we perform detailed morphological and spectral studies of the SNR G150.3+4.5. The gamma-ray emission is adequately described by an extended component, spatially coincident with the radio emission, and exhibits a hard spectrum extending up to hundreds of GeV. We also investigate the association between G150.3+4.5 and the point source 4FGL J0426.5+5434, which is located in the South part of the SNR and has a pulsar-like spectrum. Using radio and X-ray data, we estimate the distance and the surrounding density of the SNR to understand its evolutionary stage. We find that G150.3+4.5 is spectrally similar to the shell-type SNRs observed with the Fermi-LAT such as RX J1713-3946 or Vela Junior. The broadband nonthermal emission of G150.3+4.5 is explained by a leptonic scenario that implies particle acceleration up to TeV energies, making G150.3+4.5 a new dynamically young Fermi-LAT SNR.

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