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Study of high-energy particle acceleration in Tycho with gamma-ray observations

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Gamma-ray emission from supernova remnants (SNRs) can provide a unique window to observe the cosmic-ray acceleration believed to take place in these objects. Tycho is an especially good target for investigating hadronic cosmic-ray acceleration and interactions because it is a young type Ia SNR that is well studied in other wavelengths, and it is located in a relatively clean environment. Several different theoretical models have been advanced to explain the broadband spectral energy emission of Tycho from radio to the gamma-ray emission detected by Fermi-LAT in the GeV and by VERITAS in the TeV.

We will present an update on the high-energy gamma-ray studies of Tycho with ˜ 150 hours of VERITAS and ˜ 77 months of Fermi-LAT observations, which represents about a factor of two increase in exposure over previously published data. VERITAS data also include exposure with an upgraded camera, which made it possible to extend the TeV measurements toward lower energy, thanks to its improved low energy sensitivity. We will interpret these observations in the context of the particle acceleration in Tycho and proposed emission models.

Collaboration

VERITAS

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