

Very High Energy Gamma-ray Emission from the Binary System LS I +61 303

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LS I +61 303 is one of around ten gamma-ray binaries detected so far, each characterized by a spectral energy distribution dominated by MeV-GeV photons. It is located at a distance of 2 kpc and consists of a compact object (black hole or neutron star) in an eccentric orbit around a 10-15 M_{\odot} Be star, with an orbital period of 26.5 days. The binary orbit modulates the emission ranging from radio to TeV energies. A second, longer, modulation period of 1667 days (the super-orbital period) has also been detected from radio to TeV observations. The VERITAS imaging atmospheric Cherenkov telescope array has been observing LS I +61 303 since 2006, and has accumulated a dataset that fully covers the entire orbit. Increased coverage of the source in the very-high-energy band is currently underway to provide more results on the modulation pattern, super-orbital period, and orbit-to-orbit variability at the highest energies. The spectral measurements at the highest energies will reveal more information about gamma-ray production/absorption mechanisms, the nature of the compact object, and the particle acceleration mechanism. Using >150 hrs of VERITAS data, we present a detailed study of the spectral energy distribution and periodic behavior of this rare gamma-ray source type at very-high energy.

Keywords

VHE gamma rays, HMXB, microquasar, Be star, TeV binary, superorbital modulation, orbital modulation

Collaboration

VERITAS

other Collaboration

Subcategory

Experimental Results

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