

VERITAS Observations of the gamma-Ray Binary LS I +61 303

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Abstract: LS I +61 303 is one of only a few high-mass X-ray binaries currently detected at high significance in very high energy gamma-rays. The system was observed over several orbital cycles (between September 2006 and February 2007) with the VERITAS array of imaging air-Cherenkov telescopes. A signal of gamma-rays with energies above 300 GeV is found with a statistical significance of 8.4 standard deviations. The detected flux is measured to be strongly variable; the maximum flux is found during most orbital cycles at apastron. The energy spectrum for the period of maximum emission can be characterized by a power law with a photon index of $\Gamma=2.40\pm 0.16_{\text{stat}}\pm 0.2_{\text{sys}}$ and a flux above 300 GeV corresponding to 15-20% of the flux from the Crab Nebula.

Additional Information:

Differential energy spectrum of VHE photons above 300 GeV for LS I +61 303 around apastron (orbital phases 0.5–0.8). Taken from Fig.2 in V.A.Acciari et al, The Astrophysical Journal, Volume 679, Issue 2, pp. 1427-1432 (arXiv:0802.2363):

Energy [TeV]	dN/dE [cm ⁻² s ⁻¹ TeV ⁻¹]
0.37	2.83e-11 +- 1.14e-11
0.53	1.25e-11 +- 3.66e-12
0.74	6.70e-12 +- 1.49e-12
1.05	2.23e-12 +- 6.37e-13
1.48	1.24e-12 +- 3.17e-13
2.09	6.62e-13 +- 1.93e-13
2.99	<1.96e-13
4.18	7.00e-14 +- 3.48e-14
5.96	<4.14e-14