

Observation of the MGRO J1908+06 Region with LHAASO

The gamma-ray source MGRO J1908+06 is esteemed as one of the primary Galactic sites for cosmic-ray acceleration, although its nature remains unrevealed. We report the detection of gammarays from this region spanning energies from 1.6 TeV to 1.3 PeV, with a spectrum exhibiting gradual steepening and yielding an index $\Gamma = (2.51 \pm 0.01) + (0.28 \pm 0.02) \times \log_{10}(E/20\text{TeV})$ through log-parabola model fitting. Considering a two-dimensional Gaussian template, the intrinsic extension is about $\sigma_{\text{ext}} = 0.36^\circ \pm 0.01^\circ$ which is consistent with previous experimental measurements. Additionally, in its vicinity, we discovered a more extended gamma-ray source with a standard deviation of $\sigma_{\text{ext}} = 1.24^\circ \pm 0.01^\circ$. The morphology of these two sources dose not exhibit significant changes with energy, suggesting a common origin that shares notable similarities with the star-forming region Cygnus X. This morphological feature is challenging to explain through a purely leptonic origin. In contrast, the hadronic model could reproduce the observed spectrum and morphology by assuming a proton spectrum with a cutoff energy of approximately 1 PeV.

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