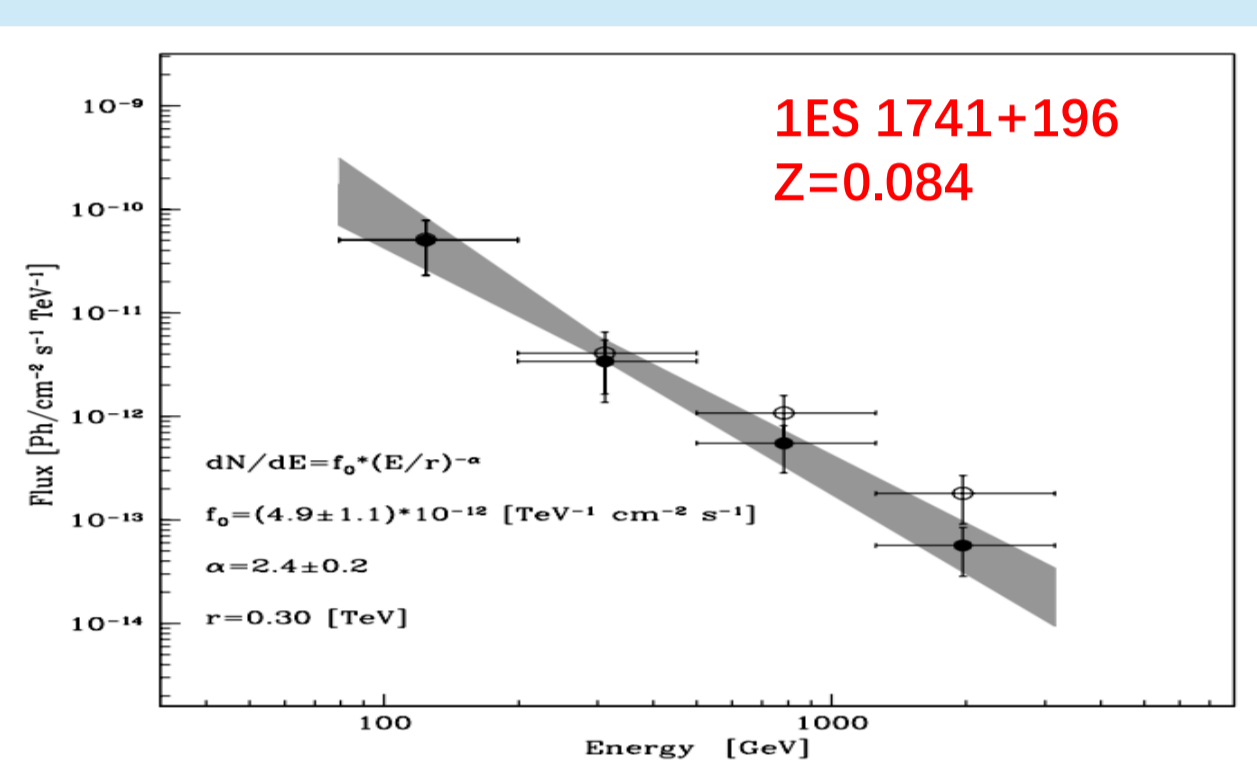
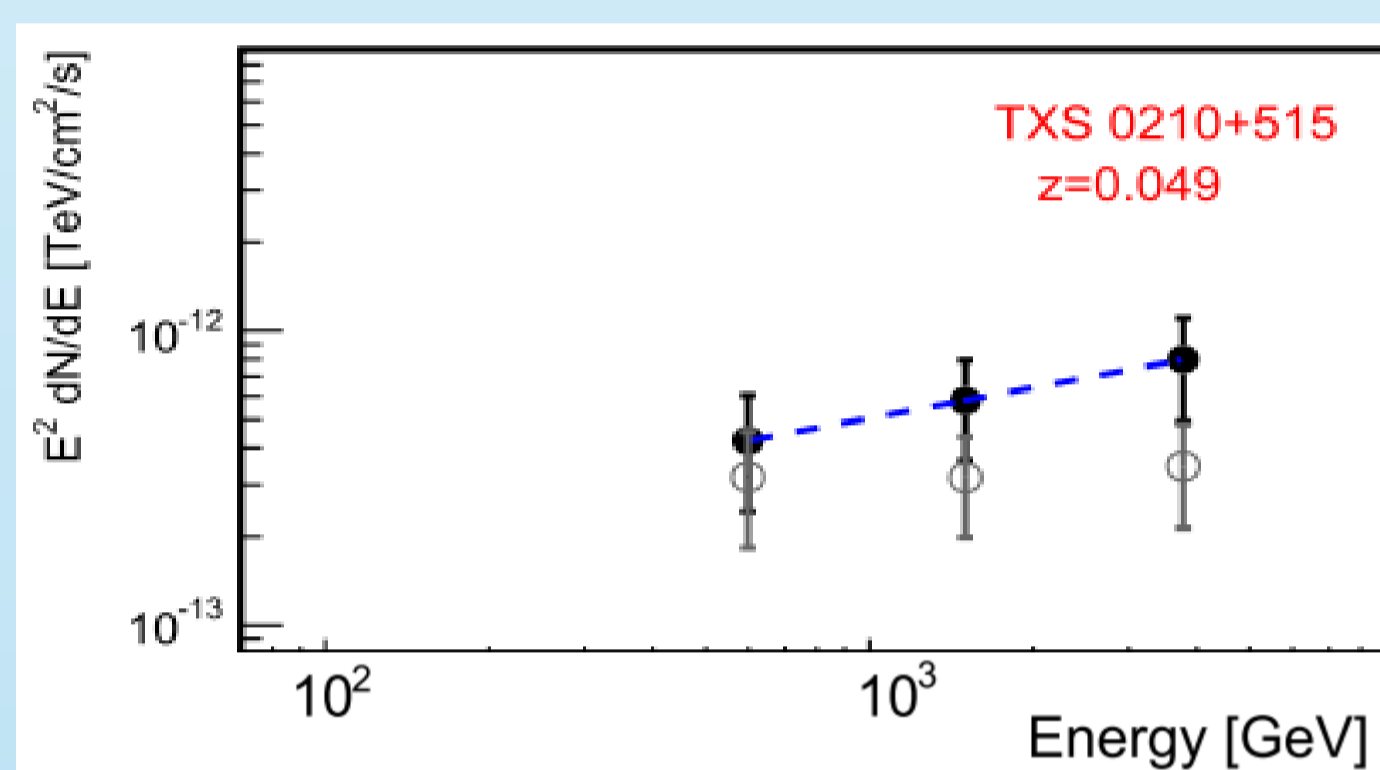


LHAASO Observation of VHE gamma-ray emission from HBL 1ES 1741+196 and EHBL TXS0210+515

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Introduction

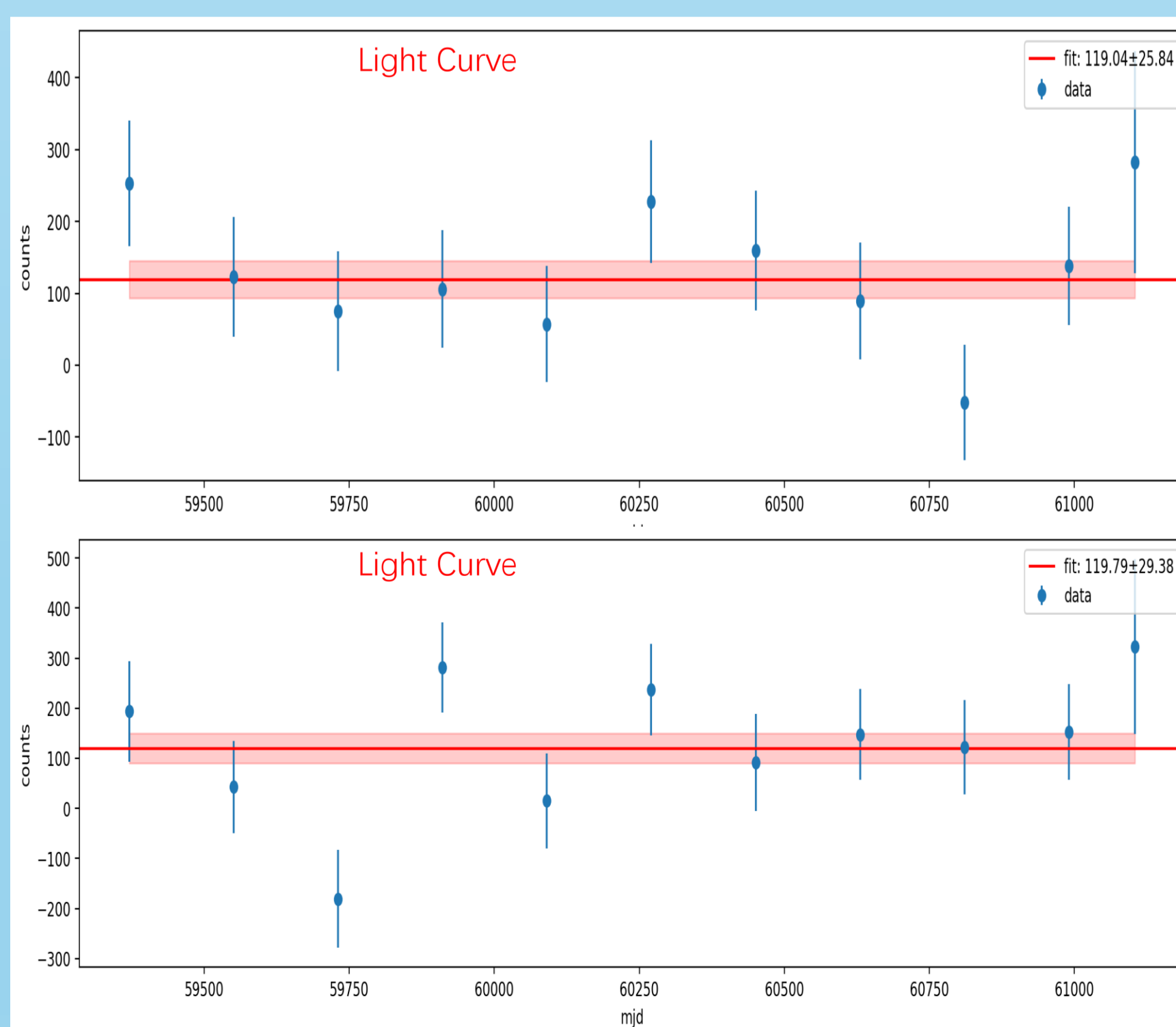
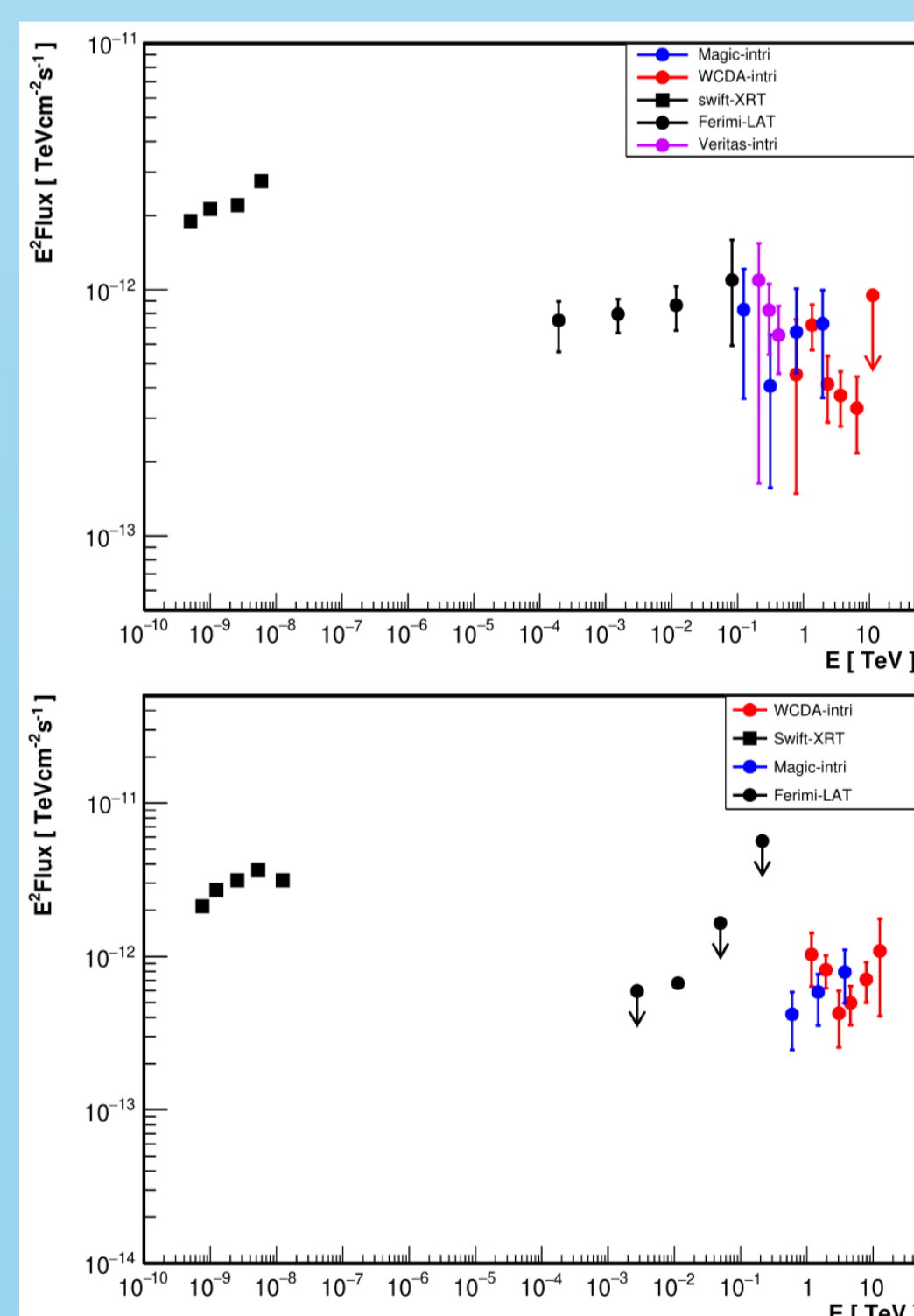
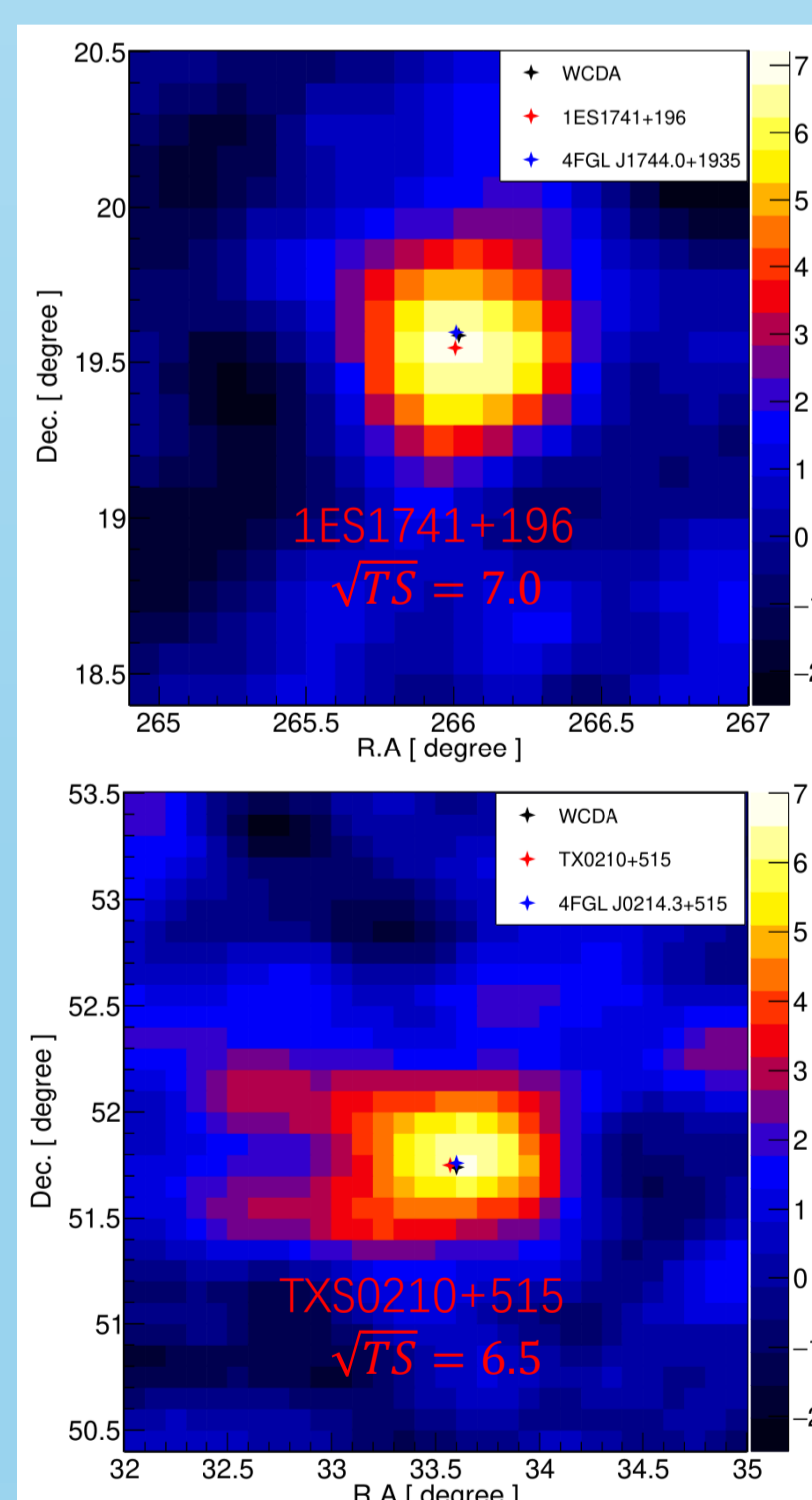
1ES 1741+196 and TXS 0210+515 are key extragalactic gamma-ray sources. MAGIC has detected them in the Very High Energy (VHE) band, revealing stable emission describable by leptonic models. However, their behavior at higher energy remains unknown. Meanwhile, IACTs are limited by weather and cannot provide long-term monitoring. With LHAASO's full-sky, long duty-cycle and high sensitivity observation, we aim to precisely measure and extend their high-energy spectrum, thereby constraining particle acceleration and radiative processes in relativistic jets.



➤ SED of EHBL TXS 0210+515 (left, ApJS, 247:16) and HBL 1ES1741+196 (right, MNRAS Vol.468, Issue 2) by Magic

Data Analysis

In this work, we analyzed LHAASO data acquired from March 5, 2021 to July 31, 2025, covering an energy range of 1 TeV to 20 TeV. Key analysis results are presented in the figures below. VHE gamma-ray emission was detected from two blazars: HBL 1ES 1741+196 (R.A. = 265.99°, Dec. = 19.59°, z = 0.084) and EHBL TXS 0210+515 (R.A. = 33.57°, Dec. = 51.75°, z = 0.049), with statistical significances of 7.0 σ and 6.5 σ respectively (left panel). The energy spectra of the two sources are shown in the middle panel, with spectral indices of 2.4 ± 0.2 (1ES 1741+196) and 2.2 ± 0.3 (TXS 0210+515). Notably, no high-flux states (flares) were observed for either blazar during the observation period (right panel).



Summary and Outlook

- 1) The LHAASO observations confirm VHE gamma-ray emission from HBL 1ES 1741+196 and EHBL TXS 0210+515. Future plan:
- 2) Extend the observation period to capture potential flare activities and long-term flux variations;
- 3) Combine multi-wavelength data (e.g., X-ray, optical) for joint analysis to constrain the blazar jet models.