

Research and development of Large Array of imaging atmospheric Cherenkov Telescopes

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In 2021, LHAASO discovered 12 ultra-high energy gamma ray sources. The gamma ray energy measured by LHAASO are far beyond 100 TeV and the highest energy reaches to 1.4 PeV, which prove the existence of Galactic PeVatrons. However, these sources are unidentified (except the Crab Nebula), because the angular resolution of LHAASO is about 0.3° . Therefore, we propose a new project: Large Array of imaging atmospheric Cherenkov Telescopes (LACT). LACT plans to build 32 Image Atmosphere Cherenkov Telescopes (IACTs) for ultrahigh-energy γ -ray astronomy on LHAASO sites in the future to identify the ultra-high energy gamma ray sources discovered by LHAASO and to study the morphology of the source. The mirror diameter of each LACT telescope is about 6 m and the SiPM camera is still planned to be used. Each LACT telescope has a FoV of 9.6° with pixel size of 0.2° . The angular resolution of LACT is better than 0.05° and the effective area is large than 4 square kilometer above the energy of 30 TeV. Together with the contribution of gamma proton discrimination of LHAASO muon array, the sensitive of 500-hour LACT observation is almost the same as that of one-year LHAASO observation at around 100 TeV. The paper will introduce the design and properties of the LACT, as well as the information of one prototype.

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