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The GLAST Large Area Telescope: design, construction, test and calibration

The Gamma-ray Large Area Space Telescope (GLAST) is an international, multi-agency satellite mission with a vast and ambitious physics program in gamma-ray astronomy, particle astrophysics and cosmology. The Large Area Telescope (LAT) is the main instrument onboard GLAST, and is currently being integrated to the satellite in preparation for the november 2007 launch. The LAT is a unique γ -ray observatory capable of scanning the whole sky in a few hours, building spectra over four energy decades (20 MeV- \geq 300 GeV) and locating sources down to arcmin level, covering the existing gap in the observations of the previous generation of γ -ray satellites, like EGRET, and the most modern ground imaging Cerenkov detectors, like HESS and MAGIC. The commissioning of the LAT instrument has combined technologies, methods, institutions and dedication from both the high energy physics and the γ -ray astronomy communities. The pair-conversion telescope design was implemented making use of the most advanced particle detectors, like an 83 m² silicon strip tracker, full custom readout electronics and stiff, light structural mechanics mostly based on composite materials. Highlights of the LAT instrument performance and of the main technological aspects encountered during the telescope design, construction, test and calibration phases are discussed here, as well as their impact on the mission discovery potential.

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