

The Gamma Ray Large Area Space Telescope: Instrument Technology Development (Overview)

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The Gamma Ray Large Area Telescope (GLAST) is a satellite-based experiment under development to measure the cosmic gamma-ray flux in the energy range from 20 MeV to 300 GeV. The GLAST mission is a part of NASA's Office of Space Science strategic plan with a scheduled new start in 2002. The primary instrument for the mission is a pair-conversion telescope. Our international collaboration is developing a telescope design which includes a precision pair tracker/converter section utilizing silicon-strip detectors, a CsI scintillating crystal calorimeter arranged in a hodoscopic configuration, an anticoincidence shield that is an array of plastic scintillator tiles read out with optical waveshifting fibers, and a powerful distributed data acquisition and triggering system. Central to the instrument design is the utilization of real-time multi-level hardware and software triggers to discriminate against backgrounds and efficiently recognize valid gamma-ray events over a wide field-of-view. The trigger method is made possible, in part, by the self-triggering ability of the silicon-strip detectors and the capabilities of the present generation of space-qualified processors.

The design and expected performance of the telescope are presented. Accompanying posters (A. Moiseev et al., W. N. Johnson et al., R. Johnson et al.) discuss details of each measurement subsystem and present a summary of results from a high-energy beam test of prototypes. The work described has been supported by both NASA and the Department of Energy.