1. Particle Acceleration in AGN Jets, Pulsars, & SNRs

(a) Sensitivities of γ-ray experiments operating and accepted. (b) LAT provides measurement of Crab unpulsed flux from below 100 MeV to ~1 TeV. (c) & (d) Simulations showing SNR -Cygnus spatially and spectrally resolved. (e) LAT will measure blazar quiescent emission and spectral transitions to flaring states. Example: LAT should detect low state emission from Mrk 501.

2. Resolving the γ-ray Sky: Unidentified Sources & Diffuse Emission

(a) LAT 95% confidence radii localizations of a 5σ source in the one-year sky survey and of the EGRET source 3EG 1911-2000. (b) & (c) Comparison of EGRET and LAT simulated observations of the Cygnus region E>1 GeV (15’ x 15’). (d) Expected number of isotropic extragalactic photons detected by LAT after 5 years. (e) LAT will map the cosmic-ray distribution in other galaxies. Shown is a simulated observation of M31 with the optical image for scale.

3. High Energy Behavior of γ-ray Bursts & Transients

(a) In scanning mode LAT will achieve after one day a sensitivity sufficient to detect (5σ) the weakest EGRET sources.

4. Dark Matter & the Early Universe

(a) LAT probes optical-UV Extragalactic Background light by measurement of high-energy spectral roll offs of AGN: Shown is simulation of ratio of integral flux above 10 GeV to that above 1 TeV as function of redshift for EBL absorption model of Stecker et al. 1999.

(b) LAT monenergetic γ “line” sensitivity (95 % CLUL) vs Eγ. Colored areas are a range of MSSMs within a restricted parameter space from standard assumptions and thermal relic abundance calculations. Red lines are rates assuming a non-thermal origin with Higgsino accounting for the bulk of the Galactic halo.

5. Extensive LAT Catalog

5σ Sources from Simulated One Year All-sky Survey

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GLAST LAT/Foldout A Science

Key Features of the Instrument Enable an Exciting Science Program:

- Peak Effective Area: 12,900 cm²
- Precision Point Spread Function (0.10° for E = 10 GeV, with a large and distinguishable subset of events with 0.074°)
- Excellent Background Rejection: 2.5 x 10⁵:1
- Good Energy Resolution for all Photons
- Discovery Reach Extends to TeV Energies