Calibration and Analysis Methods
Group Report
Collaboration Meeting August 05

W. Atwood and S. Ritz
The Group

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Leon Rochester
Jeff Scargle
Eduardo do Couto e Silva
Gloria Spandre
Paolo Spinelli
Mark Strickman
Andy Strong
Mutsumi Sugizaki
Hiro Tajima
Gino Tosti

60 Strong!
A good size.
WEB Presence

Minutes and Talks from the "Monday Meeting"

linked from both SLAC LAT home page and C&A Confluence Page

Plans to have individual confluence pages by topic
• Needs more attention

GLAST LAT Analysis Group Home Page

Information about the group can be found here.

The mailing list and message archive can be found by clicking here (_secure) and scrolling down to LAT Performance Analysis Group.

You can find analysis memos (and all other documents) in LAT Docs here.

We meet on Mondays at 8:00 Pacific Time via VRVS.

This page is maintained by S. Ritz, last updated 12 Aug 2005 19:37
(secure = password required for access to the link)

Meetings and Minutes

◆ 15 August 2005 in Astro/Geminga VRVS
  ■ Topics
    • Announcements, news
    • Energy methods selections - Bill
    • TKR recon at the highest energies - Tracy
    • 4-panel plots, etc. - Julie, others
    • Comments on PSF fitting - Toby
    • Status of 1% and 10% runs - Richard et al
    • Collaboration meeting planning - Bill, discussion
    • AOB
    • Next meeting: face-to-face Monday 29 August 3-4:30 PM at SLAC

◆ 8 August 2005 in Astro/CygnusX VRVS
  ■ Topics
    • Announcements, news (5)
      • IA workshop
      • Collaboration meeting agenda
    • Updated selection for valid level 1 trigger (5) - Toby
    • System tests (10) - Julie
Papers the group is considering

First paper through the process:

Beam Test on GLAST Calorimeters using Electrons, Protons, and Heavy Ions - Benoit Lott et al

Treating as a Category 3 Paper
Main Focus Over the Next Year

- Instrument performance re-evaluation (PSF, energy resolution, background rejection, $A_{\text{eff}}$ & FoV) for DC2 and pre-ship review
  - Very large effort by many people (see meeting page)
  - Updating public LAT performance page and instrument response functions for collaboration use
- Paper production (prioritization, realistic order)
- Onboard science algorithms evaluation (overlap with other groups, particularly GRBs)

- Note other overlaps with other groups:
  - I&T and SVAC activities
    - Glimpse into Reality
      - Driver for transforming the Ideal Simulation towards a real representation of the as built GLAST
  - Science Tools: use of known sources for On-Orbit Calibrations Studies (e.g. bright Pulsars & AGNs)
DC2 Algorithm & Production Pipe Line Preparation

Energy Moments – Tracy Usher

Energy Correction Algs - Pol d'Avezac, Phillipe Bruel, Bill Atwood

Cal MIP Finder – Fred Piron et al

Background Fluxs – Toby Burnett, T. Mizuno

G4 Physics – Francesco Longo et al

Track Alignment – Leon Rochester, Micheal Kuss, et al
Tracker Calibrations (Dead strips, TOT, etc) – Hiro Tajima, Leon Rochester

Calorimeter Calibrations and Xtal Recon – Zack Fertwell, Sasha Chekhtman

ACD Alignement, noise, Calibration – Heather Kelly, Alex Moiseev

System Tests - Julie McEnery

Simulation Pipe Line Production and Schedule – Richard Dubois

AND MANY MORE!
New Background
Flux Models

Why do these always get bigger???
When will G4 Multiple Scattering mimic reality?
MIP Finding in the CAL

CAL MIP finder

- The StdMipFindingTool
- First results with low statistics
- Results from GR-HEAD1.65 simulation

These events should be more easy identify and reject now!
3 Approaches to Energy Corrections

A new profile fitting above 5 GeV

- Principles
- Shower Parameterization
- Shower Development description
- Results

Combine with CTs and Clipping tails gives....
Real Tracker Alignments

Residuals vs. slope (horizontal and vertical alignment)

\[ r \rightarrow \text{DrawResSlope("Y9", "abs(h_abs-h_abs_ext)<1\&\&abs(invSlope)<1")} \]

\[ \text{real position} \]

\[ \text{ideal position} \]

\[ \text{res} = \Delta x + \Delta z \cdot \cot(\alpha) \]

Aligns:
- horizontal (⊥ to strips)
- vertical

Analysis Group Meeting, 20 June 2005

Michael Kuss
Realistic Calorimeter Pedestals, Gains, and Noise

Julie McEnery, Mark Strickman & the NRL Gang

Threshold lowered to 1 MeV

Threshold now 2.5 sigma, many more noise hits.

And raised back up to 2 MeV....
LAT Effective Area and Point Spread Function

Toby Burnett
University of Washington
GLAST LAT DOC
AM 04356

Introduction

This is a summary of the post-DC1 status of measurements of the Effective Area and Point Spread Function (PSF), using the Monte Carlo source "all_gamma" source, which consists of photons generated uniformly in log(E) from 16 MeV to 160 GeV, and cos(θ) for the forward direction. It was run using GlastRelease v4r2, the Glim application.

Generated events: 4,095,568
Filename: ag-v4r2-merituple-180GeV-prune-20040427-fullup.root

The cuts used are the standard "DC1" set. In terms of the merituple:

```
goodCal = CalTotRLn>2&&CalEnergySum>5.0&&!IMgoodCalProb>0.2;
goodPSF = IMcoreProb>0.2&&IMsoftErrProb<0.05;
TCut zdir_cut("Thr12Dir<0.2");
TCut goodGamma("|mGammaProb|<0.15");
m_goodEvent = goodCal && goodPSF && zdir_cut && goodGamma;
```

where the final "m_goodEvent" is used to select the final tuple.

Effective Area

To determine the effective area, we bin the accepted events in log(E/generated), (tuple name MceEnergy) per decade, and in 0.1 steps in cos(theta) (tuple name McZDir). The effective area calculation is 6 meV ratio of events in the bin to generated events in the bin. The following plots are the results for the front defined by the cut Thr1FirstLayer<12, and the back section, the remainder.

Made into a Science Tool by
Jim Chiang
A First Paper:  Beam Test on GLAST Calorimeters using electrons, protons, and heavy Ions  - Benoit Lott et al

Category 2 Paper

GSI Heavy Ion Test