Introduction to the Workshop Series

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Welcome and Thanks for Coming

• A reminder…
  – This is NOT an I&T Workshop
  – This is NOT an SAS/offline Workshop

• This is Workshop 2 of
  – The Workshop series of the Instrument Analysis Group

• It is a LAT Collaboration effort
  – To support Flight Integration and
  – To develop ownership of the LAT Instrument
Goals for this Workshop Series

Prepare for Instrument Data Analysis

• Familiarizing LAT Collaborators with the
  – LAT instrument
    – Front-End Electronics
    – Trigger and Data Acquisition
    – Data Analysis Software
  – Data taking plans during LAT integration using
    – Cosmic rays
    – Van de Graaff photons

• Create a forum to
  – exchange knowledge between all subsystems and “hardware and software oriented people”

• Use simulated and real Data to
  – exercise reconstruction algorithms (mostly with real data)
  – exercise the data analysis tools and provide feedback to developers

• Develop expertise to
  – uncover and quantify any instrumental effects that could have an impact on the LAT science data
  – start the work that will evolve into the Science Operations Group of the ISOC
  – create a core and trained group to participate in the beam tests analysis effort (after instrument delivery)

Develop ownership of the LAT instrument
The Workshop Series

- **Instrument Analysis Workshop 1** *(June 7-8, 2004)*
  - Kick off meeting
  - Homogenize the knowledge from people who will do the data analysis
  - Assign “projects” using Monte Carlo simulated data
- **Instrument Analysis Workshop 2** *(September, 2004 - TBR)*
  - Discuss results from projects assigned during Workshop 1
  - Discuss results from projects derived from REAL data collected with the Engineering Model 2 (ACD, CAL and TKR) – will start on Oct 1
  - Develop a list of instrumental effects that could have an impact on science data analysis
  - Pretty much “our Readiness Review” for Flight Integration – we are almost there...
- **Instrument Analysis Workshop 3** *(TBA 6 weeks before the meeting)*
  - Analysis of real data from the first two towers
- **Instrument Analysis Workshop 4** *(Summer, 2005 - TBR)*
  - Analysis of real data from XX-towers (TBD)
- **“Instrument Analysis Workshop 5”** – Collaboration Meeting *(Full LAT - TBD)*
  - LAT Data Analysis (and to validate Monte Carlo simulation)
• The focus was on simulated data from the first Two Towers

• Educate people on behavior and/or performance of
  – TKR Front-End Electronics
  – CAL Front-End Electronics
  – Trigger and Data Acquisition system
  – Reconstruction software

• Provide hands-on experience
  – With SAS/I&T analysis files and tools

• Use the knowledge acquired during the workshop to
  – Assign MC projects that will be due during Workshop 2
  – Provide input to data taking plans for LAT integration
1. Implement dead channels in the tracker for imaging Luca
2. Revisit the spectrum of sea-level cosmic rays Toby
3. Define strategy for implementing Deadtime in MC Steve/Richard/Elliott/Toby
4. Validate Energy Scales using CAL EM MC/DATA Pol
5. Compare numbers from alignment procedure to those from metrology at SLAC Larry
6. Calculate the tracking efficiency of each tower using track segments Leon
7. Calculate residuals by comparing CAL and TKR locations Leon
8. Make images of the CAL layers (to expose uniformity of response of the CAL) Benoit
9. Make image of TKR layers to identify location of shorted strips and broken wirebonds Bill
10. Implement simulated trigger primitive information into MC Luis
11. How well do we find MIPs (e.g. at several angles, within a tower, across towers)? David
12. What is the light output of tracks crossing diodes? Sasha
13. What are the effects to the data when zero suppression is applied? Traudl
14. What is a “clean” muon definition? Claudia
15. Can we find gamma rays and $\pi^0$ from showers? SAS

Will send a student as part of the long term plan– Per/Staffan
Goals for Workshop 2

Prepare for Instrument Data Analysis

• Discuss results from projects assigned during Workshop 1
  – Advertise improvements in the infrastructure

• Narrow down the work needed for data analysis with real data from the first two towers

• Bonus from subsystems:
  – Some highlights of hardware tests prior to delivery to I&T

Develop ownership of the LAT instrument
Agenda - Workshop 2

- 08:00-08:30 - Registration
- 08:30-08:40 - Overview of LAT Project Schedule - Steve
- 08:40-09:00 - Introduction to the Workshop 2 – Eduardo

• 09:00-12:30 - Session 1 - Infrastructure, Trigger and Deadtime
  - 09:00-09:15 Data Taking Plans for Cosmic rays and VDG photons - Gary/Eduardo
  - 09:15-09:30 Data Analysis files and info: where to go to get them? - Warren
  - 09:30-09:45 Overview of distributions for offline reports - Xin
  - 09:45-10:00 Calibration Trending Database - Xin
  - 10:00-10:20 Coffee break
  - 10:20-10:25 Instrument Data Analysis Primer- Eduardo/Lee
  - 10:25-10:40 Update on Event Display: FRED - Anders/Riccardo
  - 10:40-11:00 How will we handle SAS code updates during I&T - Richard
  - 11:00-11:20 Overview of trigger tests and muon telescope - Martin/Su Dong
  - 11:20-11:30 Trigger Studies - Luis
  - 11:30-12:00 Instrument Data Analysis Variables (GEM/TEM): Update - Anders
  - 12:00-12:15 Deadtime in Monte Carlo - Toby

• 13:30-18:00 - Session 2 - TKR and CAL offline analysis for 2 Towers
  - 13:30-13:50 Latest and greatest from offline analysis with real TKR data - Michael/Luca?
  - 13:50-14:20 TKR Recon update - Tracy
  - 14:20-14:50 TKR Alignment in Gleam - Leon
  - 14:50-15:05 How Does Calibration Flow Through the New Single CDE CalRecon and Digi? Mark
  - 15:05-15:15 CAL Calibration Operations during I&T - Eric
  - 15:15-15:25 CAL Crosstalk Issues and their Implications - Sasha
  - 15:25-15:40 Crystal Imaging with TKR - Benoit
  - 15:40-15:50 Light Collection Near the Ends of CDEs - Sasha/Andrey
  - 15:45-16:00 Coffee break
  - 16:00-16:20 MIP Selections - Sara/Dario
  - 16:20-16:40 Data Analysis 101 - Bill
  - 16:40-17:00 List of Data Analysis Tasks: what, who and when - Eduardo/Bill
  - 17:00-18:00 Discussions and assignment of projects – All

• 19:00 Laser tag to relieve stress...organized by SAS (thanks Heather)
Lessons Learned from Workshop 1

- The learning curve to use the SAS software is steep...
  - Analysis at all levels were performed requiring different skills
    - “Experts” and “non-experts” provided valuable contributions

- There were improvements in the infrastructure since workshop 1:
  - New TKR Reconstruction
  - Improved Event Display FRED
  - GEM information in TDS and in the analysis files
  - SAS Workbook (soon to be available)
  - Instrument Data Analysis Primer
    - A draft will be released during this Workshop
      » Thanks to ISOC for supporting this project
  - New CAL Calibrations
  - Additional manpower to the Trigger group
  - Planning evolved: Overview of End-to-End LAT tests with particle data

Develop ownership of the LAT instrument
Special Thanks to

• Everyone who has helped to debug and improve the infrastructure
  – Thanks SAS for the support and patience with our requests usually due tomorrow…
  – Sure we want more…we will always do
• European Collaborators who are providing substantial contribution to keep projects going
  – Keep the flame alive when away from SLAC…
  – Come to SLAC if you are feeling lonely…
• NRL and Pisa for providing the whenever-you-can support during this important construction phase
  – We appreciate the XX% donations in the weekly meetings
  – but we need you at a 100% level to understand the instrument!
  – ..and you all came to give talks in both Workshops: thank you!
• Everyone working with the “new Kid on the block” : Trigger
  – We are getting the infrastructure in place
  – We need to get you some data, MC land is too dry…
• Bill and Steve for the guidance
  – Couldn’t do it without you!
• Anders, Xin and Warren
  – Hard-working and dependable: the fuel for this engine
  – Hope you will be able to get a break to analyze data too…
We need more people

• There are people out there who think they can not do much
  – Pay attention to the talks
    – there is room for everyone
  – Motivation is more important than skills

• We will help everyone who wants to learn

• Come talk to me, Bill or Steve during this week
  – bring your idea
    – We will do the best to make it fit in the plan
  – bring no idea
    – we will have one for you