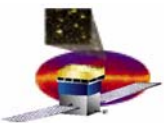


EM Data Analysis Status

Eduardo do Couto e Silva and Xin Chen
I&T Meeting
October 30, 2003



The EM data

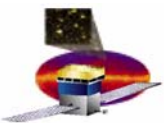
- About 1 ½ months of data taking of TKR minitower and CAL (for details wait until later in this talk).
- Data consists of two types of particle source
 - Cosmic rays
 - Low Energy Van de Graaff photons (~ 20 MeV)
- All raw FITS files are in
</nfs/farm/g/glast/u03/EM2003/rawFitsData>
- All digi.root files were processed with GlastRelease v3r3p2 and are available at SLAC in
</nfs/farm/g/glast/u03/EM2003/rootFiles/v3r3p2/digi>
- Electronic Log Book is available at the following page
 - <http://www.slac.stanford.edu/cgi-wrap/eLog.pl/index>Runs can be queried by accessing the following page
 - <http://www.slac.stanford.edu/cgi-wrap/eLog.pl/list>

What do we have to do by Dec 2003?

We are preparing preliminary results to present next week

- **Develop Infrastructure for TKR and CAL calibrations**
 - **Produce and read in calibration constants for the reconstruction**
 - **TKR**
 - » **noisy**
 - » **dead strips**
 - **CAL**
 - » **Measure pedestal and gains**
 - » **Identify noisy and dead logs**
 - » **Measure light asymmetry**
 - **Determine time dependence of calibration constants**
 - **Measure the Energy Spectrum of the VDG photons**

- Done
- In progress
- Needed prior to next EM Test
- Needed prior to LAT Integration



What we would like to do...

- **TKR**

- **Calibrations**

- **Determine Operational Thresholds**
 - **Measure Electronic Gain**
 - **Identify noisy and dead strips**
 - **Characterize TOT**
 - **Linearity with charge injection**
 - **Mean and width of distributions**

- **Measure efficiencies (capture/hit/recon)**

- **With external scintillator**
 - **Without external scintillator**
 - **As function of bias voltage**

- **Study TOT distributions in the VDG beam**

- Done
- In progress
- Needed prior to next EM Test
- Needed prior to LAT Integration

- **CAL**

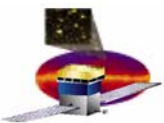
- **Calibrations**

- **Determine Operational Thresholds (HI, LO and zero suppression)**
 - **Measure pedestal and gains**
 - **Identify noisy and dead logs**
 - **Determine muon peak position and width**
 - **Measure light Asymmetry, Attenuation, Yield**

- **Measure position resolution**

- **Without TKR tracks**
 - **With TKR tracks**

- **Determine system timing and deadtime**
- **Study trigger primitives**
- **Exercise flexibility of geometry input for the Monte Carlo simulations**
- **Validate a preliminary set of Monte Carlo simulations**
- **Prototype alignment and low energy resolution algorithms**



Technical Land...

- Calibration Infrastructure

- CAL

- Produce calibration data
 - Load Calibration data into SAS database
 - Input calibration data into recon
 - Input calibration constants into Monte Carlo
 - Validate MC implementation
 - Input calibration data into SVAC database
 - Automate process for future tests
 - Review Calibration chain

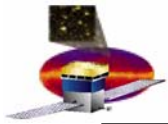
- TKR

- Produce calibration data
 - Load Calibration data into SAS database
 - Input calibration data into recon
 - Input calibration constants into Monte Carlo
 - Validate MC implementation
 - Input calibration data into SVAC database
 - Automate process for future tests
 - Review Calibration chain

- Done
- In progress
- Needed prior to next EM Test
- Needed prior to LAT Integration

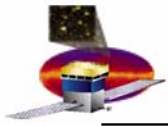
- Data Analysis Infrastructure

- Develop scripts for next tests and implement offline event display
 - Improve e-log for data taking and educate users
 - Commit changes into RECON for future EM tests
 - Develop offline test suite for Integration and Environmental Tests

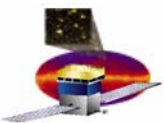


Input expected from this meeting

- **I&T would like to know**
 - **Who will contribute to the data analysis?**
 - **Who is already analyzing data and what is needed to make your life easier?**
 - **Is there any goal not listed in this presentation that needs to be covered?**
 - **What is a reasonable timescale for this data analysis?**

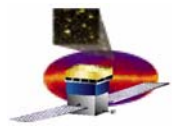


Following slides contain details about configurations used during data taking

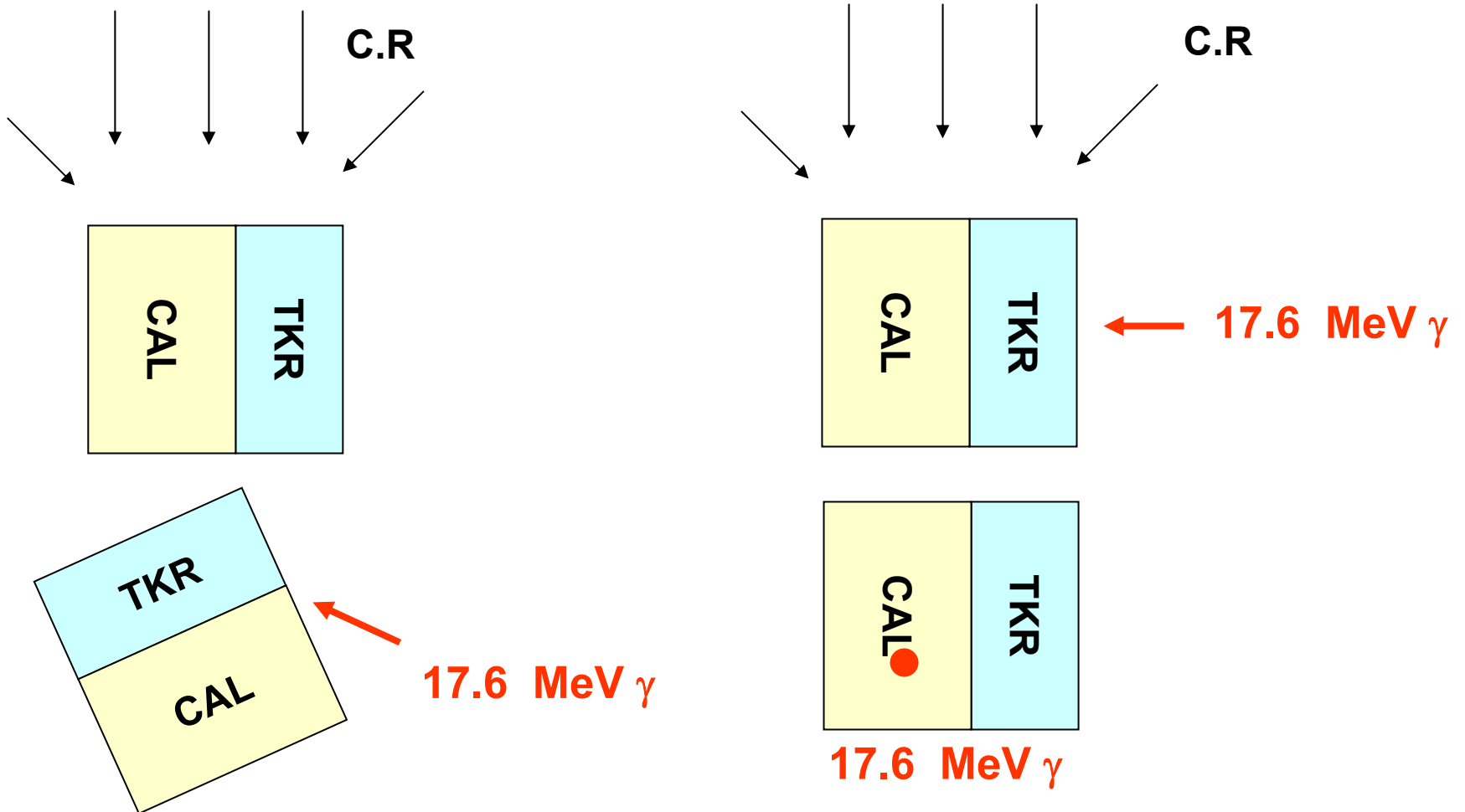


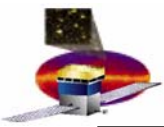
Cosmic Ray Data

- **Default configuration**
 - nominal CAL (~ 8 MeV/crystal) and TKR thresholds (0.29 MIPs)
 - TKR TOT disabled
 - CAL non zero suppressed, 4 range readout
 - Nominal TACK delay values for TKR (0 ns) and CAL (60 x 50 ns = 3000 ns) triggers
- **TKR trigger (3_IN_A_ROW)**
 - Tower oriented vertically
 - With a 50 cm stack of Pb
 - Without Pb
 - Several values of Trigger acknowledge delay
 - Tower oriented horizontally
 - TKR TOT Enabled
- **CAL Trigger (CAL_LO)**
 - Tower oriented vertically
 - With a 50 cm stack of Pb
 - Without Pb
 - Several values of Trigger acknowledge delay
- **Scintillator Trigger (EXTERNAL)**
 - Tower oriented vertically
 - With a 50 cm stack of Pb
 - Nominal values of Trigger acknowledge delay
 - Fixed trigger acknowledge delay and varied external trigger delay
 - Without Pb
 - Several values of Trigger acknowledge delay



VDG Configurations





VDG Data

- **Default configuration**
 - nominal CAL (~ 8 MeV/crystal) and TKR thresholds (0.29 MIPs)
 - TKR TOT enabled
 - CAL non zero suppressed, 4 range readout
 - Nominal TACK delay values for TKR (0 ns) and CAL (60 x 50 ns = 3000 ns) triggers

- **TKR trigger (3_IN_A_ROW)**
 - Tower oriented horizontally with nominal CAL (~ 8 MeV/crystal) and TKR (0.29 MIPs) thresholds
 - Photons impinging on the top face of TKR
 - With a 25% X0 of Pb (beam shield) in front of the beam
 - Without the beam shield (default configuration)
 - Photons impinging on the bottom of tracker (~ 135 deg from the Z axis)
 - Without the beam shield (default configuration)

- **CAL Trigger (CAL_LO)**
 - Tower oriented vertically with nominal TKR thresholds (~ 0.29 MIPs)
 - Photons impinging in the CAL (beam area ~ 2-3 crystal layers)
 - with nominal thresholds (~ 8 MeV/crystal)
 - with threshold of ~ 4 MeV/crystal
 - Photons impinging on the bottom of tracker (~ 135 deg from the Z axis)
 - Without the beam shield (default configuration)