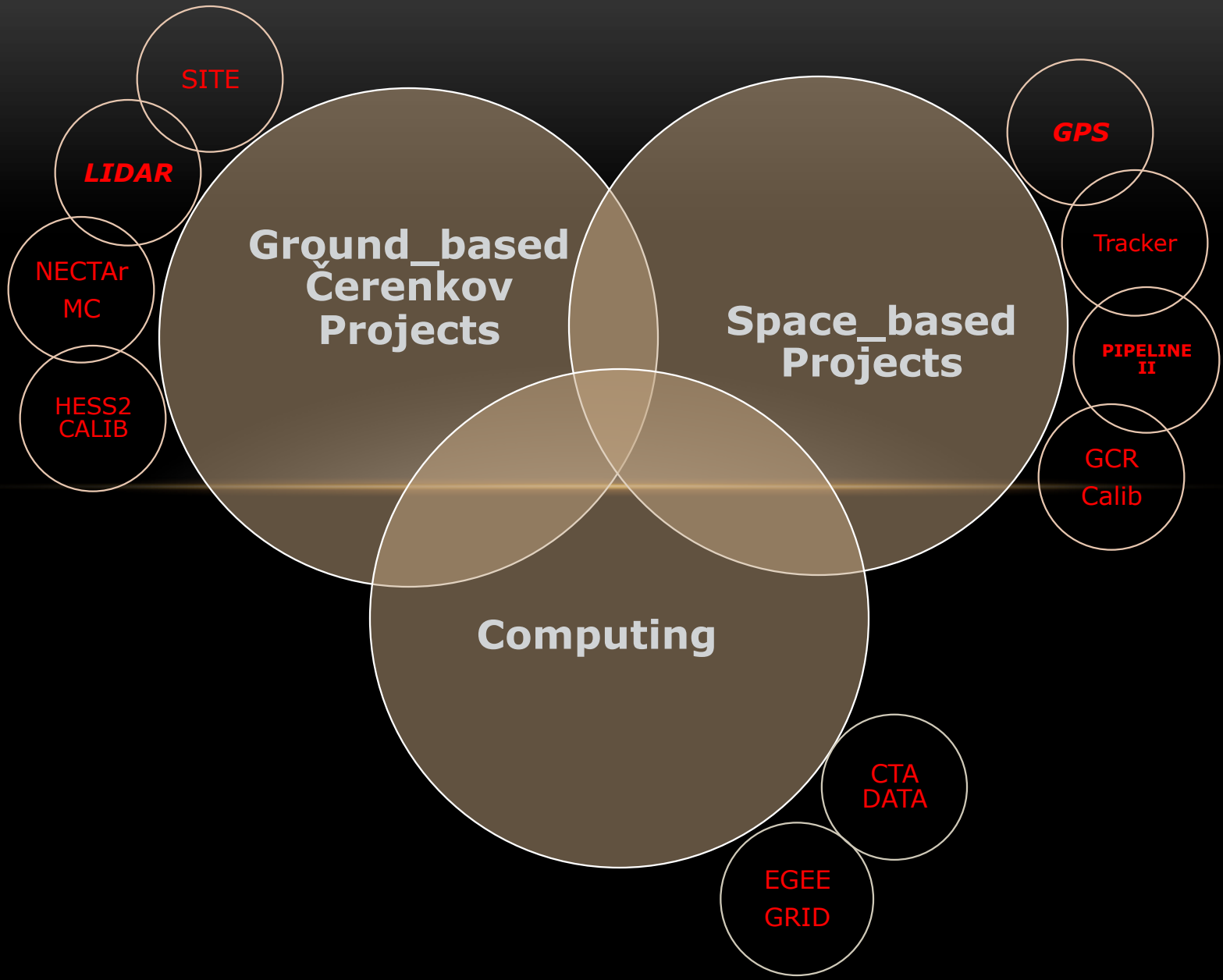
LUPM EXPERIMENTAL ASTROPARTICLE ACTIVITIES

G.Vasileiadis


SITE
LIDAR
NECTAr
MC
HESS2
CALIB
Ground_based
Čerenkov
Projects
Space_based
Projects
GPS
Tracker
PIPELINE
II
GCR
Calib
Computing
CTA
DATA
EGEE
GRID

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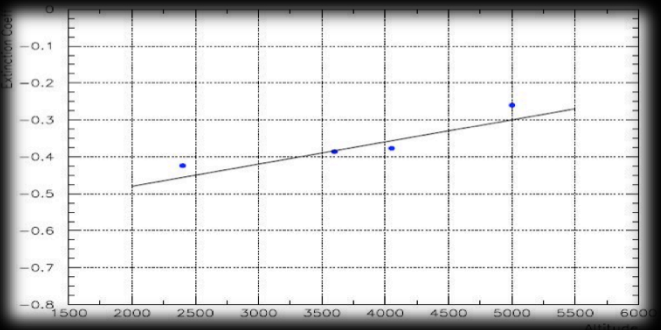
Čerenkov Projects

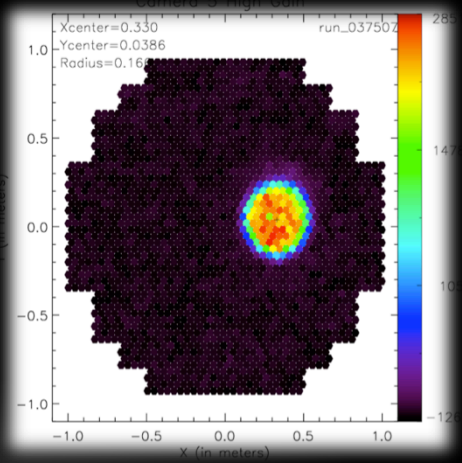
Site Search for CTA

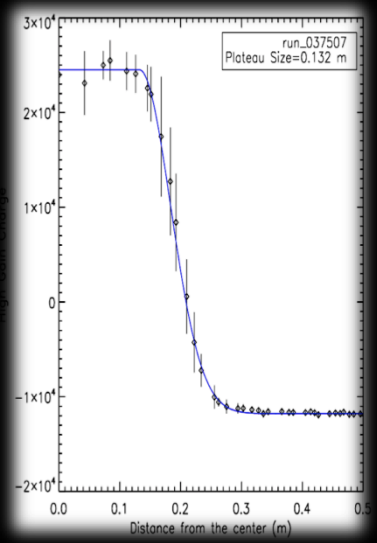
Campaign in Argentina/Chile (3-5Km Alt).
Photometric Curves (UBV), NSB comparison measurements .
Measurements available within the CTA WP-SITE.
On the road again February 2012…



Calibration Source for the HESS-II camera

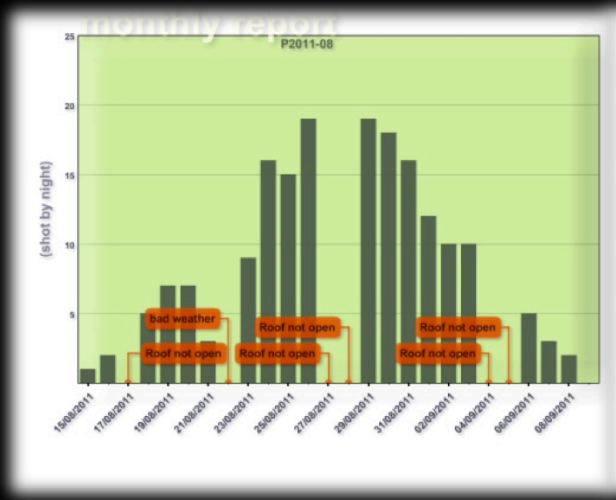
Light sources at the centre of the dish
Provides Single Photo-electron response
Flat-field at two different wavelengths (355, 465, 532 nm) with a Dispersion <1%
Installation mid 2012

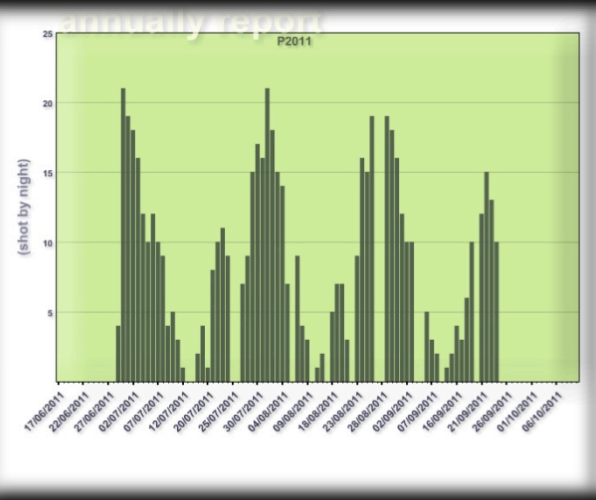


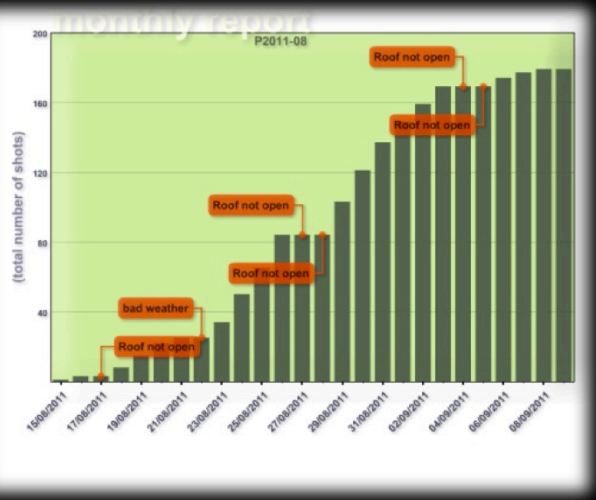


LIDAR V1 ONLINE STATUS

- Web access to online Lidar data taking status : http://l4c.in2p3.fr/P2011-08.php
- Automatic update every day



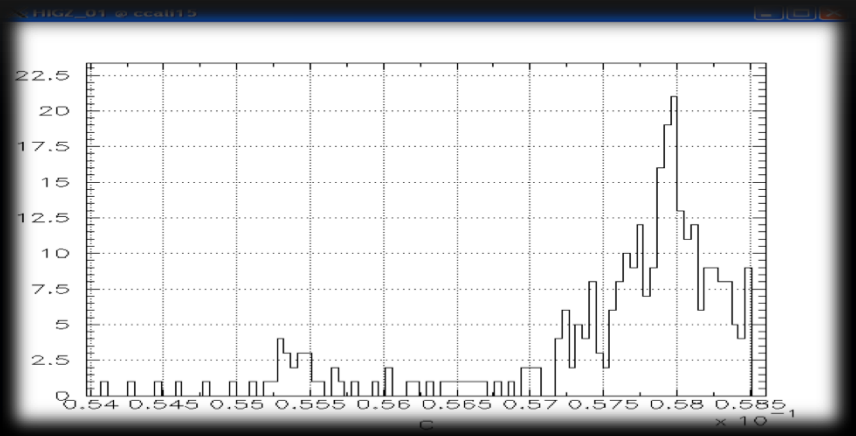




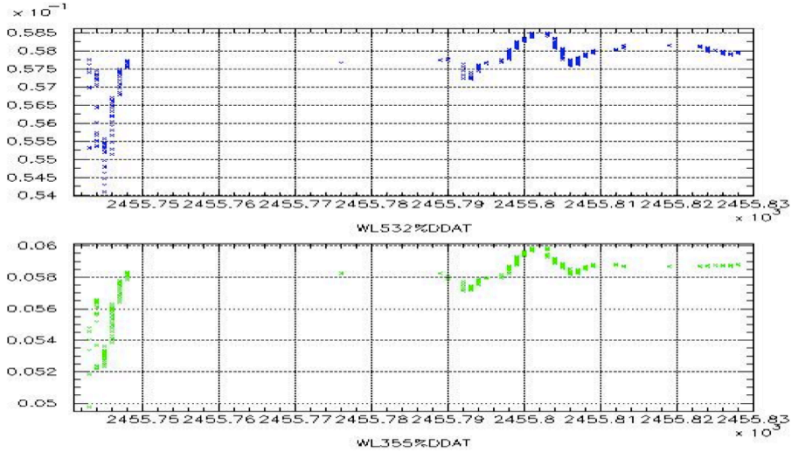
LIDAR ANALYSIS & PROFILES

- Extract extinction coefficient α.
  - Using slant method
    - rudimentary line fit
    - Assuming no clouds/aerosol
  - Mean value of α=0.0587
  - Corresponds to measured values from similar lidar measurements of the TA experiment (astro-ph1109.1196)

532nm

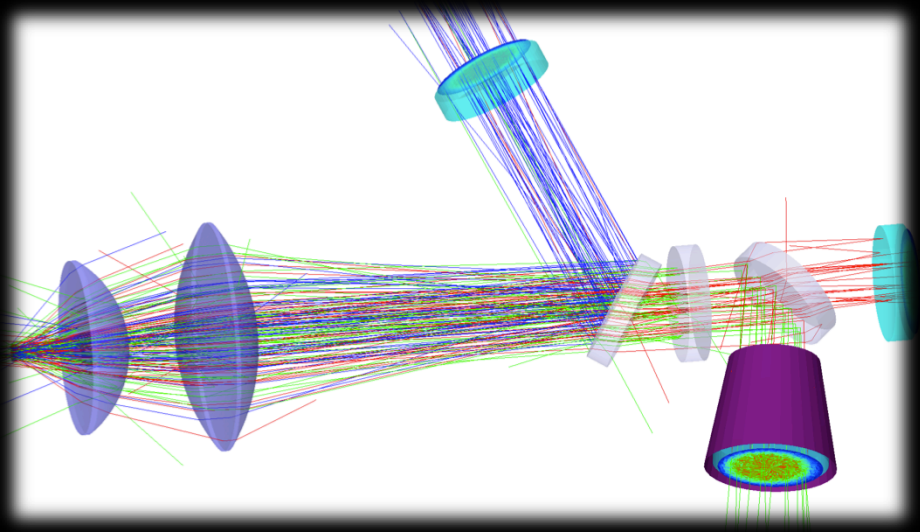


355nm

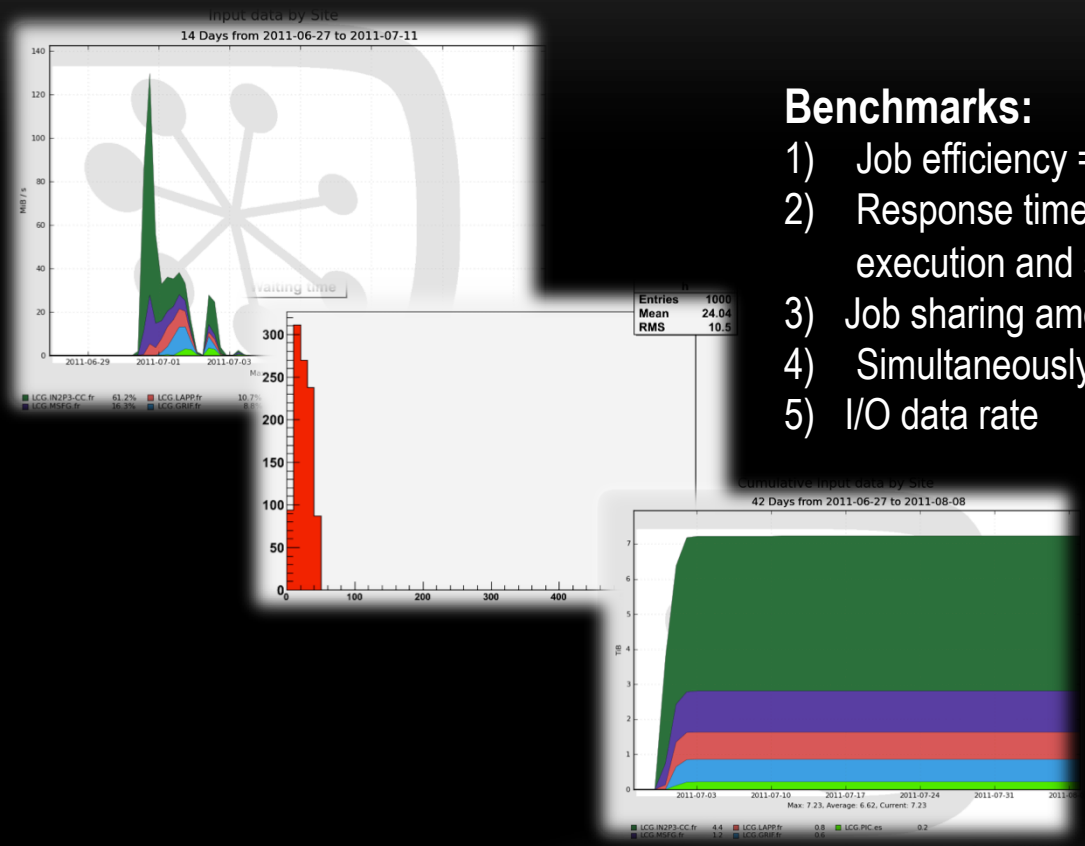


LIDAR V2 – RAMAN TYPE for CTA

Conceptual Design and simultaneous implementation..
Still we lag behind in schedule but too many things at the same time to be done.



CTA DAFA/CEIN



Evaluating computing performances for CTA (DIRAC)

Benchmarks:

1) Job efficiency = done/total jobs
2) Response time = time difference between start of job execution and submission time
3) Job sharing among sites
4) Simultaneously running jobs
5) I/O data rate

CTA DAFA/CEIN

METADATA FOR CTA

Anything describing data, but that is not data

- Structural information (object description): how the information or objects are organized
- Bookkeeping :
  - General run-time information
  - Calibration information
  - FileCatalog
  - Tags (Quality control, Cal/MCRealData,...etc.)

- Tight interaction with physicists needed to define necessary and enough metadata
- Once a first version is defined, need interaction with metadata DB structuring experts (AMI team at LPSC Grenoble) to:
  - Define DB structure
  - Ensure AMI compliance
- Start negotiations with CC to investigate if they can host Databases and AMI dedicated installation (if needed)
- Test production systems (DIRAC, others) interfacing with DBs

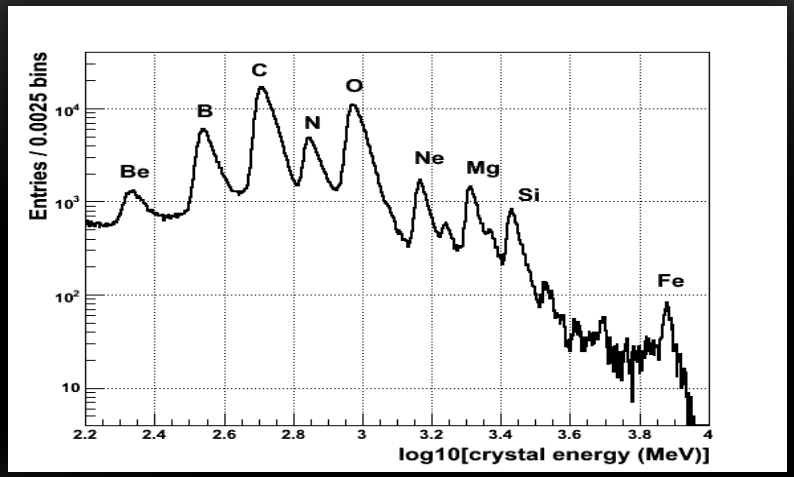
• SATELLITE PROJECTS

Galactic Cosmic-Ray Calibration ("GCR Calib") for the LAT calorimeter (*Fermi*)

- Cosmic protons / ions close to MIP used to monitor the energy response of the CAL crystals
  - *LUPM wrote and implemented the reconstruction s/w*

- All species offer a wide dynamic range (~10 MeV to ~10 GeV per crystal)
  - crystal light yield decreases with time due to the irradiation on orbit.

(LAT: Large Area Telescope)



Energy deposition spectrum per crystal

Pipeline II for LAT extensive Monte-Carlo simulations (*Fermi*)

-Distributed client-server application to launch MC simulations and data reprocessing (..soon..) from SLAC client machines via WEB interfaces
  - jobs executed either at SLAC or CC-IN2P3 farm

- LUPM in charge of all s/w developments and maintenance at CC-IN2P3

-CC-IN2P3: ~30% of the computing resources for LAT
  - 1200 cores available at any time (*MoU SLAC/CC-IN2P3*)

AMS GPS

AMS-gamma will be able to study bright gamma-ray sources (mainly pulsars and Active Galactic Nuclei)

Variability studies only possible if each trigger acquires a precise time stamp (~1μs) provided by a spatial GPS.

-Collaboration/Support by CNES (Toulouse)
- Deliver to the EC & GALILEO Joint Undertaking (GJU) the C/No obtained by the AMS GPS each year to monitor any possible degradation in presence of the GALILEO constellation.

-Occasion to develop links with the Industry (Alcatel TopStar3000 GPS receiver)

AMS Tracker flight SW

Our group developed the tracker calibration and data reduction flight software

-Unique place within the AMS DAQ group

-Gaining experience on the development of NASA certified SW code