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Ecal Overview

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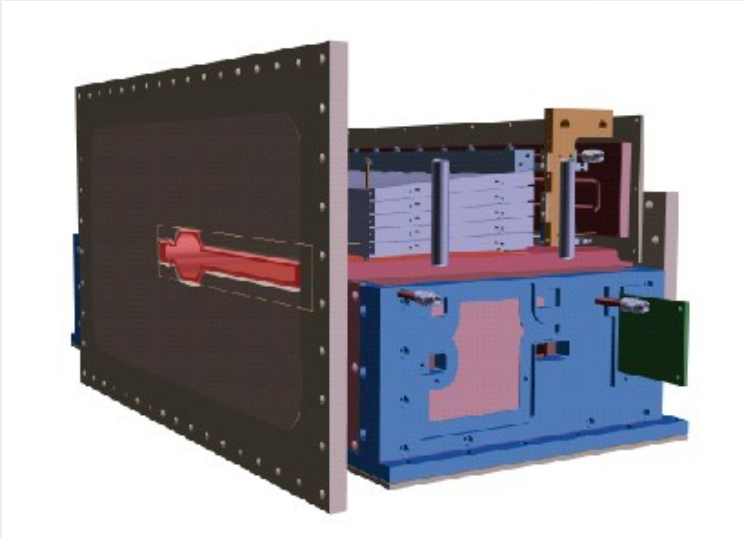
Outline



- ➔ **Upgrades**
  - ➔ Mandatory
  - ➔ Optional
- ➔ **Monitoring & Calibration**
- ➔ **Installation in the Hall B**
- ➔ **Software**

Mechanical Structure

➔Main Structure for crystals, cooling and electronics

- ➔ Done
- ➔ Might need some adjustment due to electronic changes

➔Vacuum Chamber

- ➔ Done

➔ ECal new mounting system

- ➔ To be finalized

➔Design work to be done in Orsay

- ➔ Construction by JLab or Orsay?

Motherboards

➔ **Need to be changed**

➔ **New Design**

- ➔ We have less constraints now
- ➔ To be done by INFN

➔ **Construction**

- ➔ INFN or Orsay?

Pre-Amps

➔Design

- ➔ Using design from Orsay Engineer for CLAS12 Fwd Tagger build by INFN

➔Settings

- ➔ Need to be adjusted to HPS (depends a lot on APDs)
- ➔ Tests in Orsay to adjust gain, S/B and time window

➔Construction

- ➔ Construction by Orsay

New Avalanche Photo-Diodes

➔ Optional

➔ Increase the area from 5x5 to 10x10mm

- ➔ Would increase the light collection significantly

➔ Better S/B (Tests by Andrea)

- ➔ Improve the electron identification for the whole experiment
- ➔ Allow to measure cosmics directly

➔ Issues

- ➔ Money
- ➔ Schedule

Monitoring & Calibration

- Track based calibration
  - Main calibration channel using electrons
  - Needs tracking → Cannot be used for monitoring
- Cosmic MIPs
- Light Monitoring using LED
- Neutral Pion detection

Cosmics

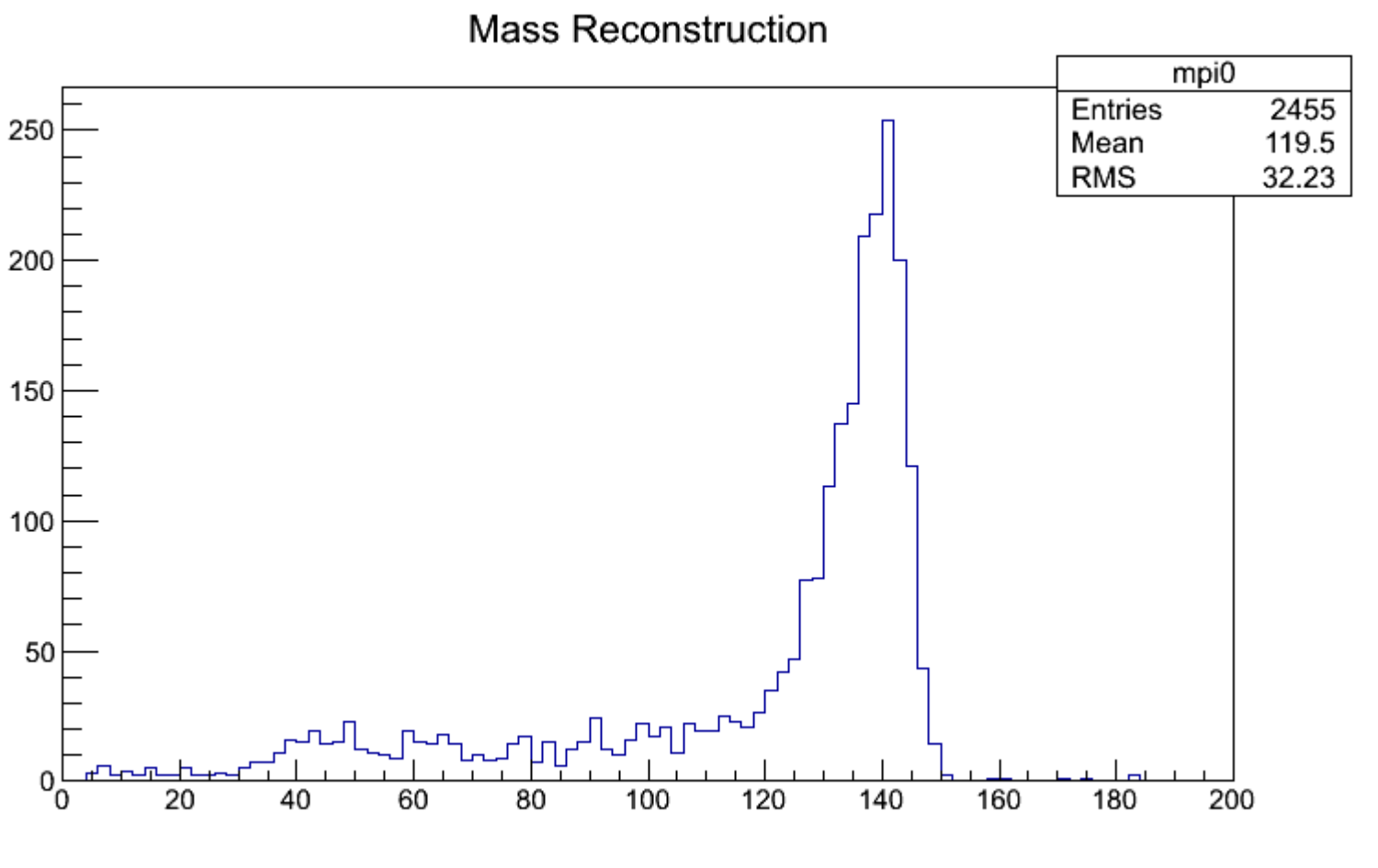
- Around the noise level in the ECal
- New APDs
- Specific trigger
  - Pattern recognition in the Ecal (need specific run)
  - Outside trigger (scintillator bars on top of Ecal)
- Slow process
  - Probably not fast enough for monitoring

Light Monitoring System

- Injecting light in crystals to check efficiency and gains
- We need to design a system completely
  - Optic fiber injection or LED directly on the crystal?
  - Can we do that for end of 2014?
- What precision and how relevant?
  - These systems are known to be difficult to setup
  - Radiation damages might affect differently the monitoring system and the actual data
- Should be funded in Orsay (TBC)

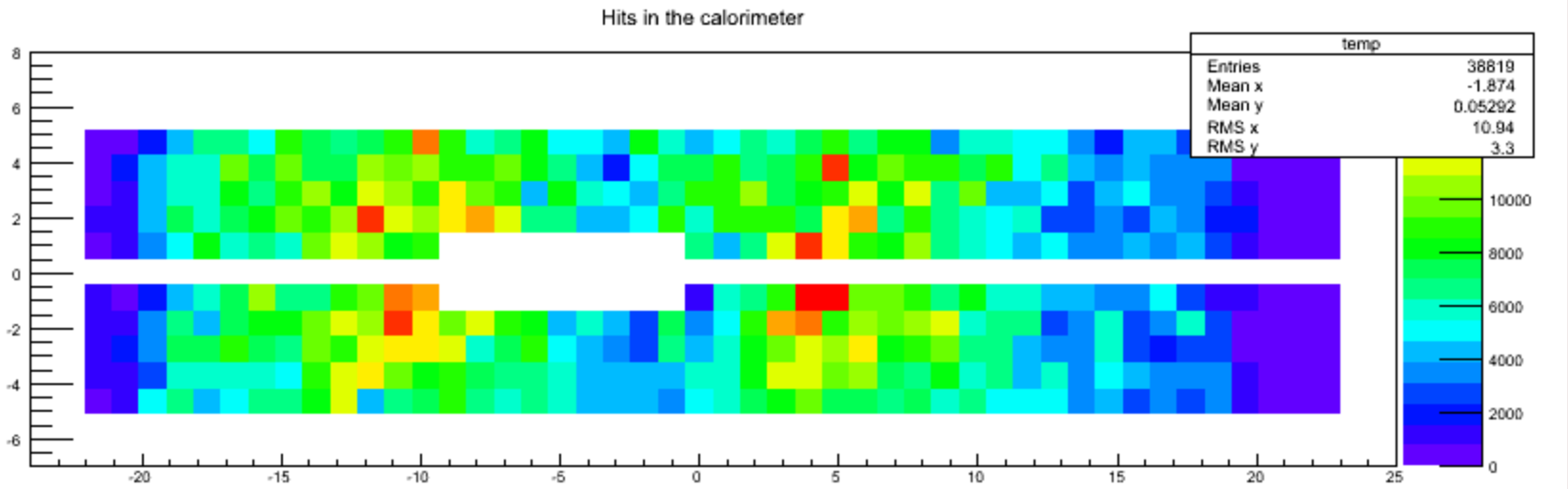
Pi0 Calibration

➔ **Using Pi0 peak might help calibration**

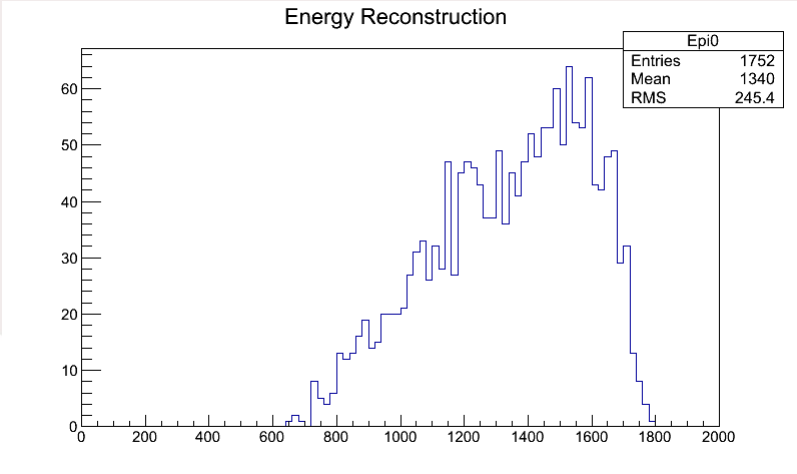


Pi0 Calibration

➔ Large Coverage of the Detector



➔Acceptance down to 700 MeV



Pi0 Calibration

- Needs to be tested with background
  - Can we resolve the peak directly?
  - Do we need veto from tracker?
- Rates have to be evaluated
  - Important to know if it qualifies for monitoring

Schedule

ECAL	230 days	Mon 9/2/13	Fri 8/1/14
Fix 2-shorted HV groups on top-left	1 wk	Mon 9/2/13	Fri 9/6/13
Order new motherboard	6 wks	Mon 9/2/13	Fri 10/11/13
New motherboards and amplifiers	8 wks	Mon 10/14/13	Fri 12/6/13
New pre-amplifier boards	6 wks	Mon 9/2/13	Fri 10/11/13
Assembling ECAL	3 mons	Mon 1/20/14	Fri 4/11/14
Test and Calibrate Ecal	4 mons	Mon 4/14/14	Fri 8/1/14
New mounting system	4 wks	Mon 1/6/14	Fri 1/31/14
ECAL Ready for the installation	0 days	Fri 8/1/14	Fri 8/1/14

➔ **Mostly constrained by electronics upgrades and light monitoring construction**

➔ **Detailed schedule need to be developed for the review**

- ➔ **In particular for the light monitoring and the electronics upgrades**

Software

- Final geometry is in the Geant4 MC (SLIC & GEMC)
  - But readout need to included
- Readout effects need to be implemented
  - Needed to match data with simulation
- Reconstruction Software
  - Existing
  - New cluster algorithms can be tested
- Monitoring Software
  - To be done

Summary

- Hardware Updates
  - In good progress in Orsay & INFN
  - New APDs or not? When is the dead line?
- Monitoring
  - No clear solution yet, but time to make decision
- Installation Schedule
  - To be improved
- Software
  - Need man power