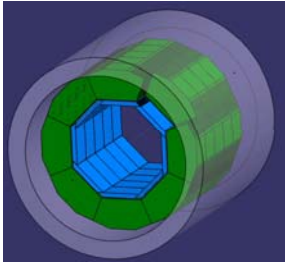# Tile HCAL status

Felix Sefkow
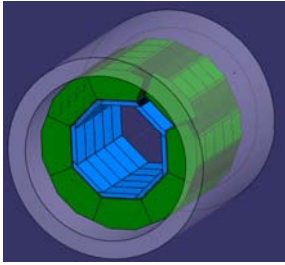
CALICE Technical Board
Review
April 19, 2007

Testbeam readiness

- Prototype production

- Commissioning

- Calibration and monitoring

- Reconstruction

- Analysis feedback

- *Summary of yesterday's HCAL meeting –*
- *thank you to all speakers for careful preparation*

HCAL production

- The last package of scintillator tiles for the physics prototype arrived at DESY last week
  - Almost 8000 SiPMs tested, mounted and delivered
  - **Congratulations to ITEP and MEPHI colleagues!**

- 32 modules ready
- Cabling was interrupted for ~ 2 weeks due to broken machine and need for re-adjustment for cable from new producer
- Schedule for assembly of remaining modules made
  - Finish all 38 by **May 23** – if no new problems
  - Manpower in place
- Repair of # 1 & 2 started
  - Tiles sent to ITEP for exchange of SiPMs by mid May

D.David
(w/ ITEP, LPI , MEPHI, DESY colleagues)
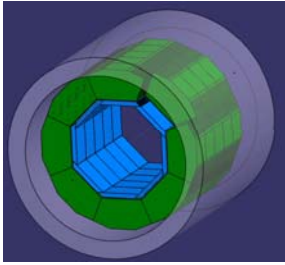
Movable stage

- is moving....!
  - HCAL modules 1-23 installed on stage
  - ECAL slabs arrive on 24th of April: 15 + 6 new slabs
  - Cabling being done: readout this week, power this/next week
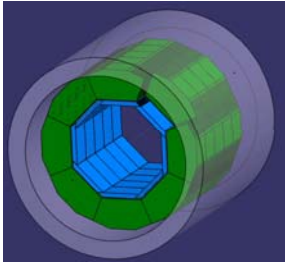 - 1st electronics test before end of April, check grounding
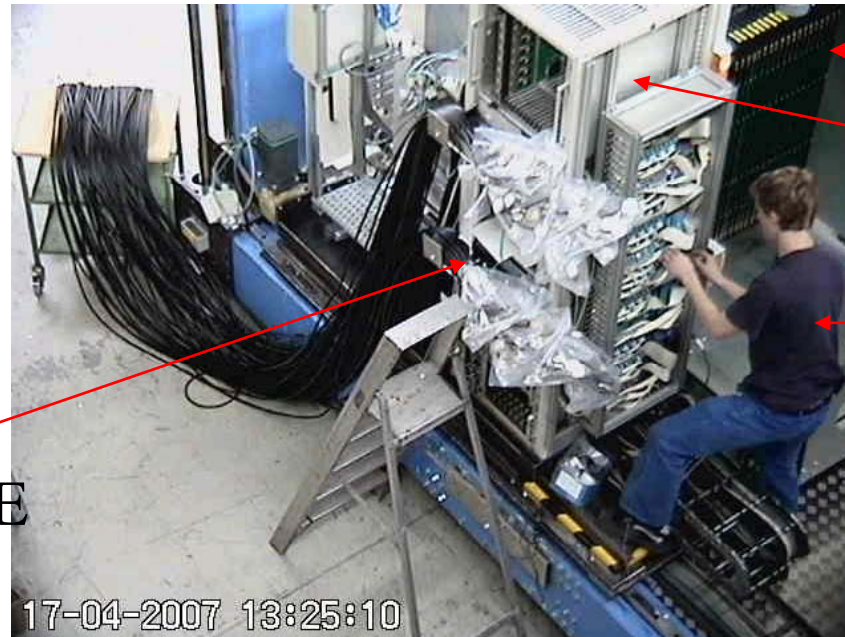
HCAL modules

ECAL VME

Thorsten working

HCAL VME

K.Gadow, S.Karstensen, T.Jung

Commissioning

- CMB (LED system) tuning in May

  about 15 working days needed to:

  - check 23 CMB tuned at CERN, some minor repairs

  - tune 15 new CMB

- Study new physics mode of FE ASIC (lower noise)

- Adjust bias voltages for a few channles from the tails

- Test does not include:

  – Trigger system, TCMT integration, MWPC and Cherenkov r/o

In // @ the DESY Test Beam:

Modules # 24, 26, 28, 30 tested last w.e. ➔ 24 repair "dead" channels

Modules # 25, 27, 29, 31 installed today (scan over w.e.)

Modules # 32-38   to be tested when ready
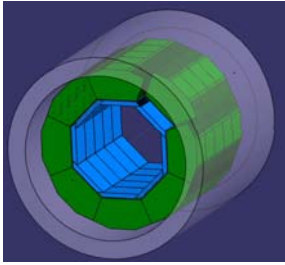
Shipment

- Additional traverse beams for stage rigidity during transport and on crane work being constructed

- Ready for shipping on June 4th

  Logistics:
  Gert Falley

  – (Open) sea container ordered
  – Additional boxes for electronics and active layers

- Installation at CERN beam line H6b starts on June 11
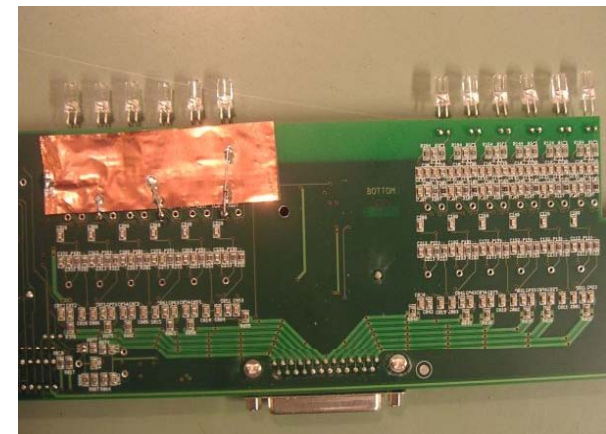 – More in Erika's talk
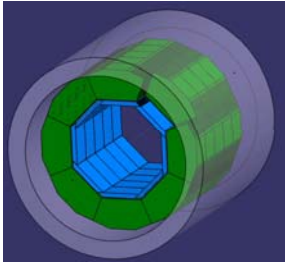
Calibration & Monitoring

- Summary (S.Schaetzel)

- SiPM temperature dependence studied using LED system
    - $-(2.2 \pm 0.8_{RMS})\%/K$ vs. $-3.7\%/K$ at MEPhI   *Depends on ΔV)*

- LED fluctuations corrected using PIN diode
    - PIN diode pedestal influenced by electrical pickup depending on V_calib → further studies needed

- PIN diode pedestal shift impact on saturation curve to be studied

Ivo Polak

- MIP calibration dependence on temperature and application of T–correction is ongoing

- optimisation of calibration data for CERN2007:
    - remove SiPM pedestal shift (V_calib dependent)
    - optimise V_calib values and statistics in gain runs
   - lower LED monitoring point if PIN diode shielding successful
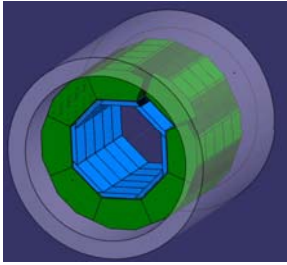
Reconstruction

- From S.Schmidt, more in Roman's talk

Current release of HCAL software

- hcal-v00-01-18 available since early March
- Includes everything promised in the last meeting

- HCAL reco package is getting more and more complete, e.g.:
    - Nicola's muon finder, UK DC reconstruction
    - Calibrations, PIN data, ITEP test bench data,
    - Vasily's DeepAnalysis
    - Cell index and alignment problems fixed
    - Even documentation (!)
- And user-friendly: Simplified installation
- LCIO Performance issues better understood
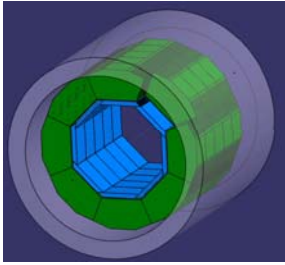
Fast feedback: optimization

- To optimize light yield and noise in situ

Online: Working Point

Optimization of working point requires:
- Muon and gain data at different voltages
- Fast mip and gain calibrations
- Analysis code for half-module wise optimization

Suggestion:
- Run the standard calibration code on binary files directly from the RAID either on `caliceana` or a similar machine in the control room -> Immediate processing 'on demand' possible
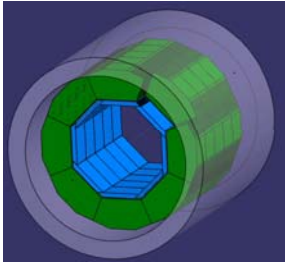
To be done:
- Documentation of calibration code
- Fast database update for setup-related information (slow control?)
- Analysis tool (simple, but has to be done and checked beforehand)

(to be discussed)

Niels Meyer   Fast Feedback Tools   AHCAL Main Meeting   18. Apr. 2007   Page 6

Fast feedback: data quality

- E.g.: check beam energy and spread!

Offline: Data Quality

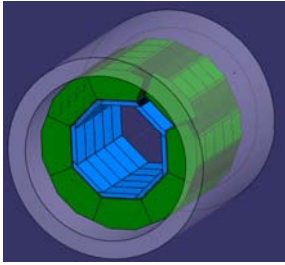Fast data quality still within beam period provide chance of 2nd take

Extract and monitor from each beam run:
- pedestal stability
- mip stability (each run contains muons)
- noise level
- energy sum in GeV (approx. with fixed sampling fractions)
- energy sum with and without Čerenkov
- veto amplitude, secondary contamination
- ...

To be done:
    Code development and documentation
    Discuss responsibilities (offline shifts?) and resources (grid?)

Niels Meyer   Fast Feedback Tools   AHCAL Main Meeting   18. Apr. 2007   Page 7

Summary

- All HCAL layers and movable stage expected to be in place for the 2007 test beam at CERN

- Detector integration, electronics and LED calibration commissioning at DESY in May prior to shipment

- Software is far more developped than in 2006 – some tools for fast feedback will be assembled

- Tight schedule – but all lights **green**