

Poster Review

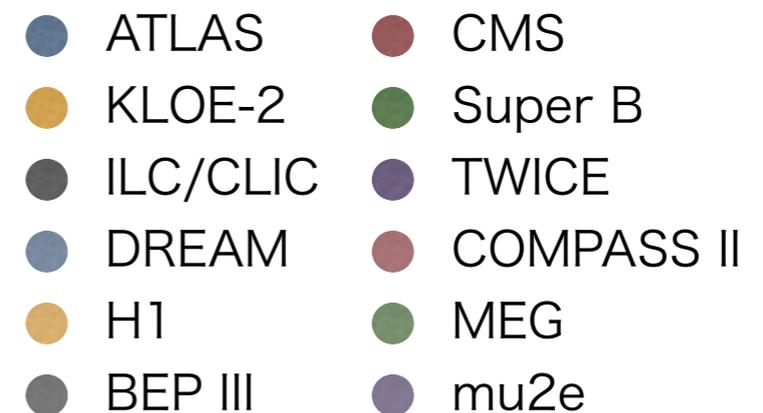
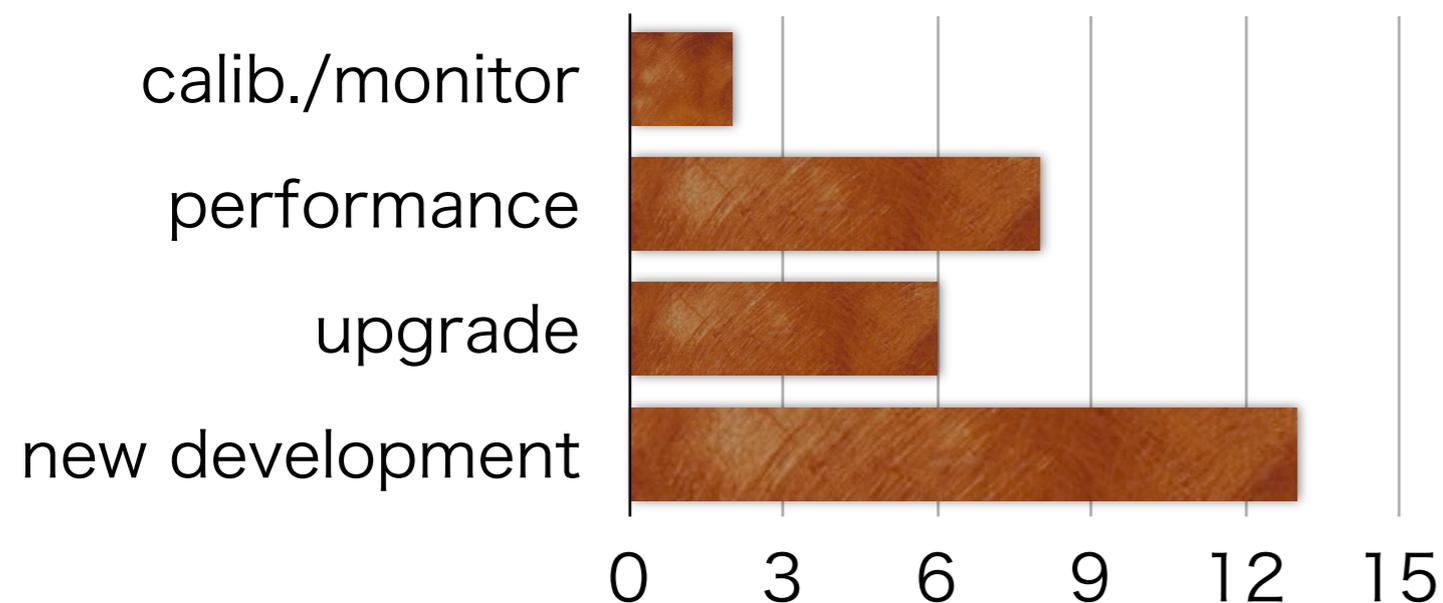
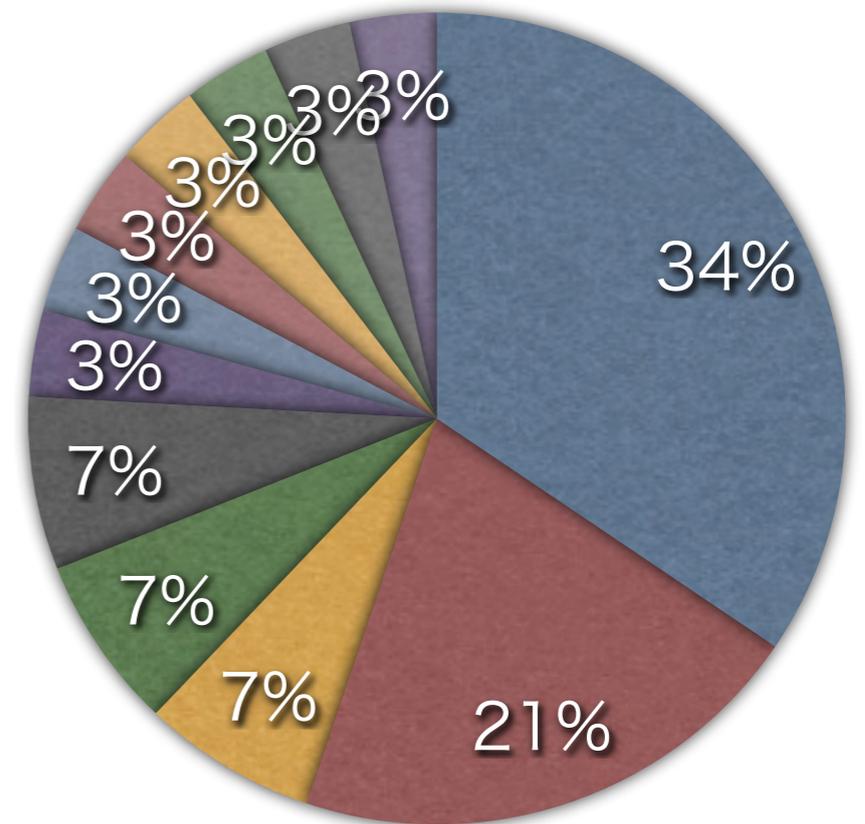
Calorimetry

Stefano Miscetti

Satoshi Mihara

Calorimetry Poster Session

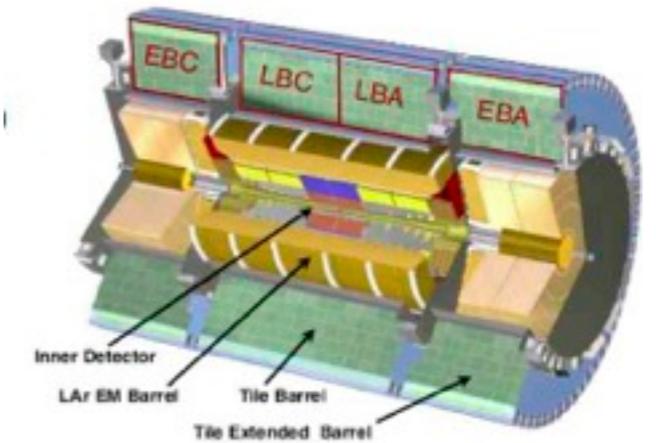
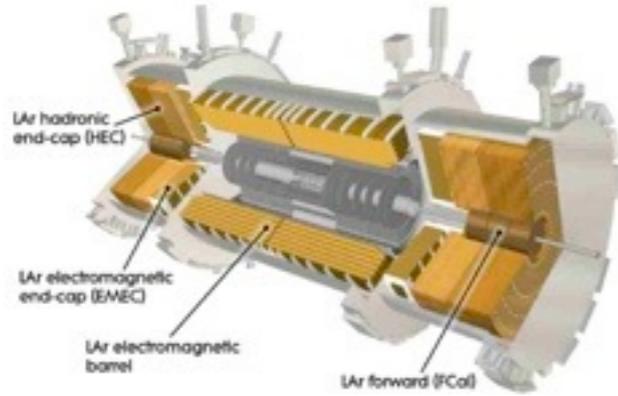
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Performance report

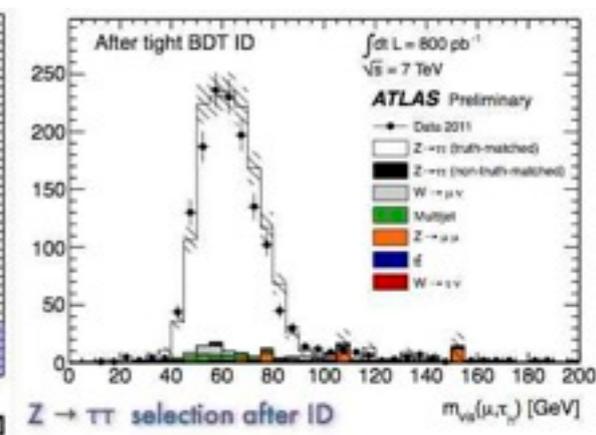
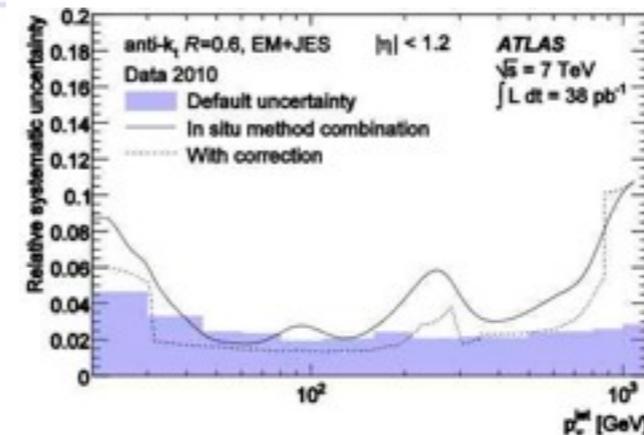
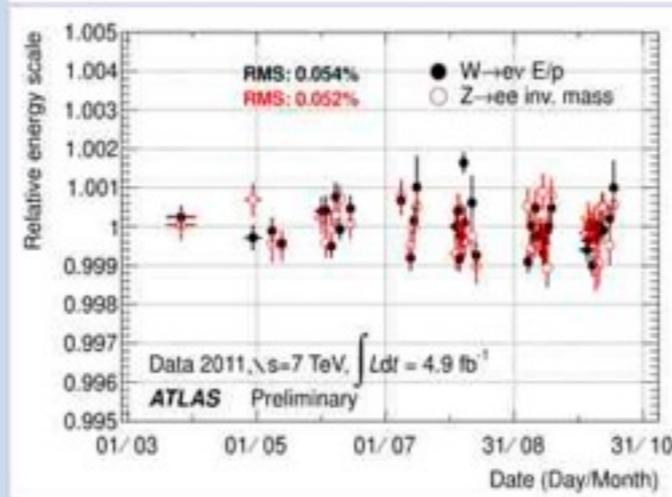
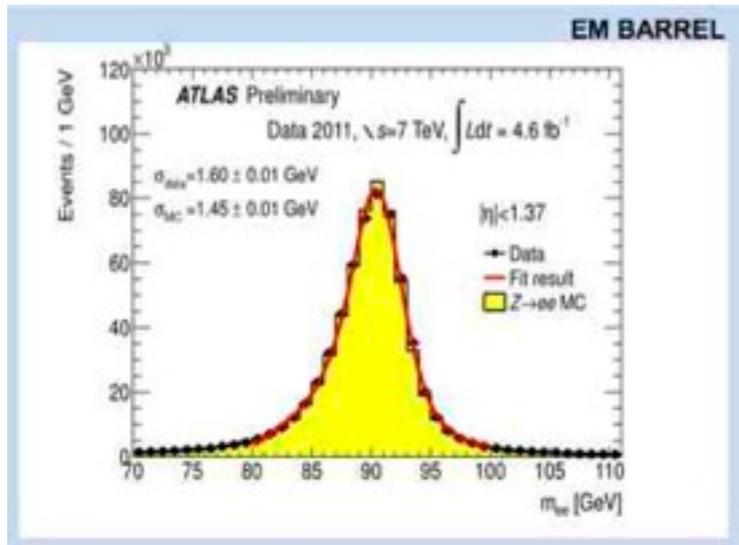
- ATLAS LAr by L. A. Bella (LAPP)
- ATLAS TileCal by Y. Hernandez (IFIC) and E. Meoni (IFAE)
- Tau reconstruction at ATLAS by S. M. Consonni (Milano)
- Jet reconstruction at ATLAS by L. Kogan (Oxford)
- Single hadron response at ATLAS by M. J. Sousa (LIP)

ATLAS



- LAr performance

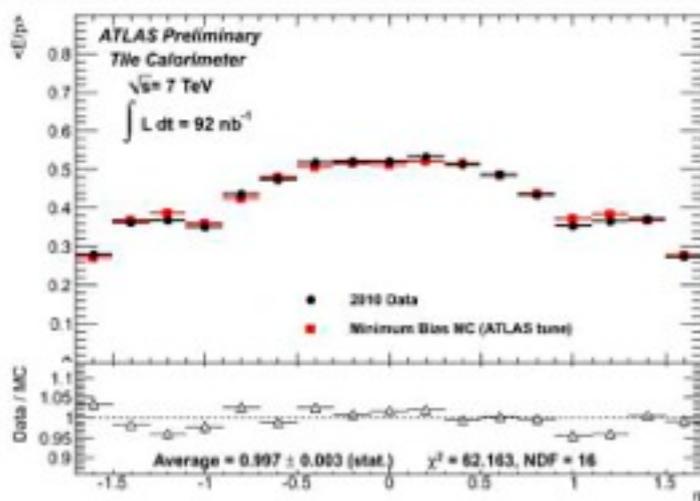
- Tau/Jet reconstruction



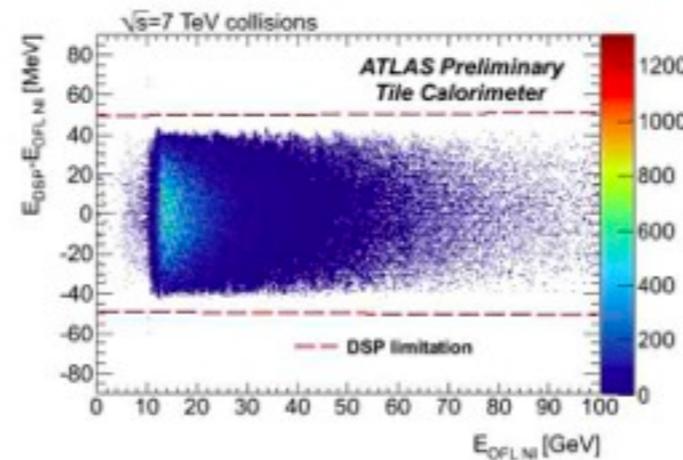
JES uncertainty 2-4%

- TileCal performance

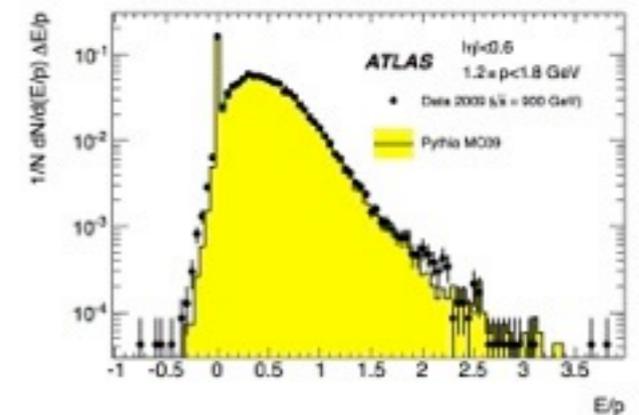
- Single hadron response



Online vs Offline Non Iterative



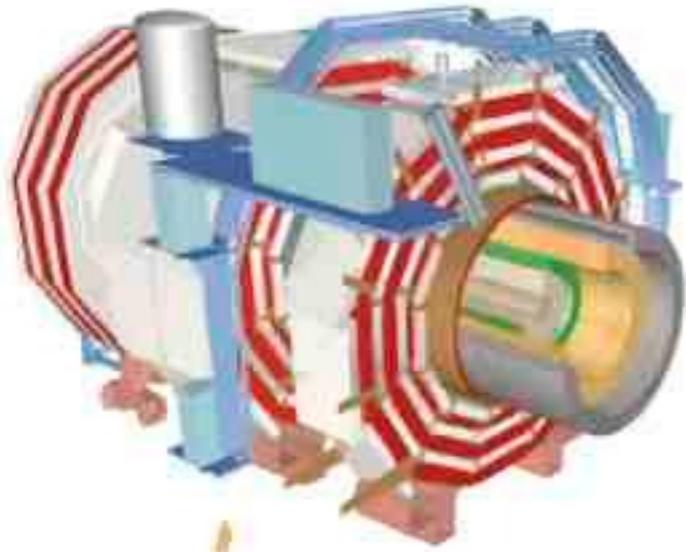
Largest contribution to the Jet Energy Scale uncertainty



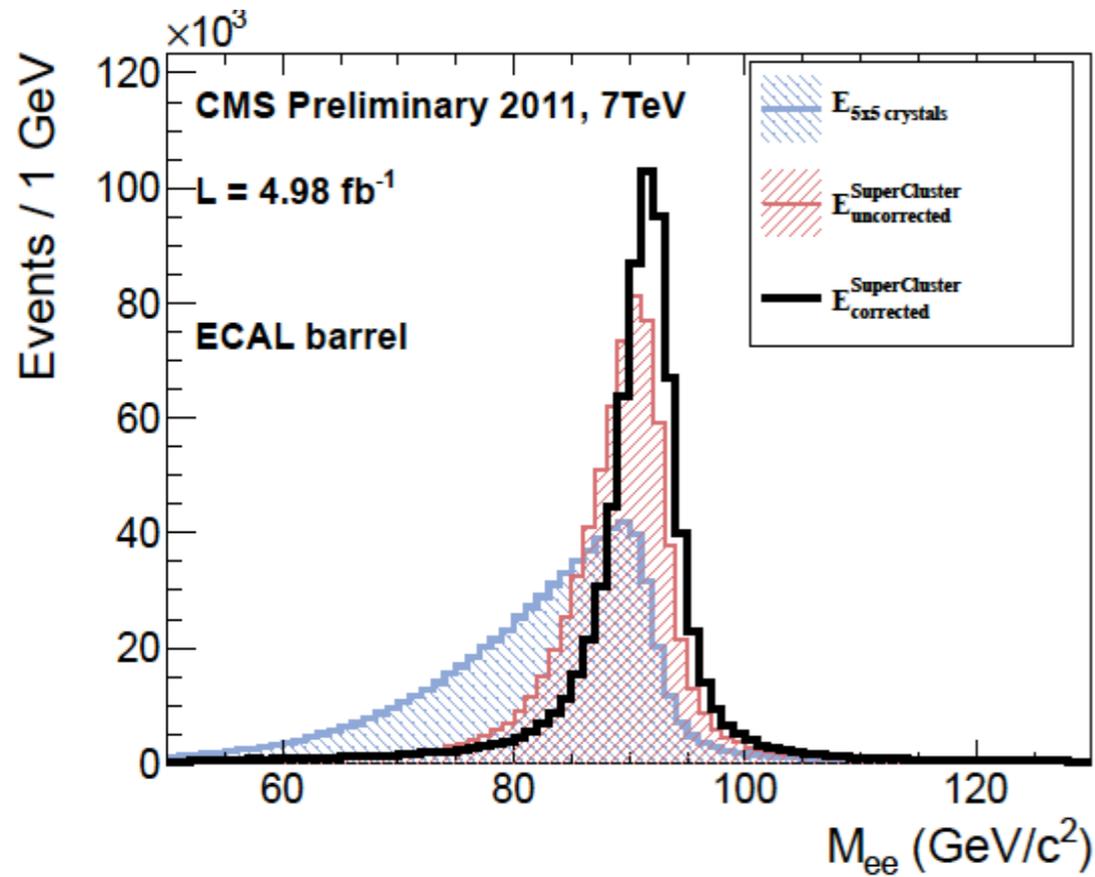
Performance report

cont'd

- CMS Ecal by J. L. Faure
- CMS forward calorimeter CASTOR
by A. P. Panagiotou (Athens)

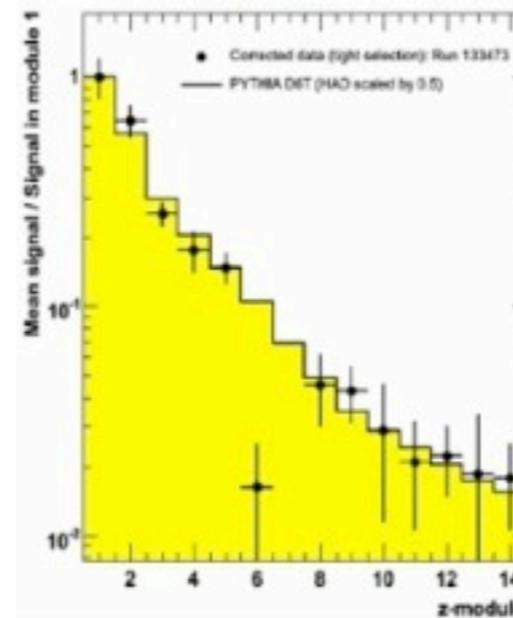
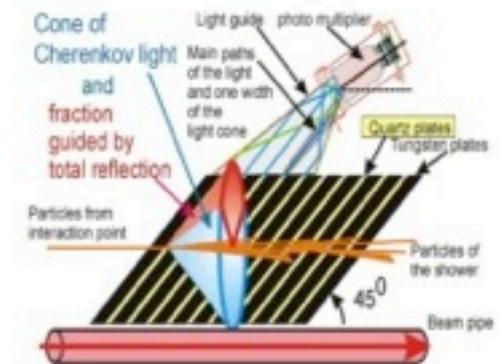


CMS



impact on the $Z \rightarrow ee$ energy scale and resolution from the incorporation of more sophisticated clustering and cluster correction algorithms.

Installation in CMS



Physics with CASTOR - PbPb



- Ongoing analysis:**
- Energy Flow
 - Elliptic Flow
 - 'Exotica'
 - UPC

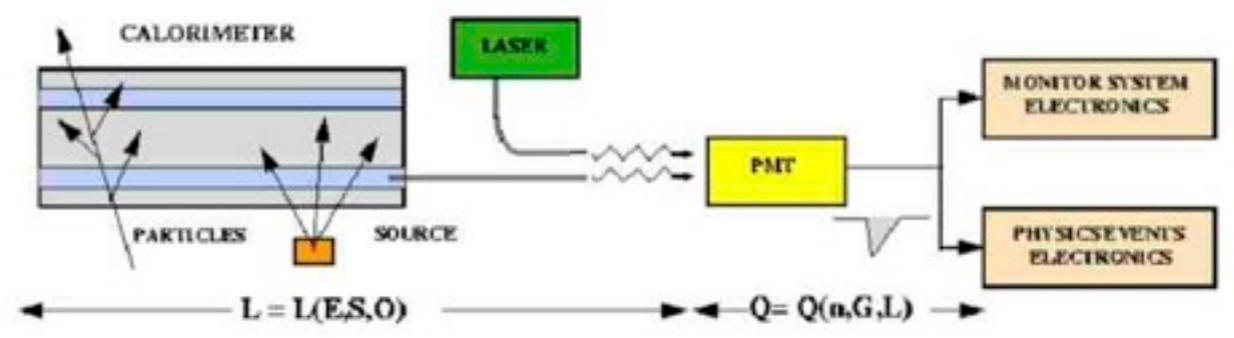
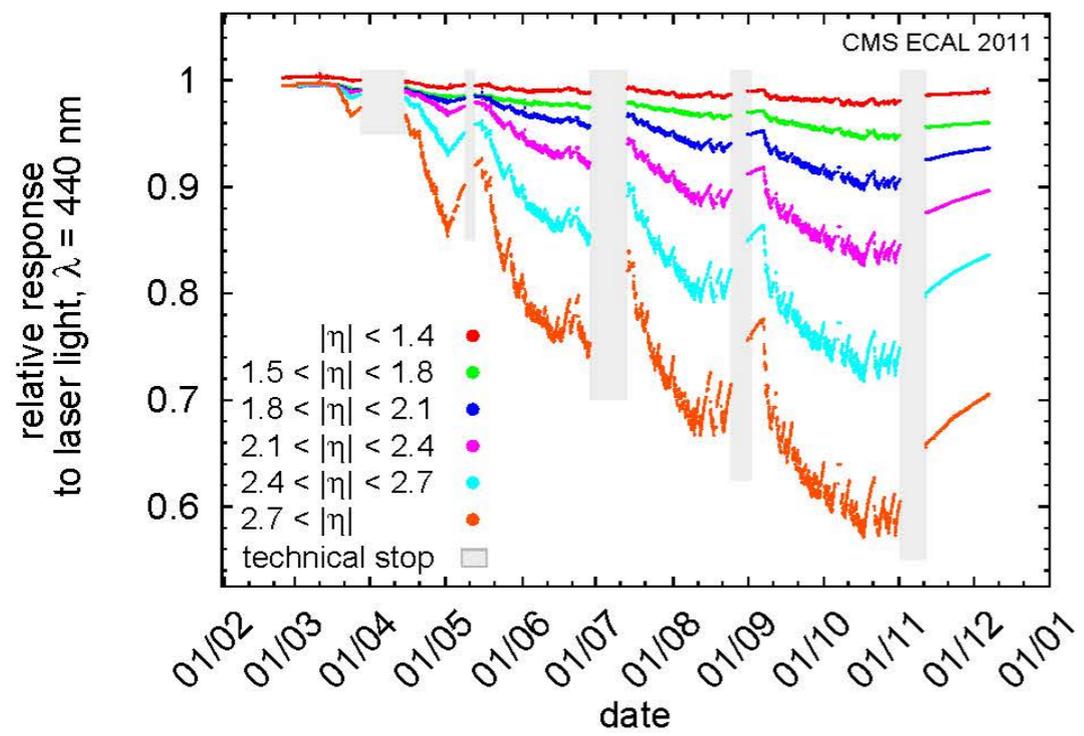
Calibration/Monitoring

- CMS Ecal calibration using LHC collision data by M. Obertino (Piemonte)
- Calibration and monitoring system for the ATLAS TileCal by D.Boumediene (U. Blaise Pascal)

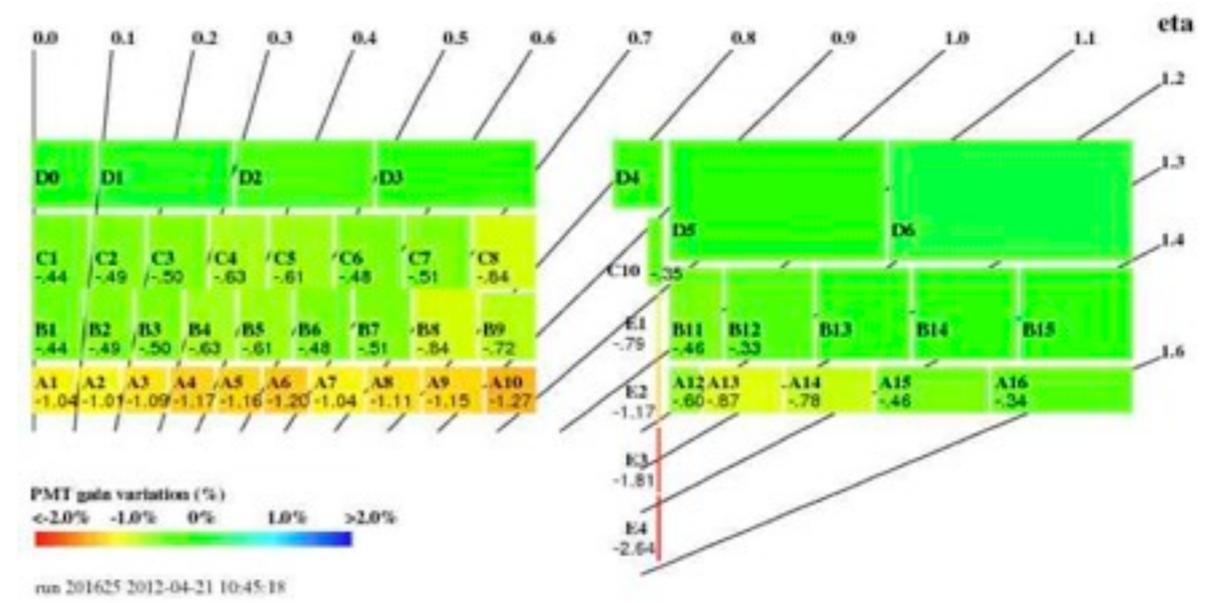
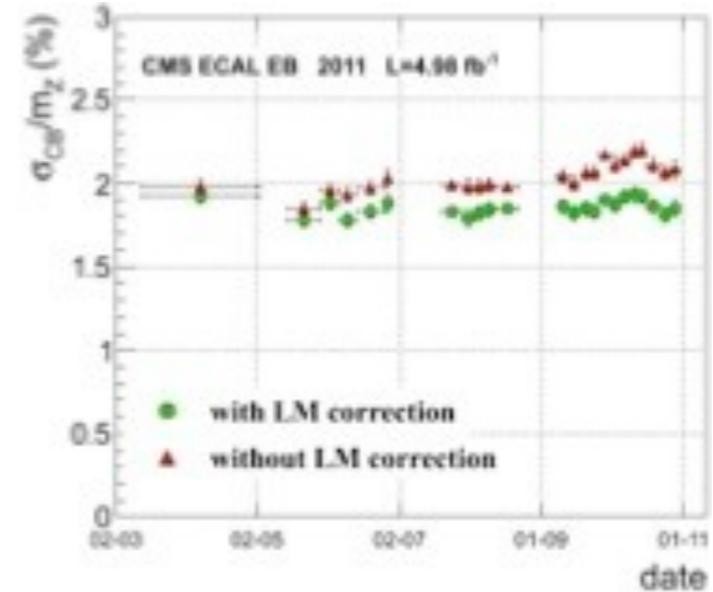
Calibration/monitoring

CMS ECAL laser monitoring system

ATLAS TileCal calib./monitoring systems



cross-check using
Z→e⁺e⁻ data
stable within 4%



The mean gain variation of the 10000 channels is computed cell by cell as a function of eta and radius, between the 19 March 2012 and the 21 April 2012

Upgrade Plan

- CMS HCAL front-end electronics by J. Anderson (FNAL)
- Upgrade of the CMS HO with SiPM by J. Anderson (FNAL)
- New photosensor for the CMS HCAL by J. Anderson (FNAL)
- ATLAS TileCal readout electronics upgrade by F. C. Argos (Valencia)
- ATLAS LAr readout electronics upgrade by S. Staerz (Dresden)
- ATLAS FCal upgrade by M. Fincke (Victoria)

CMS HCAL/HO Upgrade

major luminosity increase expected in 2017

Full HO SiPM System installation in 2013

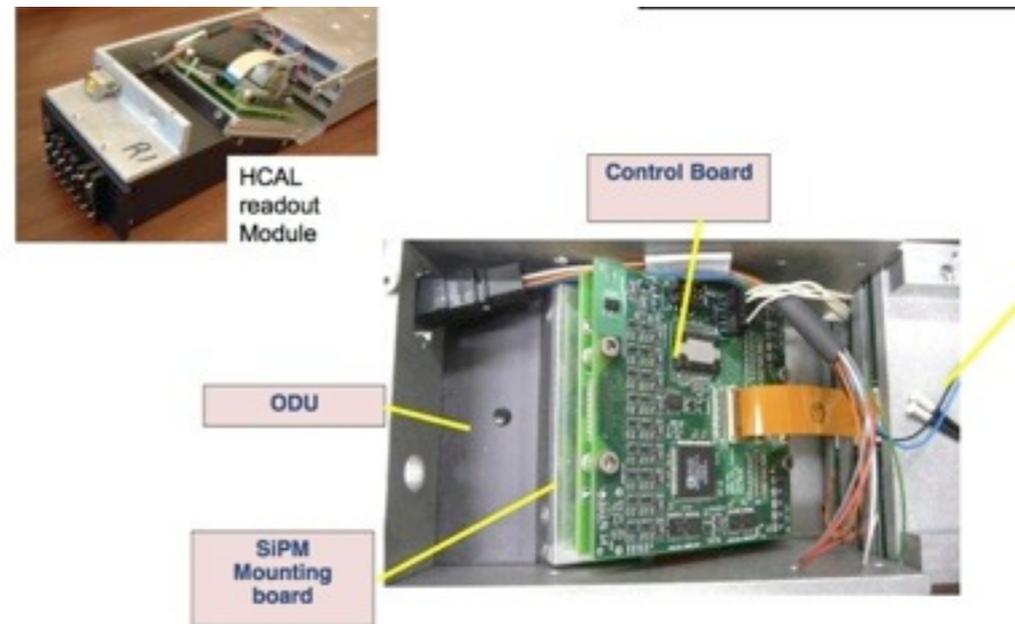
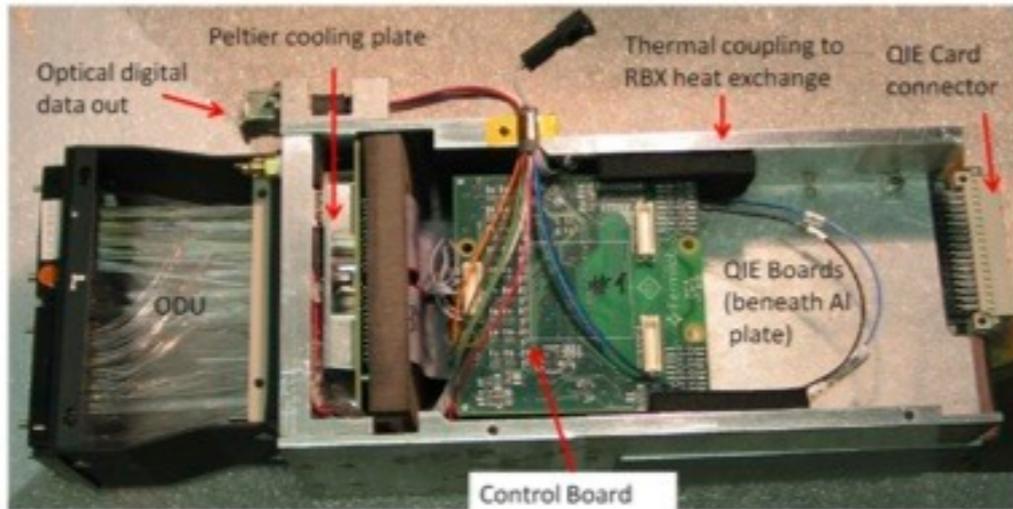
FE Electronics for HCAL Upgrades

•Installation Plan

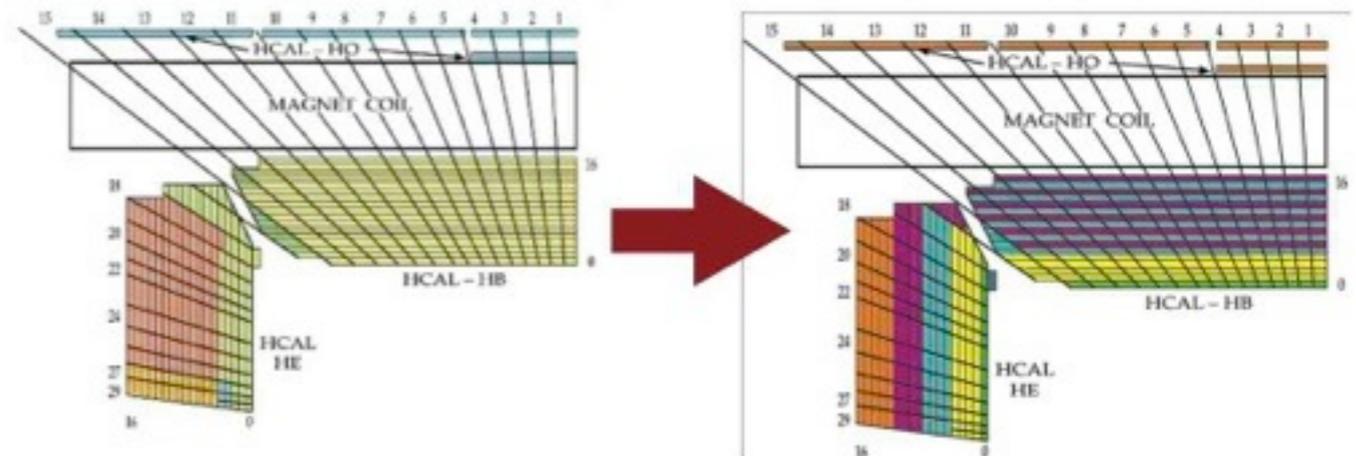
- LS1 - HF/HO Photo-sensor replacement,commisson BE μ TCA
- LS1.5 - HF FE electronics replacement
- LS2 - HB/HE/HO FE electronics replacement (HB/HE photo-sensor, FE electronics. HO FE Electronics)

•Cost/Schedule Constraints

- Re-use as much of the existing infrastructure as possible
- Reuse optical data links, H2O cooling, readout boxes
- Modular FE readout & control units allow for easy replacement of FE electronics
- Radiation Environment ($2E12$ n/cm², 100 Gy), B-field: up to 4T

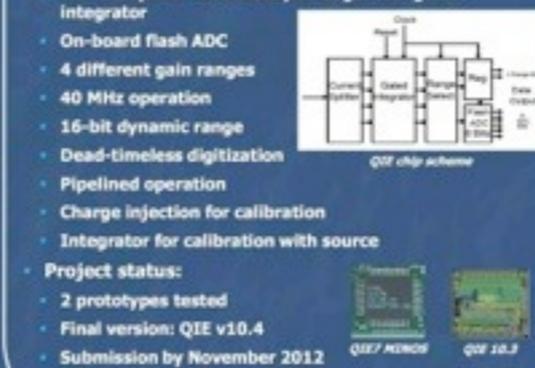
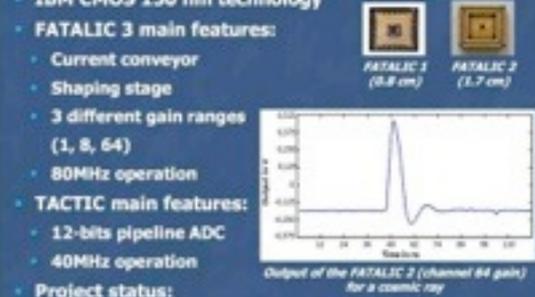


HCAL photosensor HPD -> SiPM

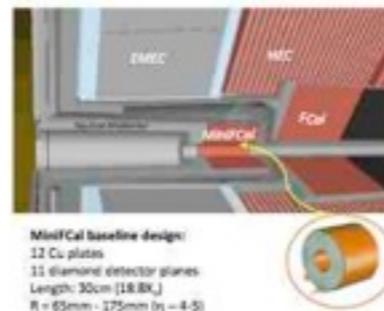
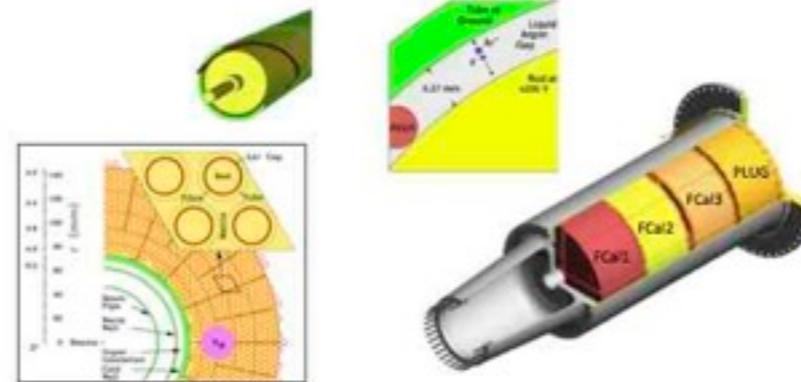
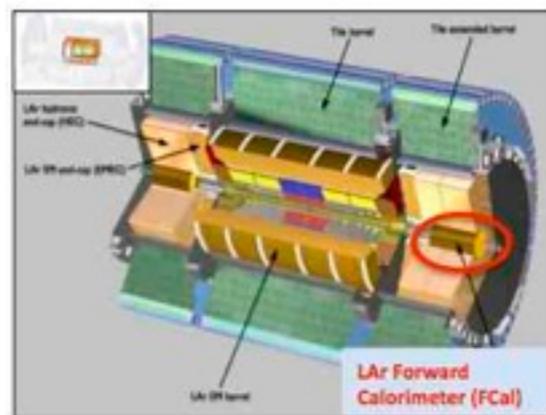


ATLAS Calorimeter Upgrade

TileCal readout electronics upgrade three options

| Modified 3-in-1 | QIE | FE-ASIC |
|---|--|--|
| <ul style="list-style-type: none"> University of Chicago Design based on the original 3-in-1 cards Compatible with the present readout system Main features: <ul style="list-style-type: none"> Reception and shaping of PMT signals Fast signal processing <ul style="list-style-type: none"> 7-pole LC shape: 50ns FWHM shaping time Bi-gain readout: gain ratio of 16 Digitization in Mainboards using 12 bit ADC Slow signal processing <ul style="list-style-type: none"> Integrator to read out Cesium calibration data Charge injection calibration and controls Better linearity and lower noise than previous version Project status: <ul style="list-style-type: none"> Prototype tested using COTS components Passed radiation tests  | <ul style="list-style-type: none"> Argonne National Laboratory (ANL) Development in collaboration with FNAL and CMS HCAL Design based on the QIE chip (Fermilab) Main features: <ul style="list-style-type: none"> Current splitter with multiple ranges and gated integrator On-board flash ADC 4 different gain ranges 40 MHz operation 16-bit dynamic range Dead-timeless digitization Pipelined operation Charge injection for calibration Integrator for calibration with source Project status: <ul style="list-style-type: none"> 2 prototypes tested Final version: QIE v10.4 Submission by November 2012  | <ul style="list-style-type: none"> Clermont-Ferrand (LPC) Combined ASIC solution: FATALIC 3 + TACTIC FATALIC 4 will include both ASICs IBM CMOS 130 nm technology FATALIC 3 main features: <ul style="list-style-type: none"> Current conveyor Shaping stage 3 different gain ranges (1, 8, 64) 80MHz operation TACTIC main features: <ul style="list-style-type: none"> 12-bits pipeline ADC 40MHz operation Project status: <ul style="list-style-type: none"> First prototypes of FATALIC 1 and 2 validated New version FATALIC 3 delivered March 2012: <ul style="list-style-type: none"> Circuit corrections + integrator amplifier Reduced parasitic self effects TACTIC: <ul style="list-style-type: none"> Designing the amplifier block Ordered by beginning of August  |

FCal Upgrade



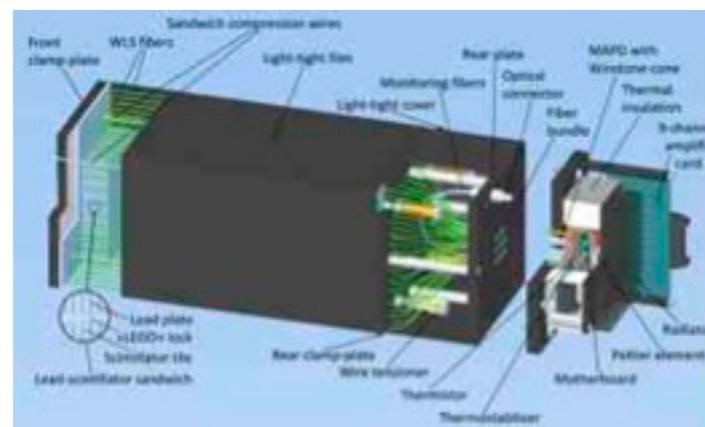
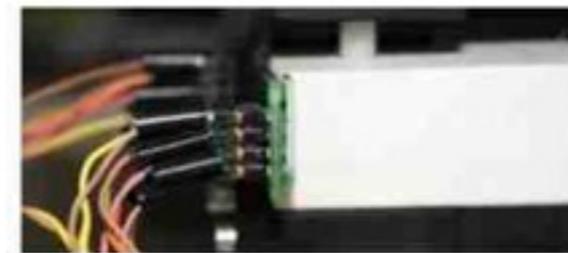
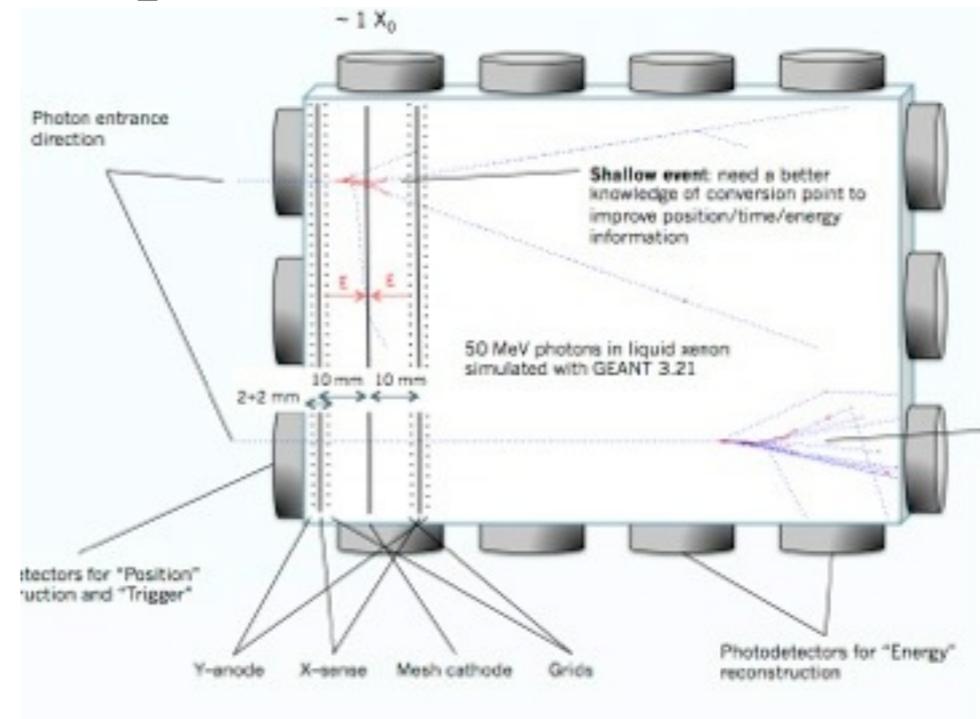
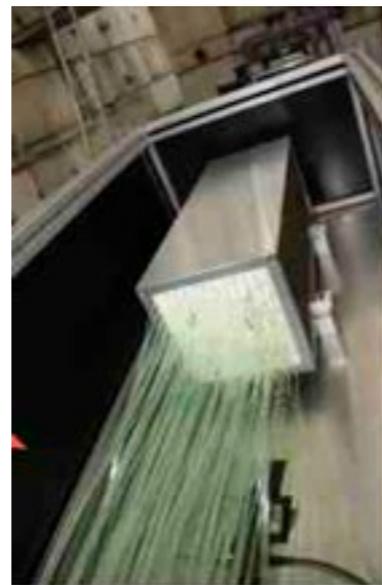
MiniFCal baseline design:
 12 Cu plates
 11 diamond detector planes
 Length: 30cm (18.8X)
 R = 65mm - 175mm (r₁ - 4.5)

LAr readout electronics development as well

sFCal or MiniFCal?

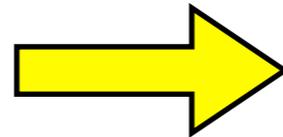
New development

- LXe detector R&D by G. Signorelli (Pisa)
- SiPM readout for Shashlik and crystal-based calorimeter, TWICE by A. Berra (MIB)
- MAPD readout for Shashyk EM calorimeter for COMPASS II by I. Chirikov-Zorin (JINR)



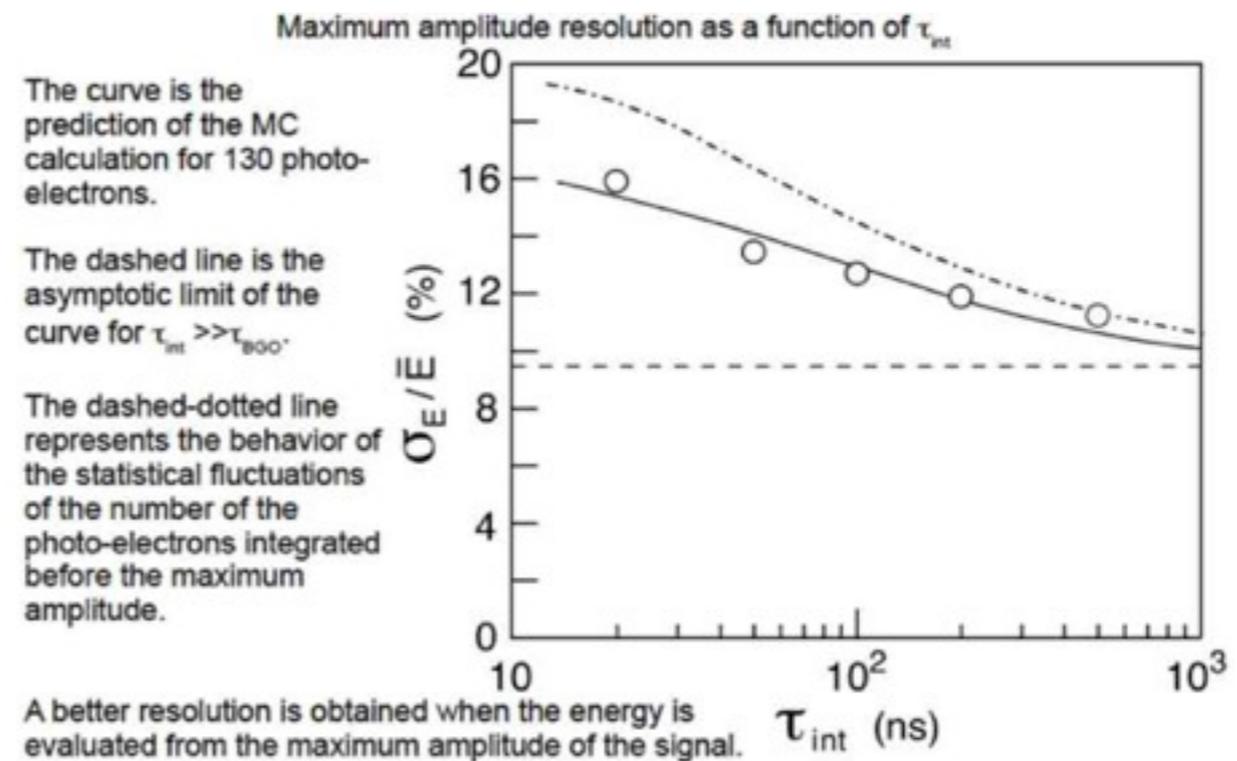
New development cont'd

- DREAM project by M. Cascella (Lecce)

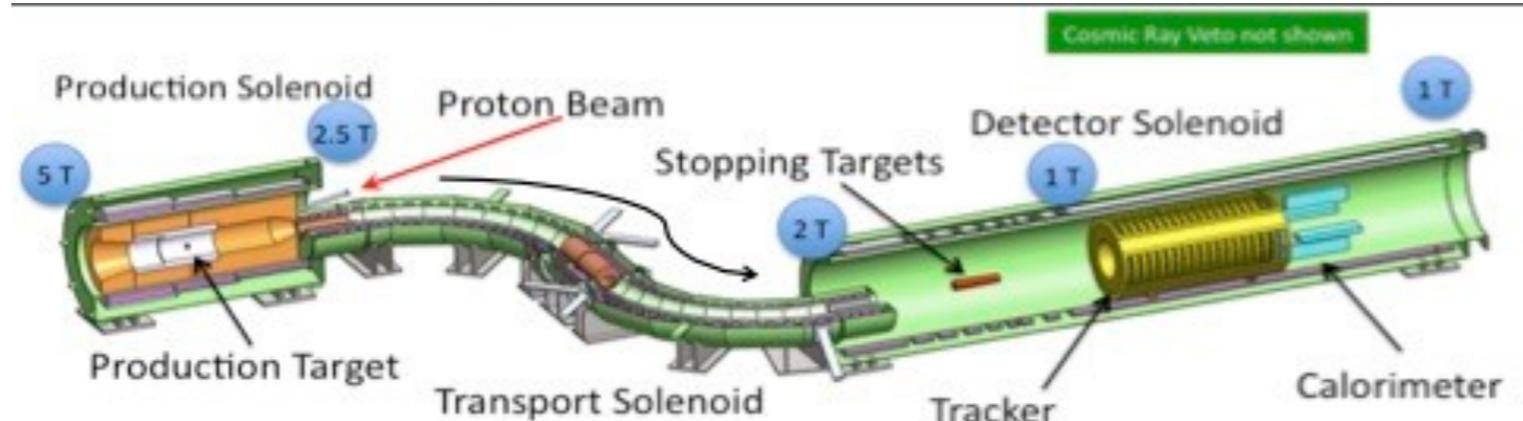


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- Study on integration time, super B by D. Pinci (Roma)

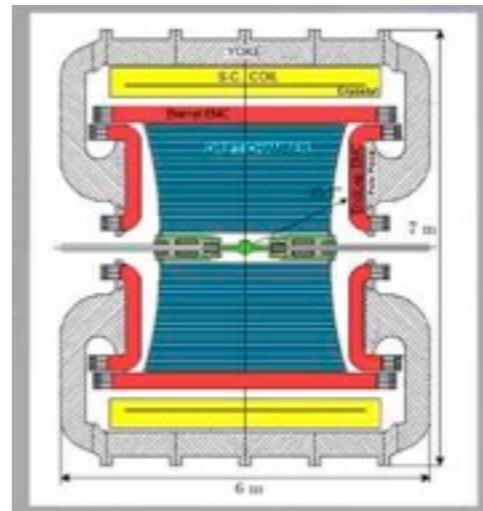


- mu2e detector by G. Onorato (FNAL)



New development cont'd

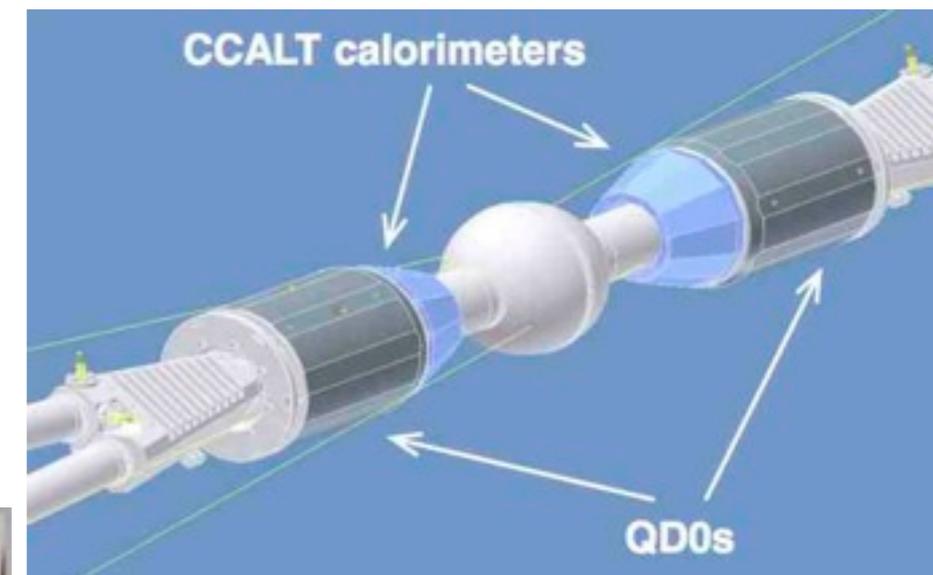
- KLOE-2 CCALT by S. Giovannella (LNF)



Upgrade of the DAFNE machine layout

- KLOE-2 QCALT by A. Saputi (LNF)

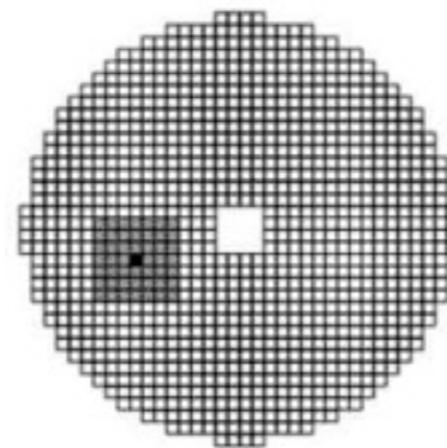
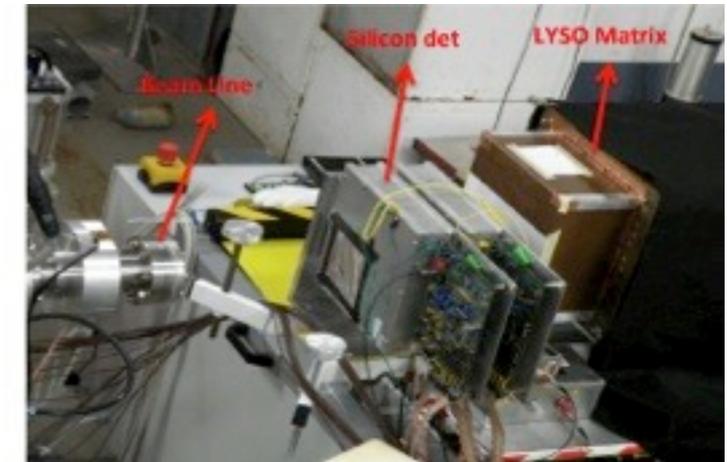
LYSO
Preliminary test



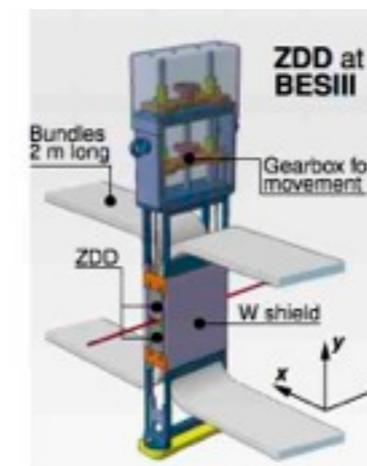
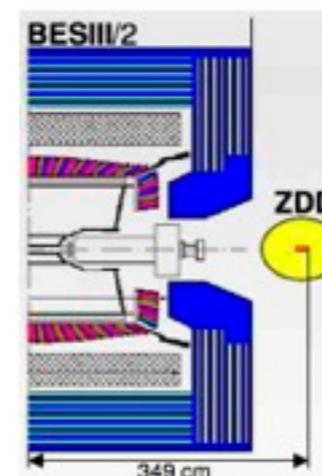
Construction in progress

New development cont'd

- LYSO calorimeter for SuperB by A. Rossi (Perugia)
- Shower Library technique H1 by N. Raicevic (Montenegro)
- Pb-Scifi Calorimeter for BES III by A. Zallo (LNF)



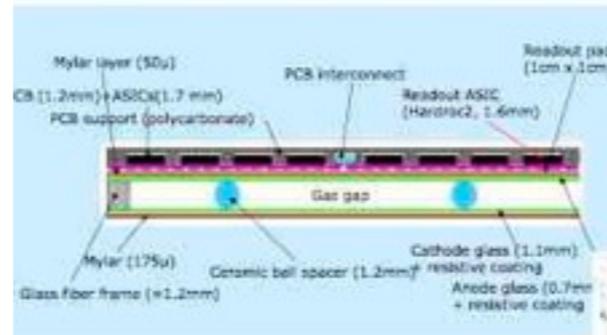
- Contains energies in a box around the hottest cell
- Binned logarithmically in energy, linearly in impact position inside the hottest cell and impact angle
- Translational invariance used to place showers for different hottest cell



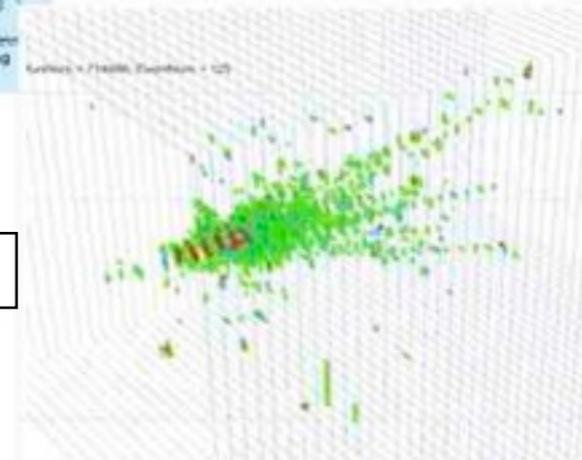
New development cont'd

- Semi-Digital HCAL using GRPC for ILC by S. Mannai (UC-Louvain)

Glass Resistive Plate Chamber

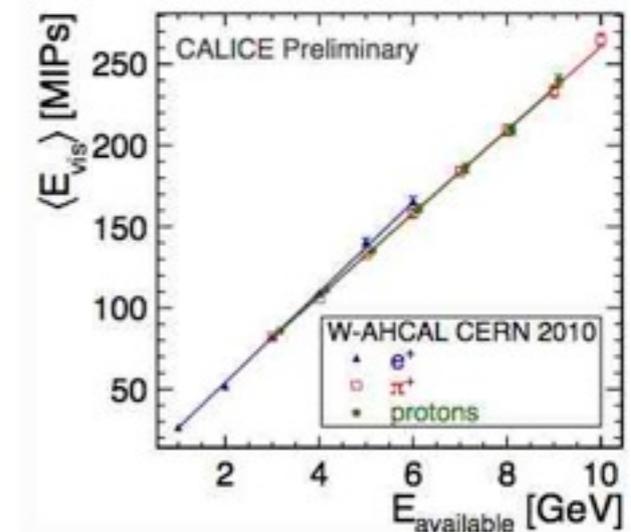


test beam May 2012 !



- CALICE scintillator-tungsten HCAL for CLIC exp. by A. L. Timoce (CERN)

- Built by CALICE collaboration: $1 \times 1 \times 0.75 \text{ m}^3$ prototype, 30 layers
- Absorber: tungsten alloy (density: 17.8 g/cm^3)



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