

EMC Summary

Frank Porter and Claudia Cecchi
For the EMC group

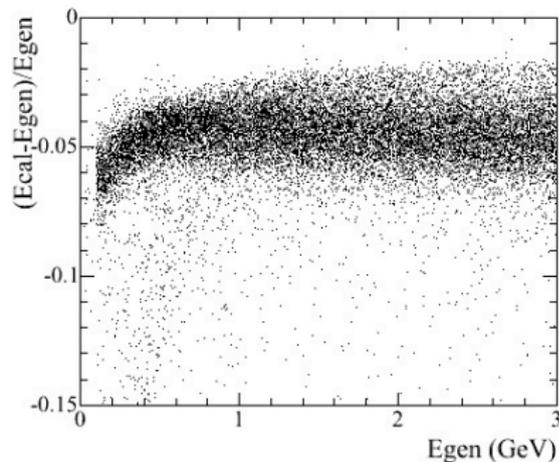
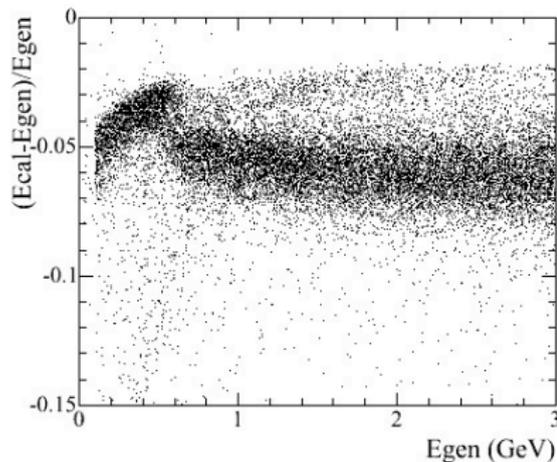
September 21, 2012

EMC at this meeting

- ▶ Wednesday 16:30-18:30
 - ▶ Chih-hsiang Cheng – Fastsim updates
 - ▶ Shawn Osier – Discussion of barrel transport
 - ▶ Criso Sciacca – Barrel transport options
 - ▶ Valerio Pettinacci – Forward mechanics
- ▶ Thursday 08:30-10:30
 - ▶ Elisa Manoni – Validation of the new implementation of fastsim
 - ▶ Stefano Germani – Updates on fullsim
 - ▶ Claudia&Frank – Discussion of TDR, budget,& schedule
- ▶ Thursday 11:00-13:00
 - ▶ Paolo Gauzzi – Updates on measurements for the noise study in the barrel
 - ▶ Alessandro Rossi - Csl measurements
 - ▶ Gerald Eigen – Backward EMC

Fastsim improved

- ▶ Feature in Fastsim that produced discontinuous energy response
- ▶ Traced to use of E_{crit} in algorithm for energy deposition
- ▶ Fixed by modifying algorithm

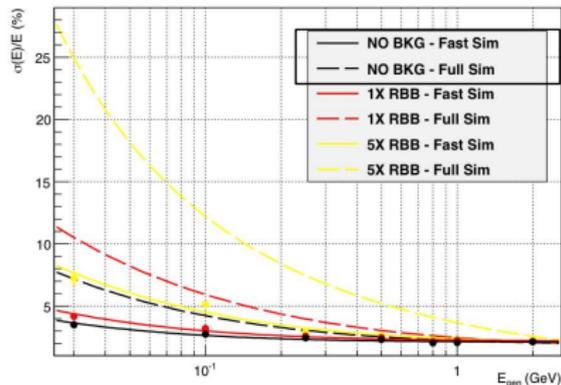


(Reconstructed energy before smearing)

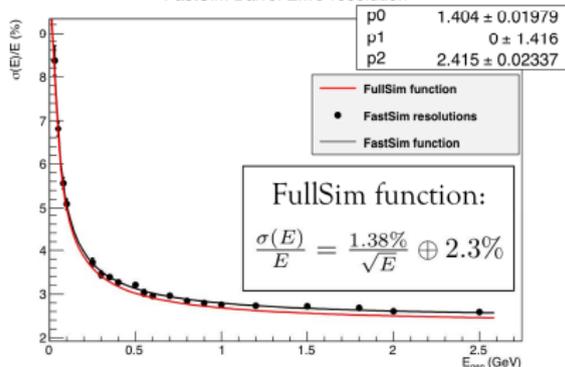
Fastsim vs Fullsim energy resolution

- ▶ Elba discrepancy between fullsim and fastsim
- ▶ Partly fixed with energy response improvement in previous slide
- ▶ New smearing strategy fixes parameters based on fullsim, correcting for the “intrinsic resolution” (in fastsim energy deposition) in computing the overall smearing.
- ▶ Fastsim validated to use for TDR distributions

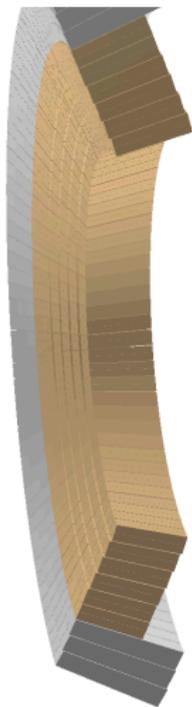
bg frames 2012 - FastSim vs FullSim



FastSim Barrel EMC resolution



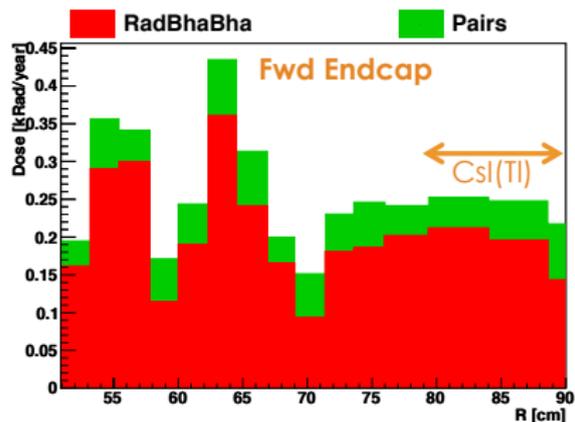
Fullsim



Hybrid geometry
implemented in
fullsim.

Studies of
resolution
underway.

Radiation levels look tolerable



Plot is kRad/year vs radius

Barrel transport

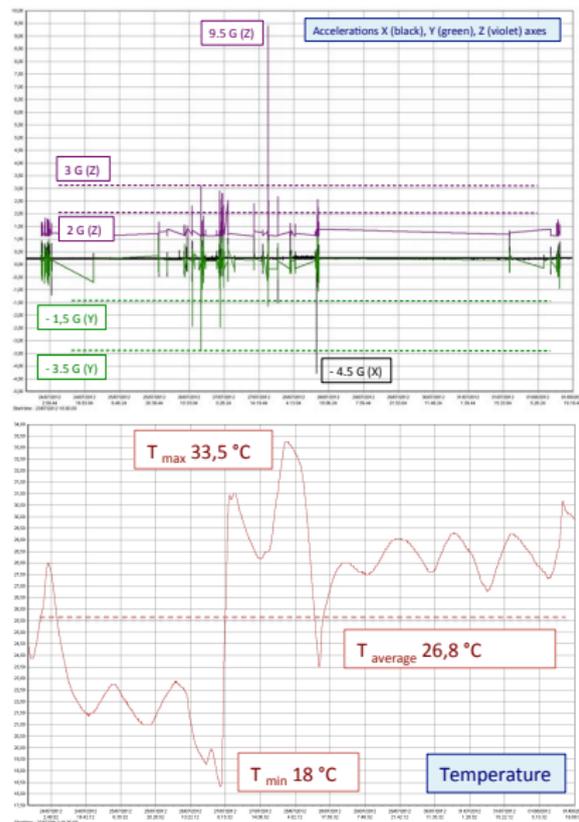
TDR baseline is to disassemble barrel

- ▶ Barrel not designed for transport, needs extensive investigation if want to transport whole
- ▶ Schedule to extract and prepare 280 modules for shipment \sim 400 days
- ▶ Preparations for refurbishing modules at Naples



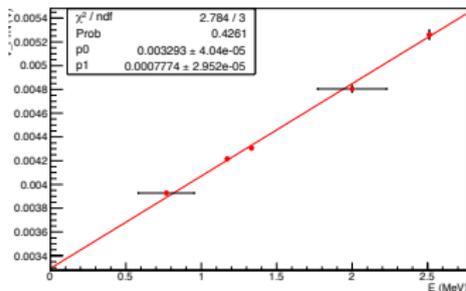
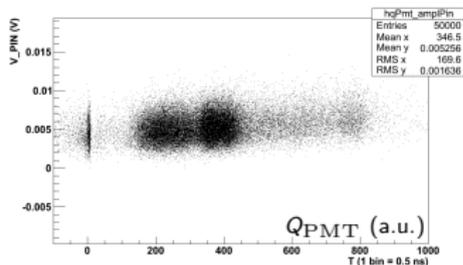
Forward EMC

- ▶ Experience with shipping spare modules \Rightarrow We will have to devote a lot of attention to safe shipping
- ▶ Shipping cost from SLAC, endcap plus tooling: €45k
- ▶ Customs duty?



Noise measurements on CsI(Tl)

- ▶ ENE measurements using 1.17/1.33 MeV lines of ^{60}Co .
- ▶ For 2 PIN diodes on CsI(Tl), BaBar ENE = 0.55 MeV
- ▶ Prototype low noise amplifier (LABE Rome-1 LNA02V0) with 100 ns integration time and 500 ns shaping on same crystal ENE = 1.3 MeV
- ▶ In TDR we'll discuss the optimization effort.



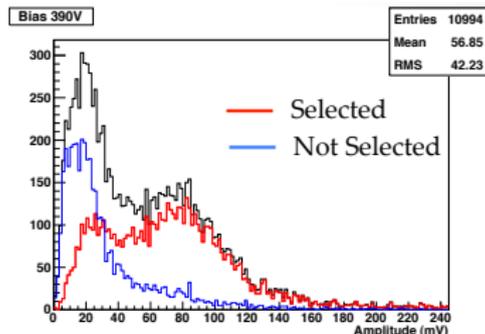
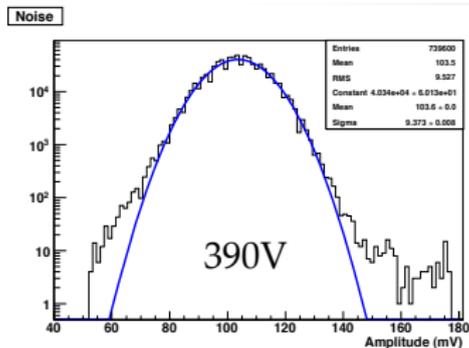
Pure CsI R&D

- ▶ Measurements on full-size CsI crystal with 2 LAAPD's ($2 \times 1 \text{ cm}^2$), using cosmic rays ($\sim 40 \text{ MeV}$ deposited)
- ▶ Best ENE:
 - ▶ Noise 9.3 mV
 - ▶ Signal $\sim 85 \text{ mV}$

Hence

$$\text{ENE} = 9.3 \times \frac{40}{85} \sim 4.5 \text{ MeV}$$

- ▶ Will test photopentodes as well.
- ▶ TDR will discuss R&D effort



Backward EMC

- ▶ TDR for backward EMC has been “done” for a long time.
- ▶ Budget&Schedule being reviewed
- ▶ Exchange rate question again

TDR issues

- ▶ Boundary with ETD
 - ▶ EMC chapter discusses electronics from photodetector through digitization
 - ▶ EMC budget includes photodetectors and preamps; ETD budget includes everything else in readout
 - ▶ On-detector cables in EMC budget; all other cables in ETD
 - ▶ Slow controls – T and radiation sensors in EMC, readout boards unclear, include in EMC for now; off-detector in ETD
 - ▶ Power supplies in ETD
- ▶ Exchange rate
- ▶ Customs duties

Thanks in advance to final reader: David Hitlin