Sampling ECAL for Strawman

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CONFIGURATION as proposed here ≫

Absorber	Pb	4 mm
Active	LYSO	2 mm
N layers		28
Zero layer	LYSO	2 mm
Total Length		170 mm
Transverse Size		19 mm x 19 mm

For FastSim, we can start with 30 mm x 30 mm to avoid extra work:

- implementation of new geometry
- validation of reconstruction algorithms

We can estimate possible improvements from transverse optimization with Standalone Geant4

LIGHT OUTPUT wrt $PbWO_4$

$\times 250$ more photons per MeV in LYSO
"LSO/LYSO Crystals for Future HEP Experiments"
Rihua Mao, Liyuan Zhang and Ren-Yuan Zhu
CALOR 2010: Journal of Physics: Conference Series 293 (2011) 012004
doi:10.1088/1742-6596/293/1/012004

$\times 0.89 \times 0.25$ due to sampling
Results from Shilpi

$\times 56$ more photons in active layers total
We are safe on stochastic term
It will be smaller than in current EE

NOISE

Photo-detector and Front-End
We need an estimation of noise term (in GeV) from detector experts

Alternatively, take literature values from SiPM / Shashlik
It is preferable that this value comes from photo-detector experts

RESOLUTION

Standalone Geant4: Sampling + Photostatistics + Noise
Shilpi is working on these simulations

FASTSIM CMSSW

Need Photo-Statistics, Noise, and Constant term (from above) as input parameters

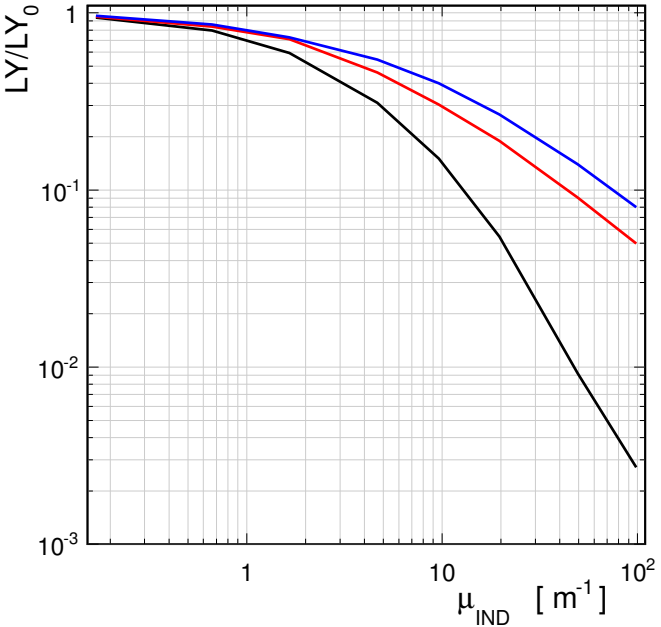
RADIATION DAMAGE

effect of short distance

Efficiency for photons to enter quartz fiber

Black: current EE (22cm)
Red: Sampling tile with 4 fibers
Blue: Sampling tile with 9 fibers

Degradation of quartz fiber is not included



RADIATION DAMAGE

LYSO is × 5 more rad hard

After 3000 /fb

Black: current EE (22cm)
Red: Sampling with 4 fibers

Degradation of quartz fiber is not included

hadron damage only