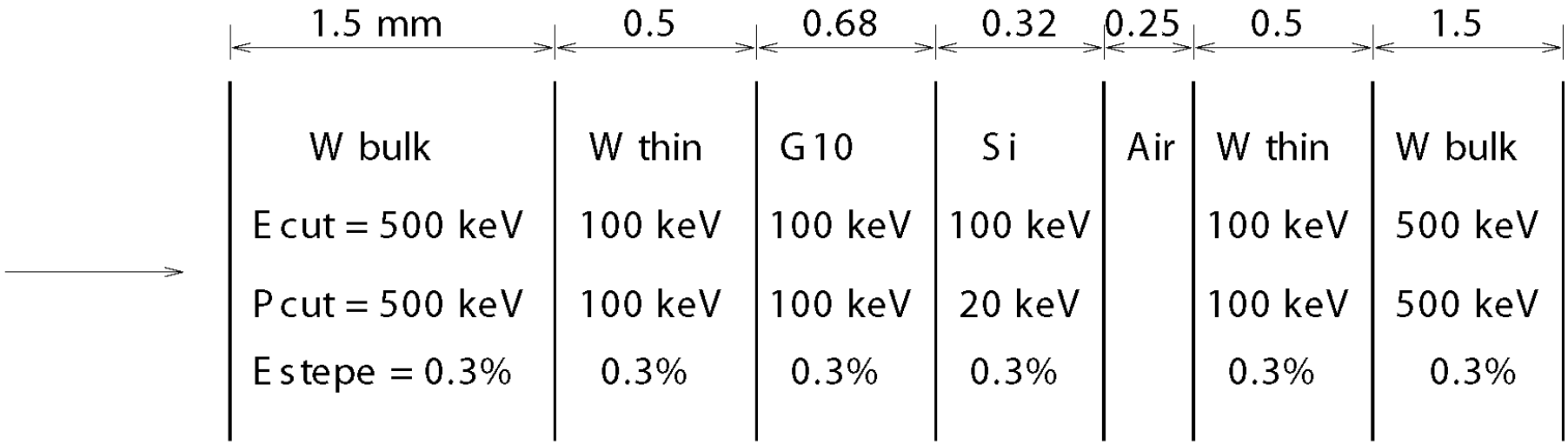
Some EGS Studies…

- Compare with Geant4
  - Questions of range/cutoff
- EM Resolution understood?

- Moliere radius – readout gap relation
- Input shower widths for fast MC

- Calibration requirement (electronics design)
- ECal depth
  - containment
  - Transverse/long. segmentation for pattern recognition
  - Optimize coarser sampling with depth
- Minimum number of silicon layers (30? 25? 20??)

EGS4 Setup



Config: 30 x [5/7 X0 (2.5 mm) + 1.25 mm gaps]

Thin EM sampling (Si)

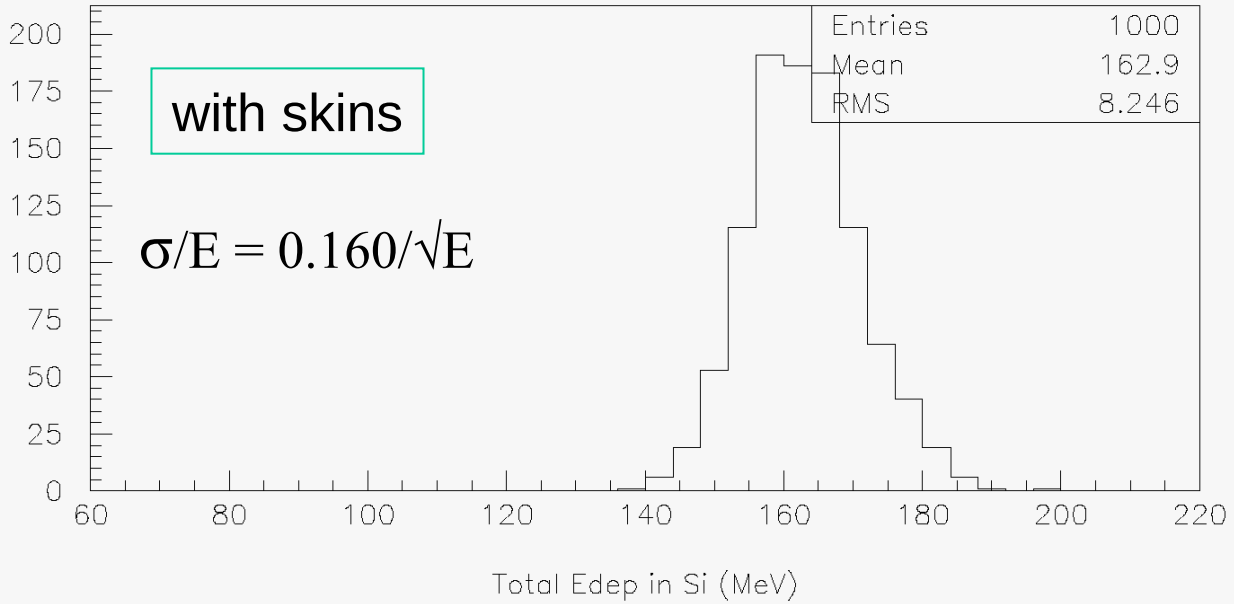
If energy cutoffs (EGS) are too large, then the simulated range of low energy secondaries exceeds the physical range

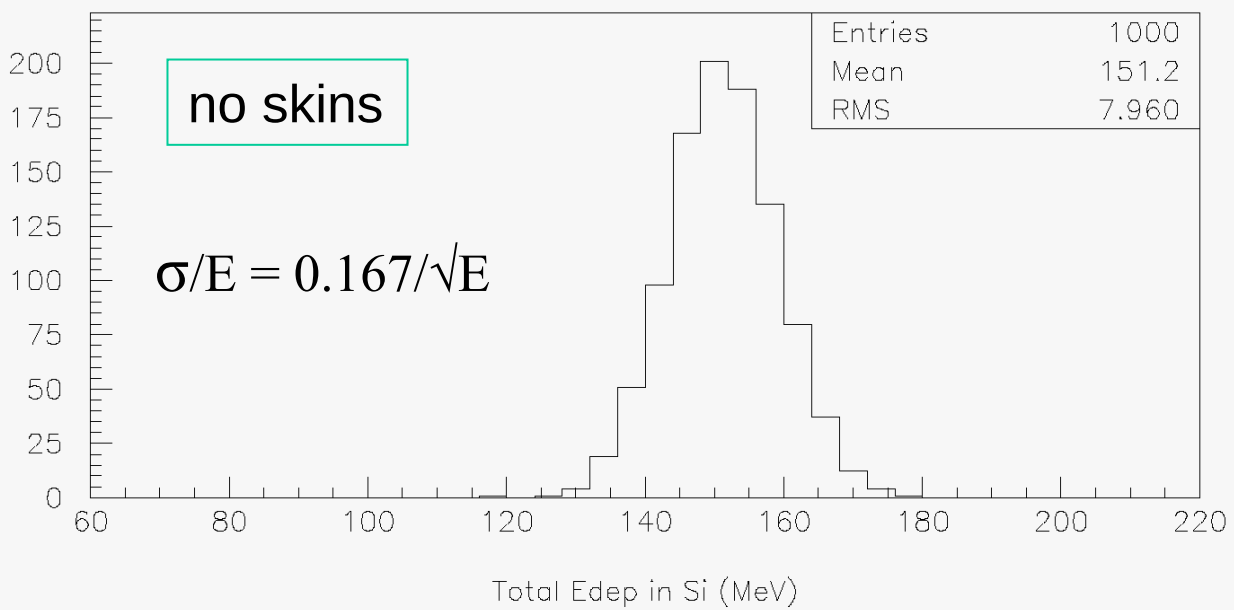
$\Rightarrow$ Their energy doesn't get deposited in the sensitive region.

Presumably the same issue exists for Geant4 (range cut)

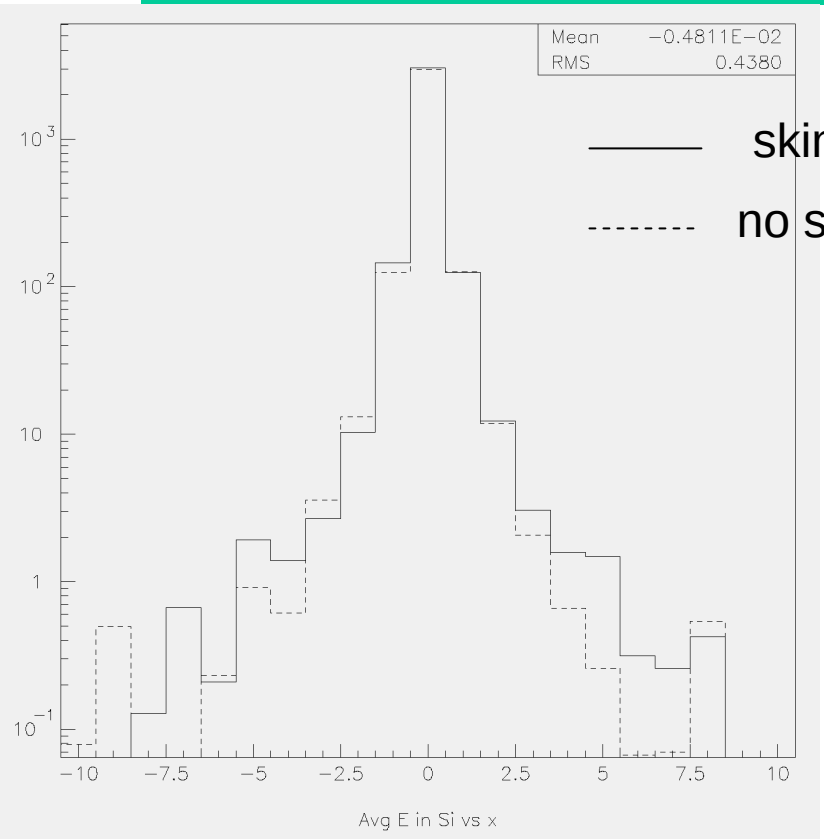
Do we need the “skins” in this case?

- 10 GeV photons
- about 3x more CPU time





transverse spatial distributions (5 GeV photons)

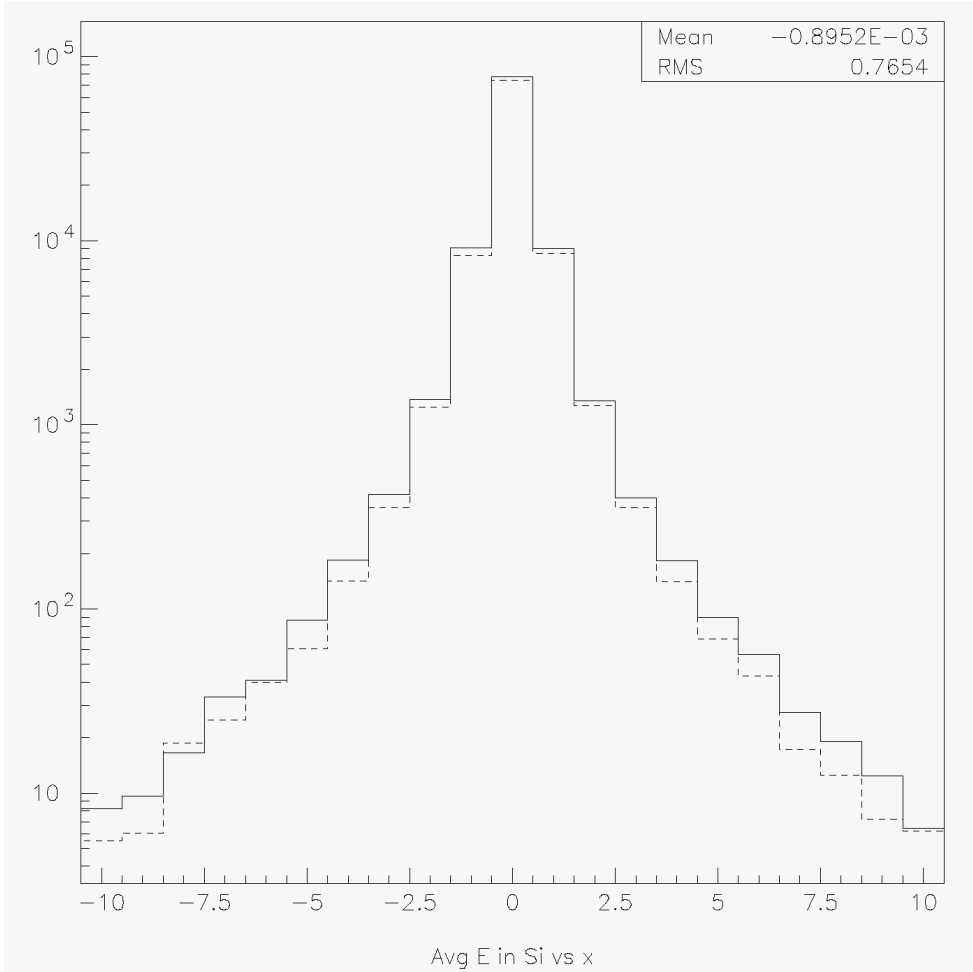


E vs x at layer 4

Note: rms is 0.44 pixel (2,2 mm)

E vs x: all layers

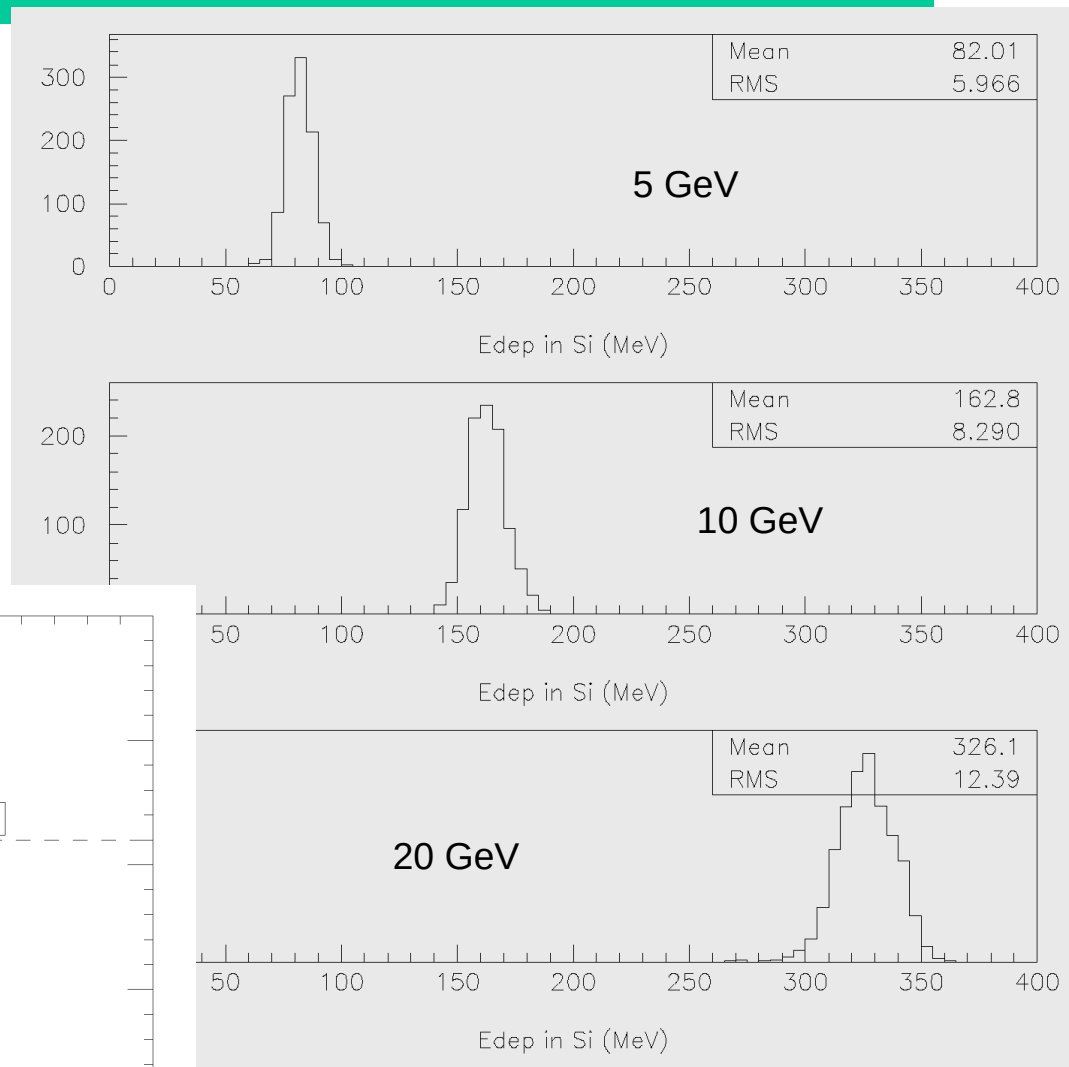
About a 20-25% difference

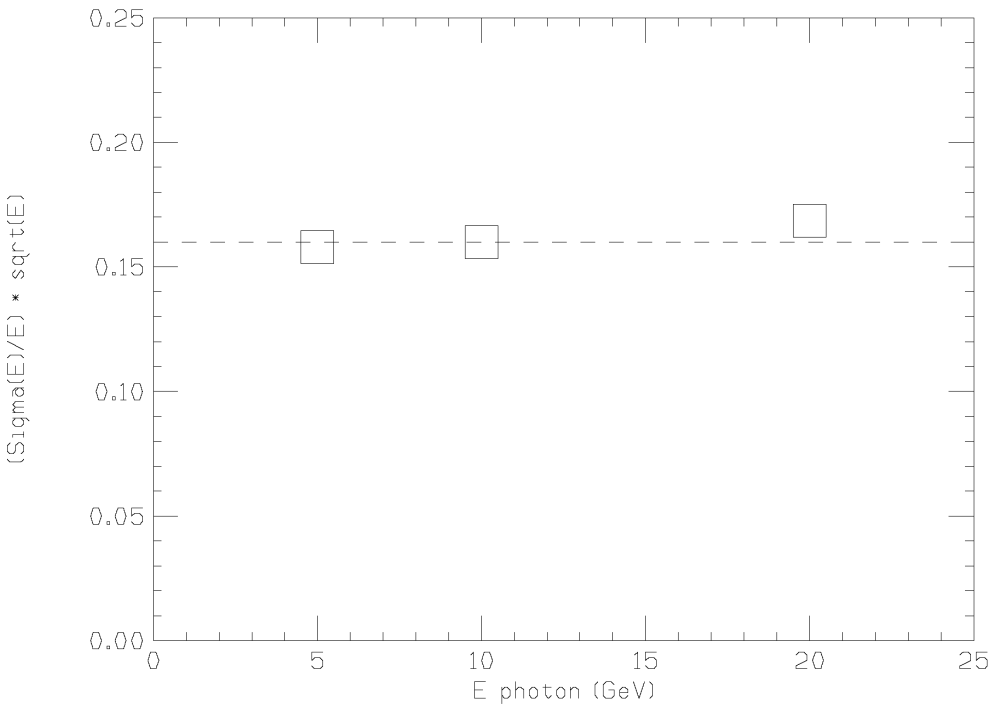


energy resolution (photons)

use rms for width:

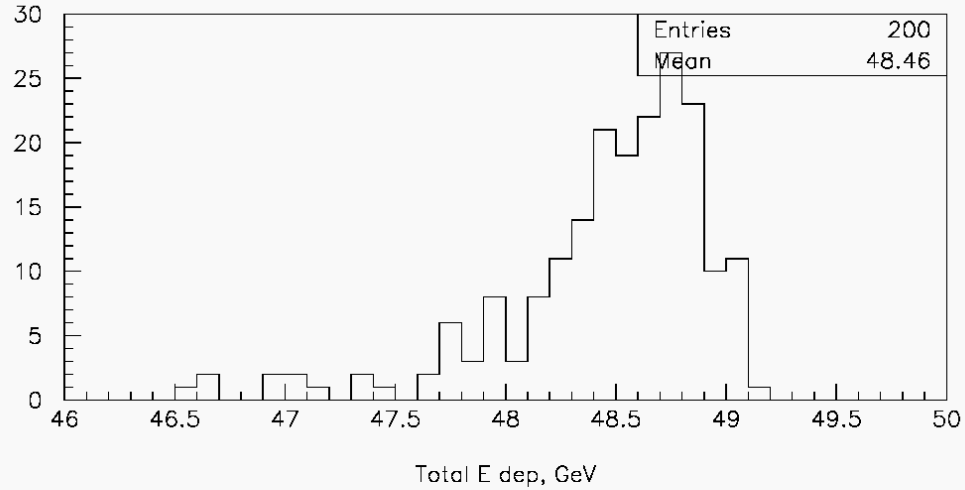
0.16/√E



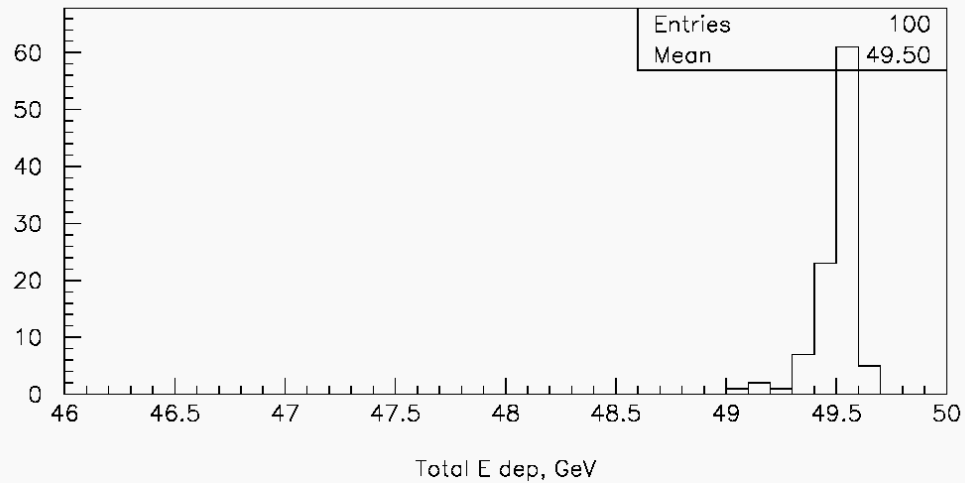


Alternative Sampling Configurations – old study

50 GeV electrons



30 x 5/7 X_0



20 x 5/7 X_0 + 10 x 10/7 X_0

- better containment
- poorer sampling