Tile Gaps and Energy Resolution in LumiCal

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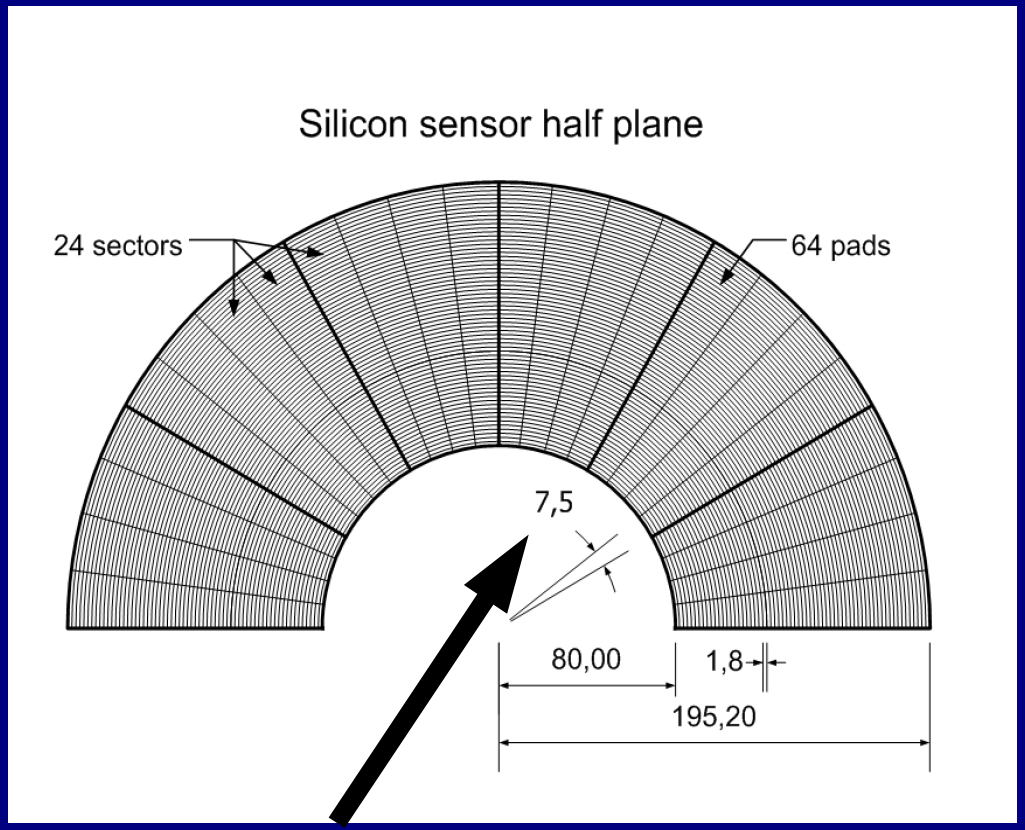
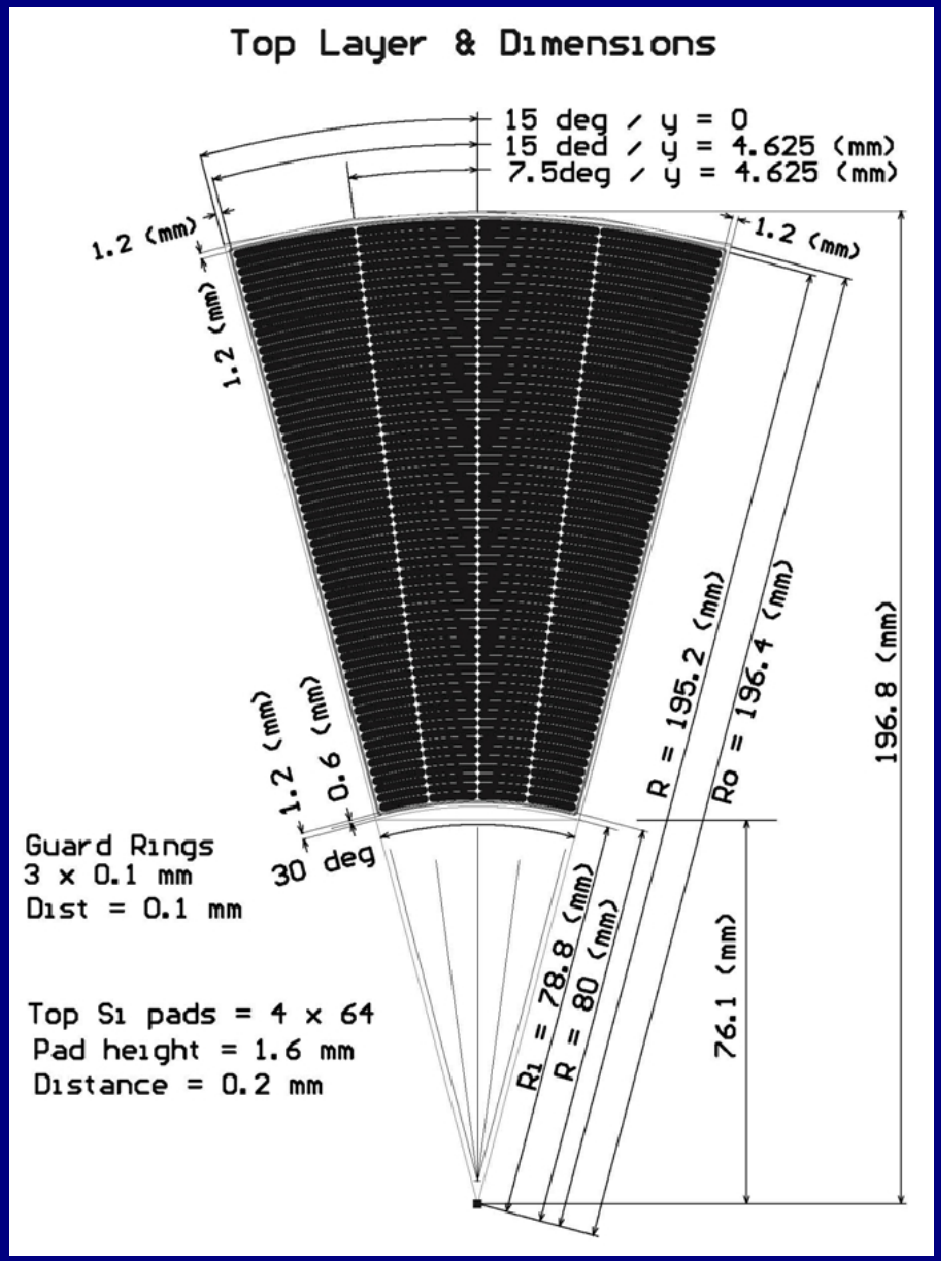
IFJ-PAN, Krakow

Tile Gaps

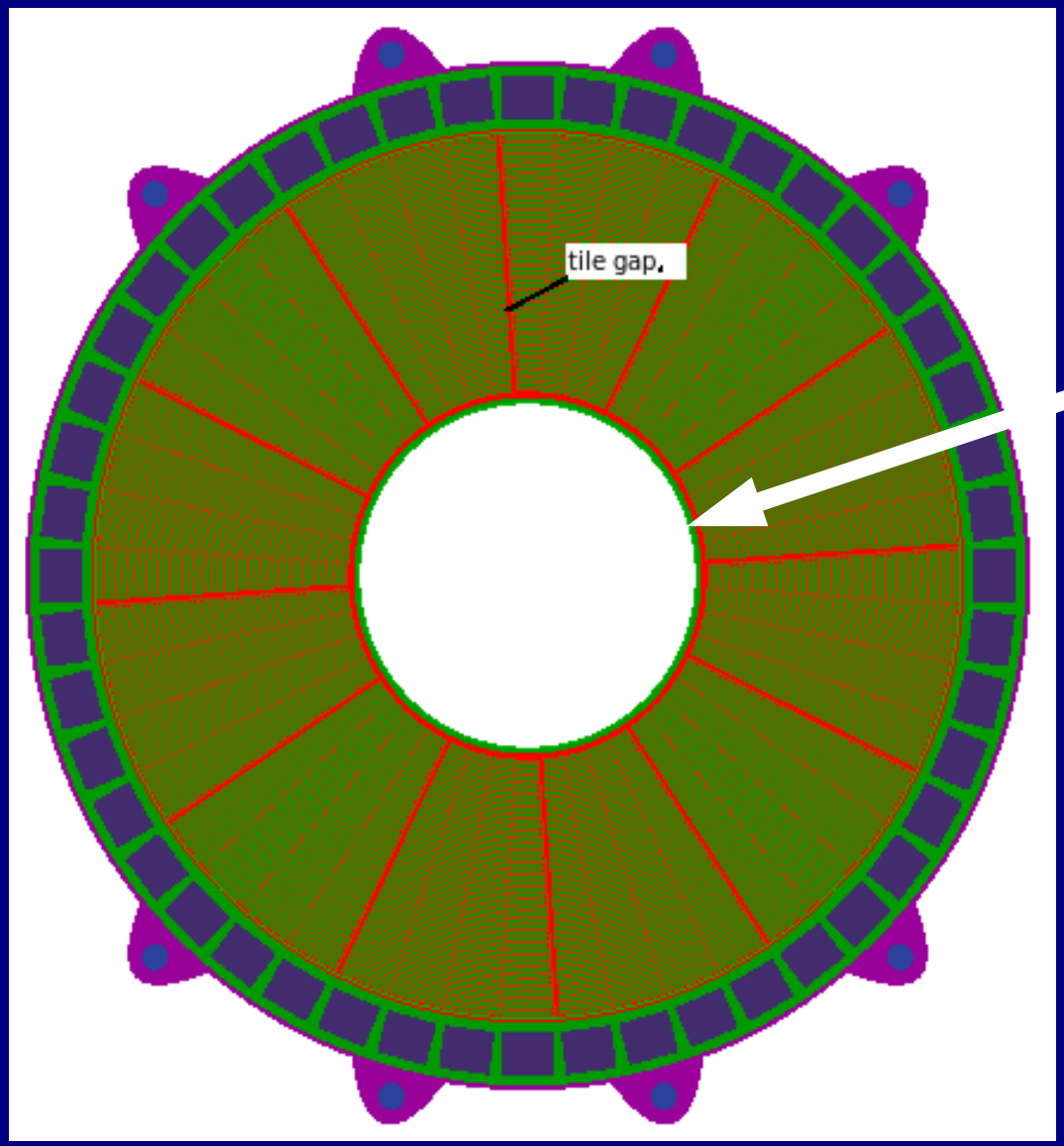


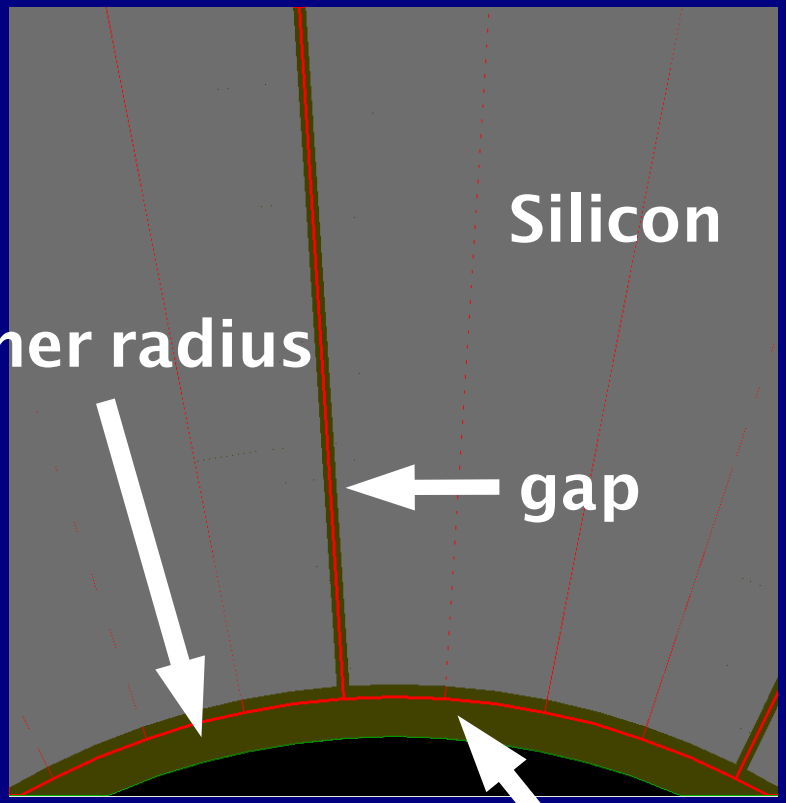
3.75° rotation between layers



Design

Tile Gaps

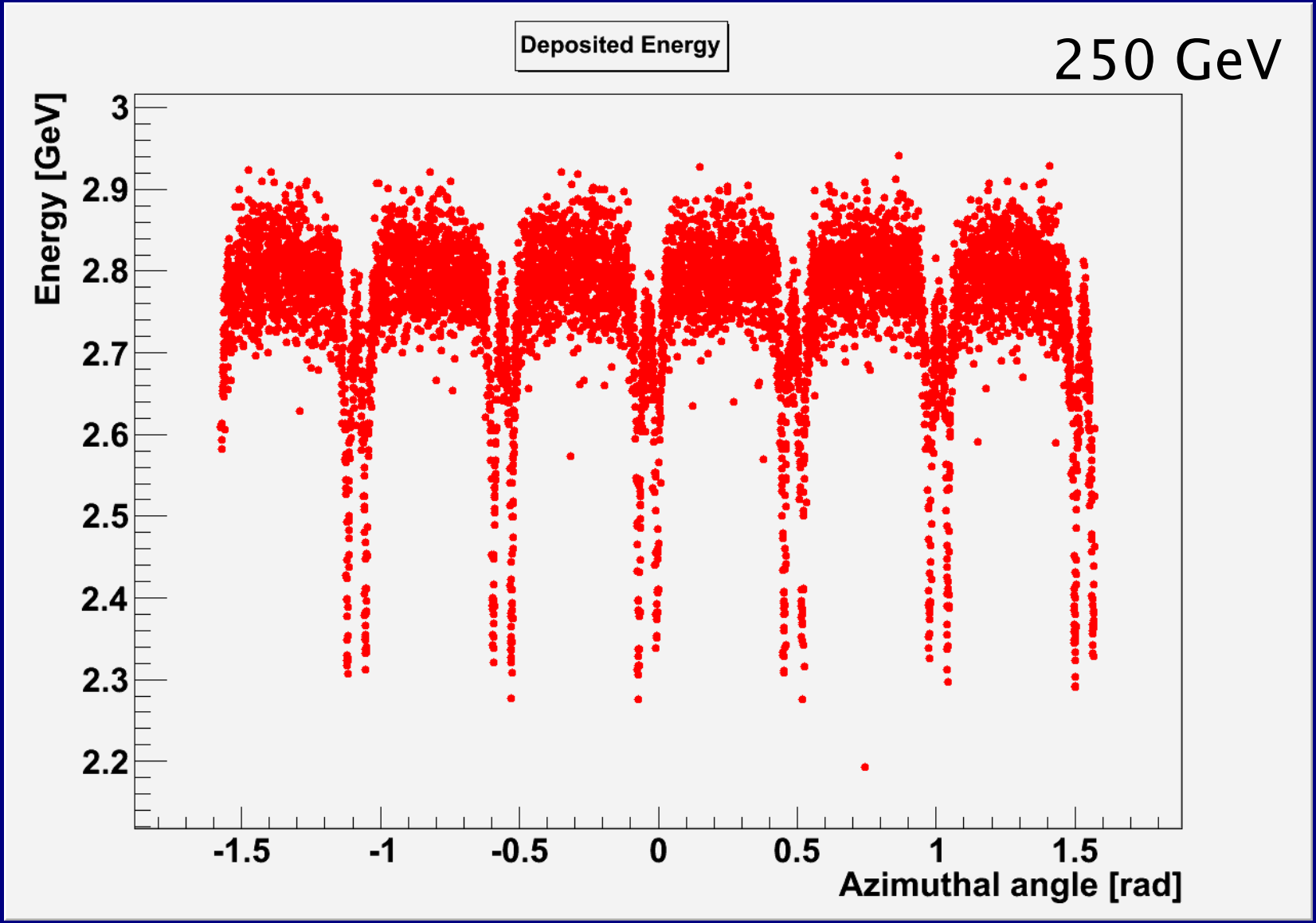




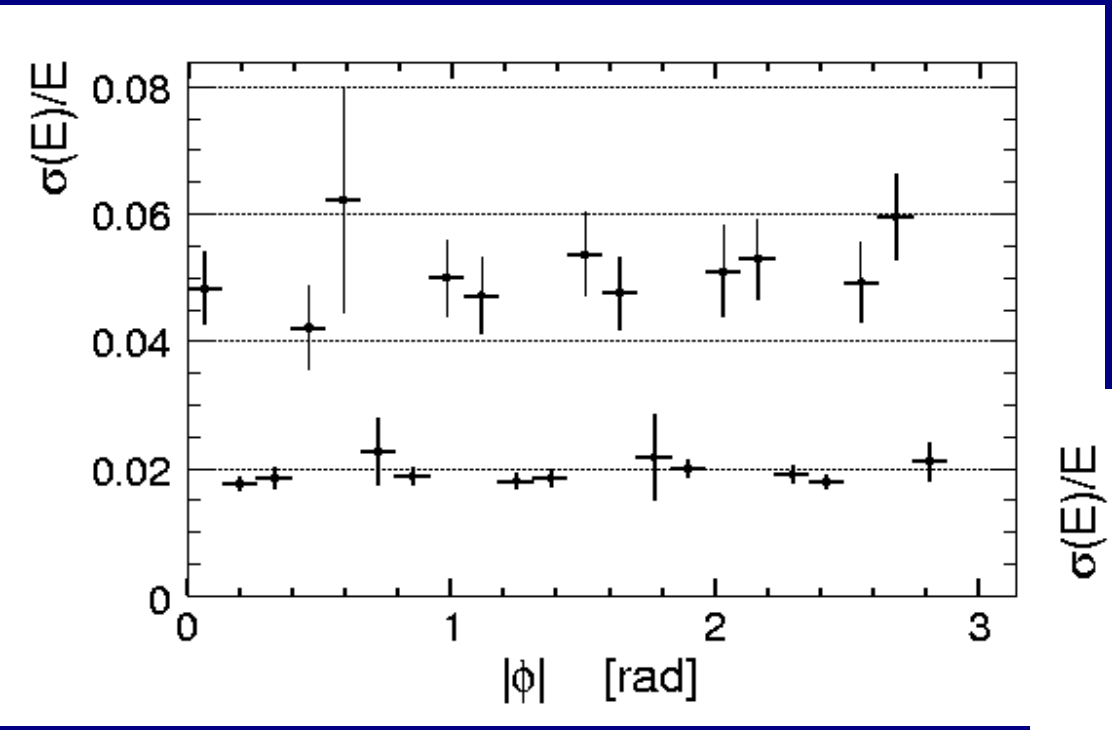
Simulation

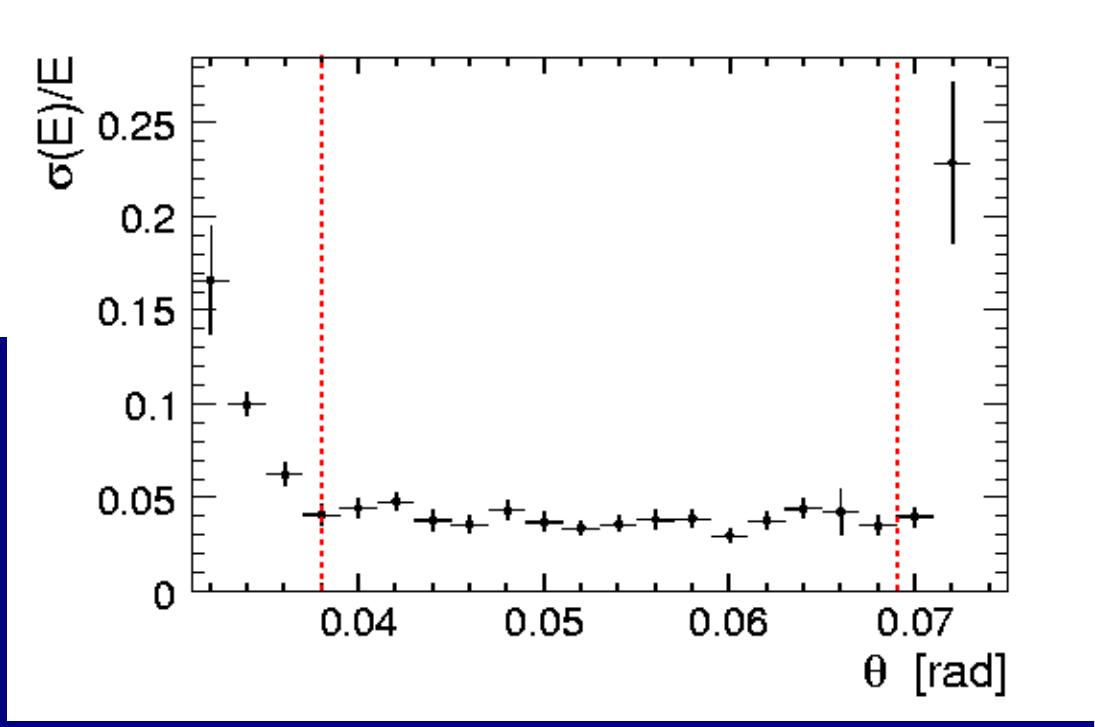
Gaps do not record energy!

Energy Loss in Gaps

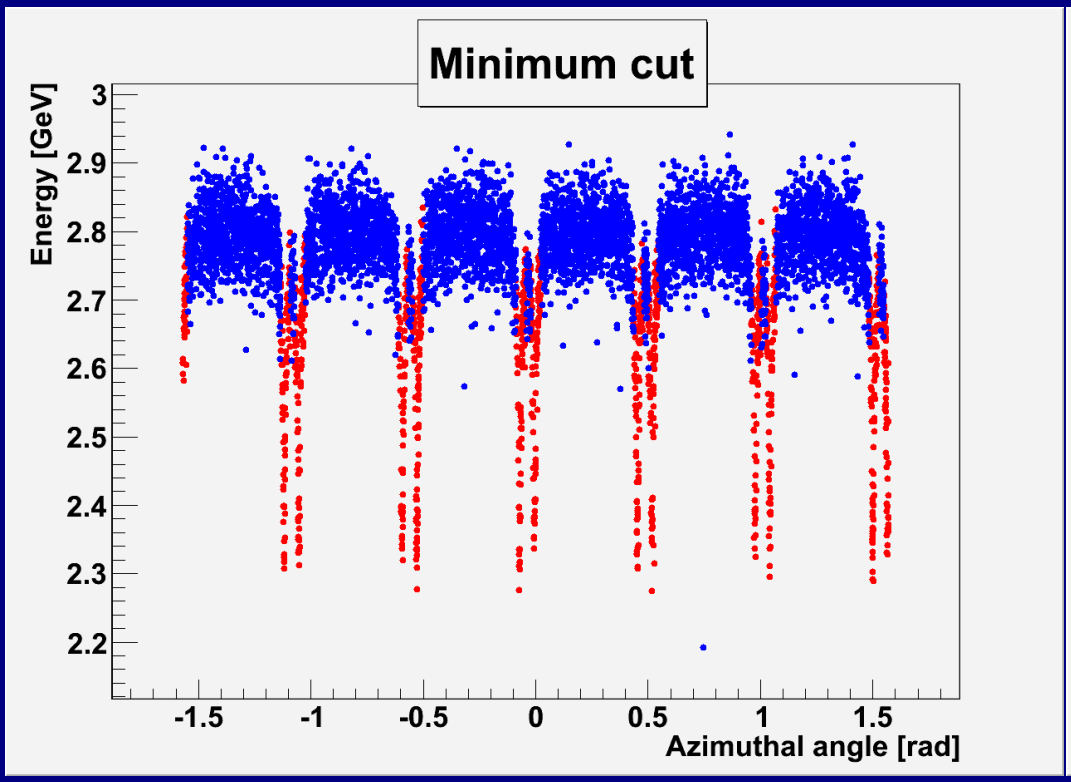


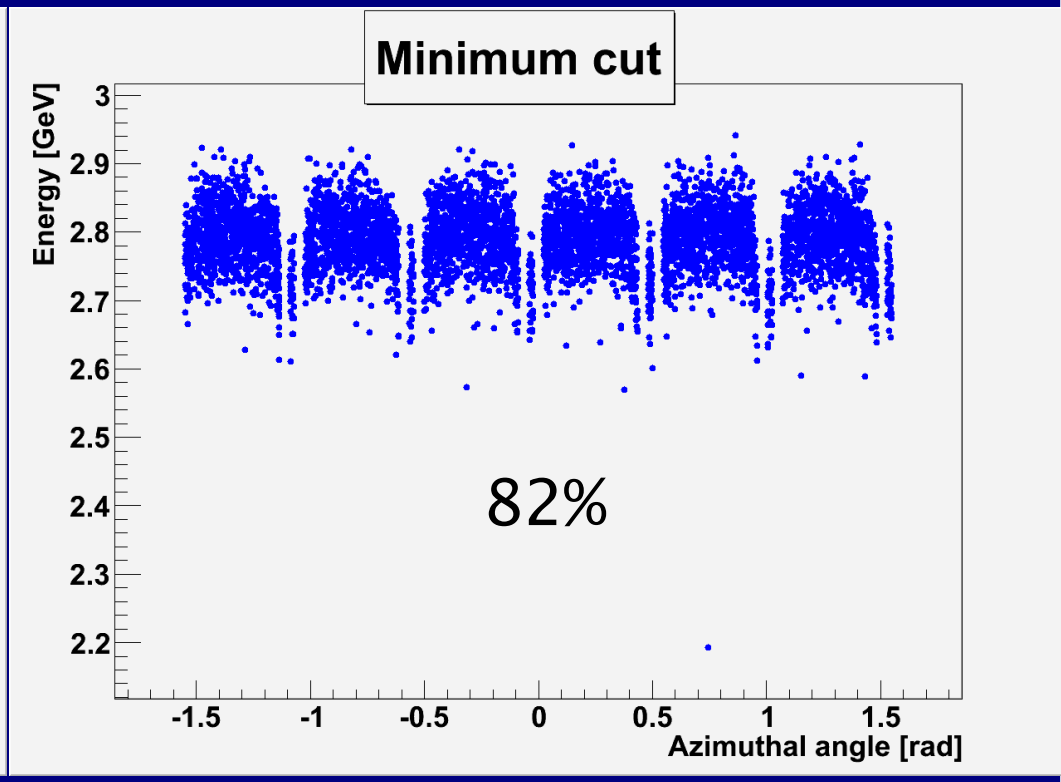
Energy Resolution vs Angle



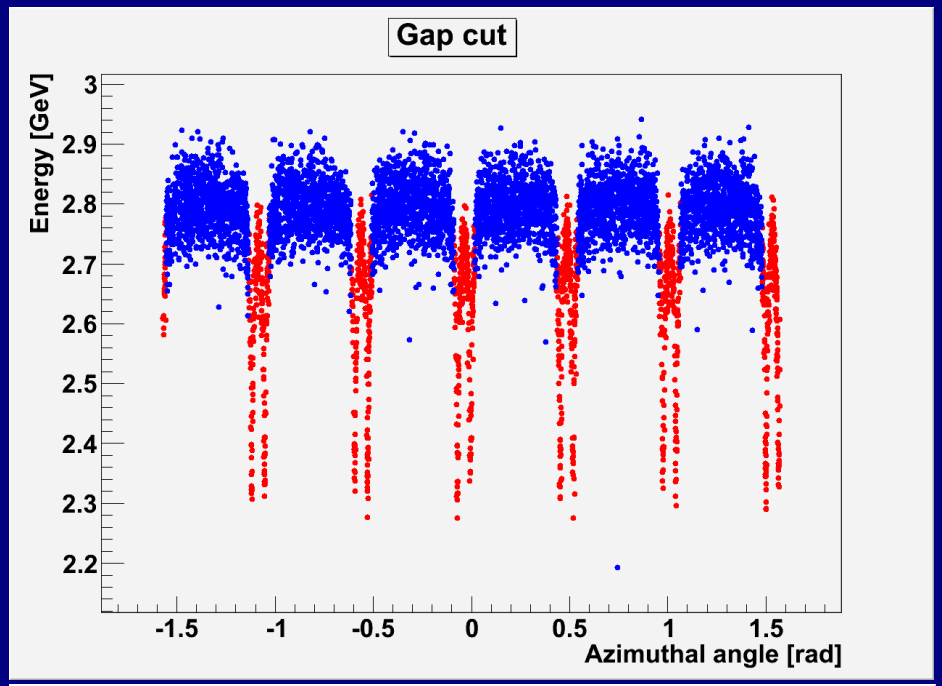


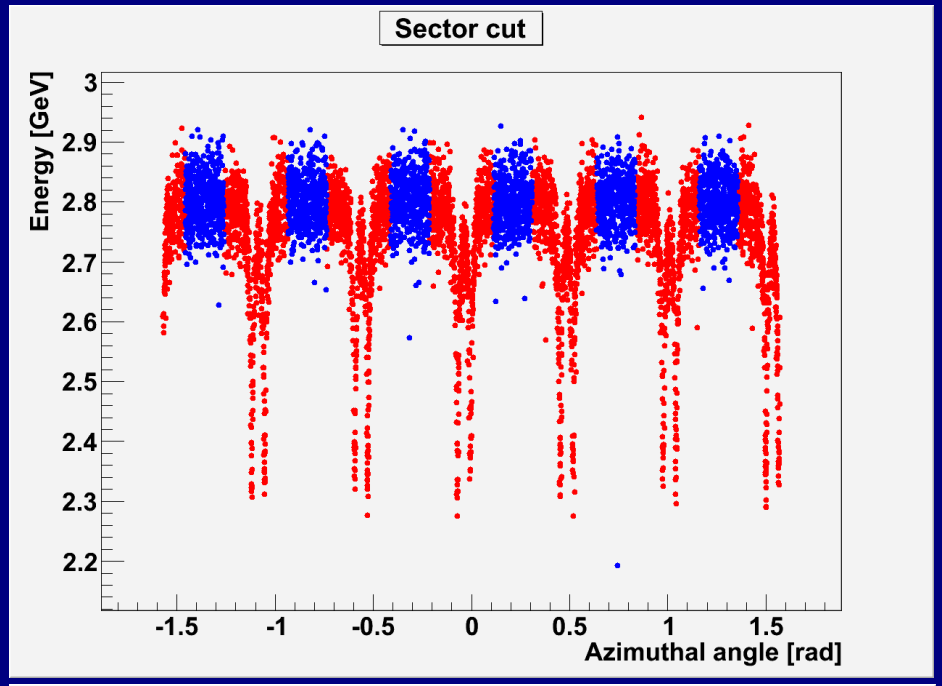
Selection Cuts

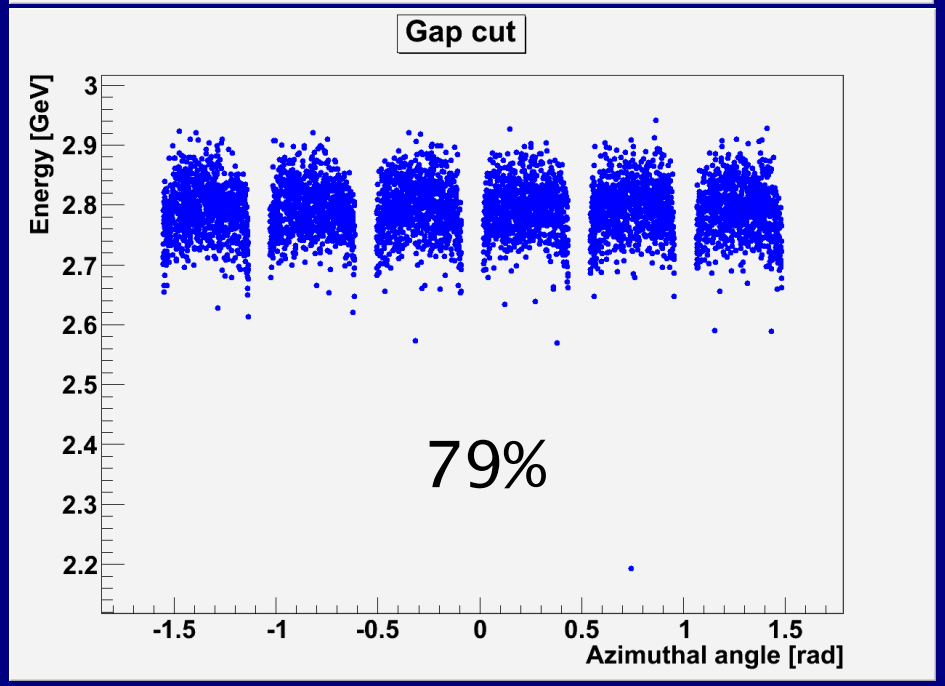


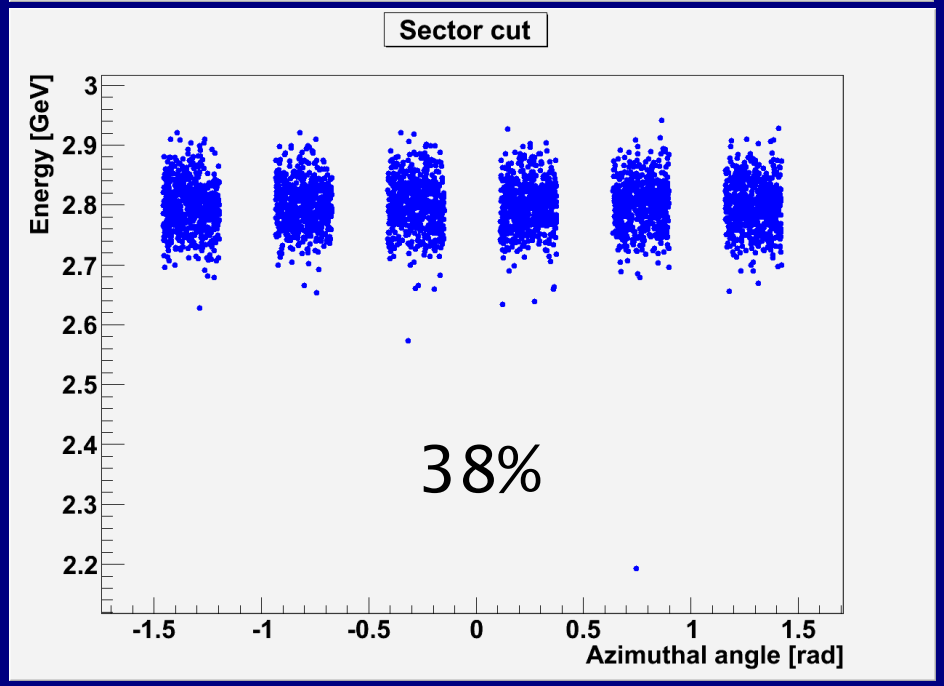


Selection Cuts, sont'd

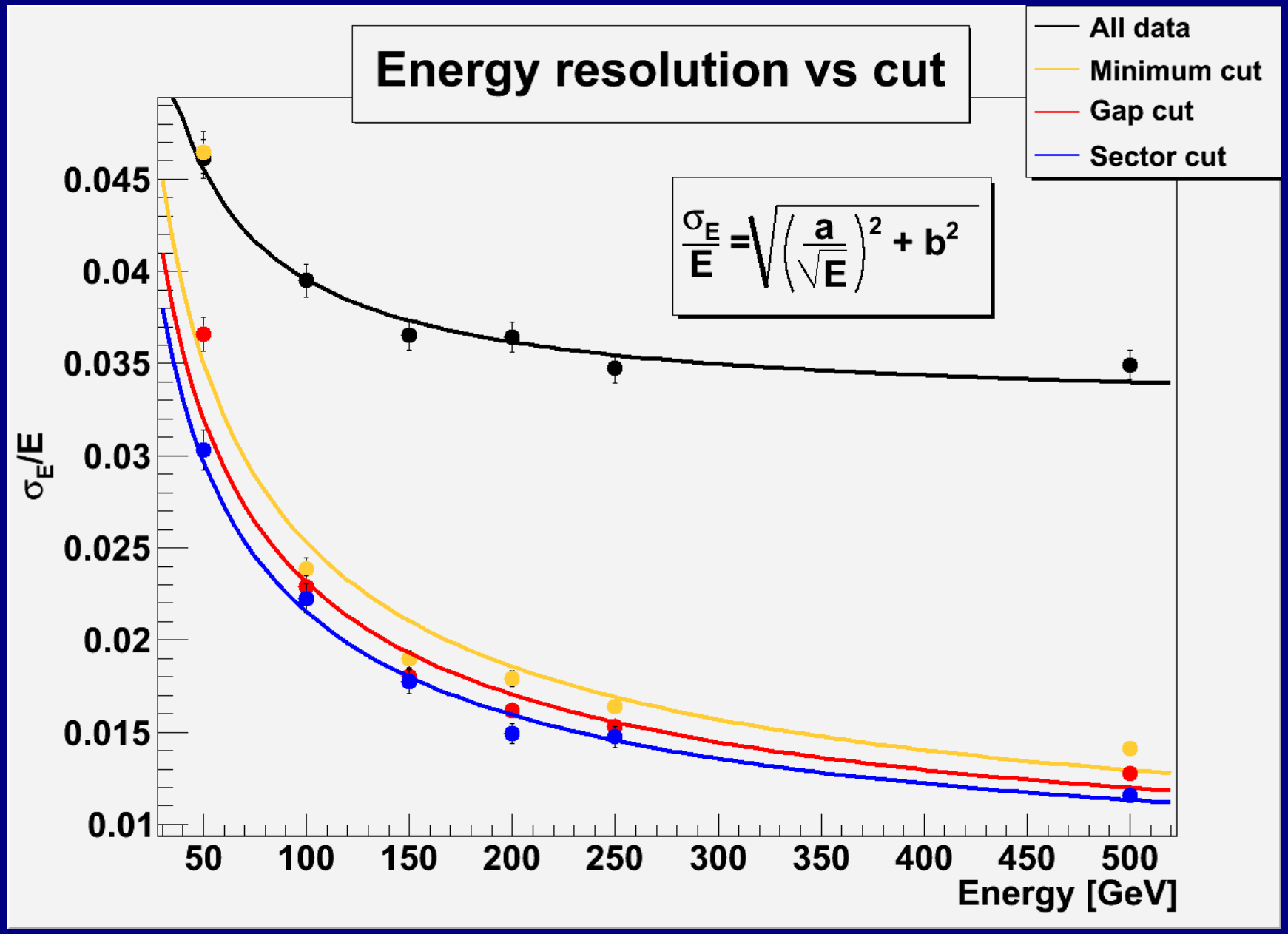




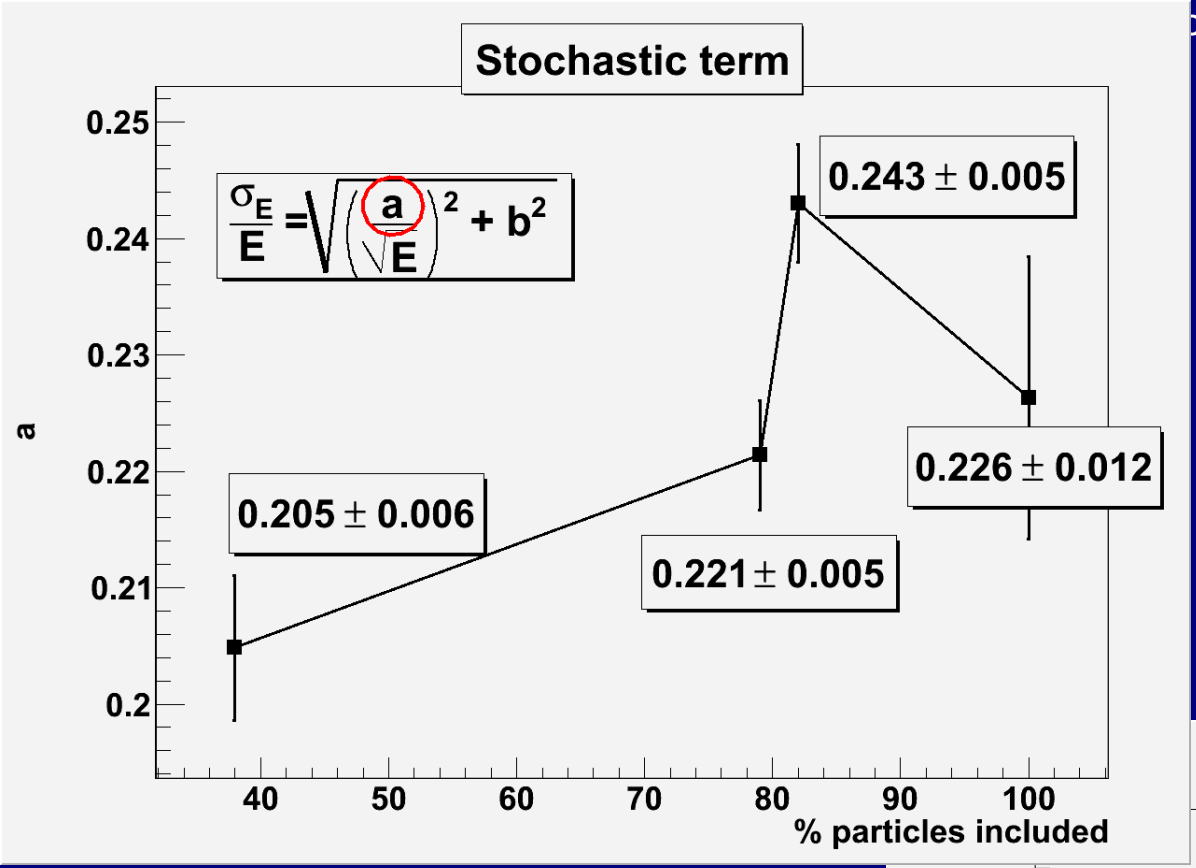


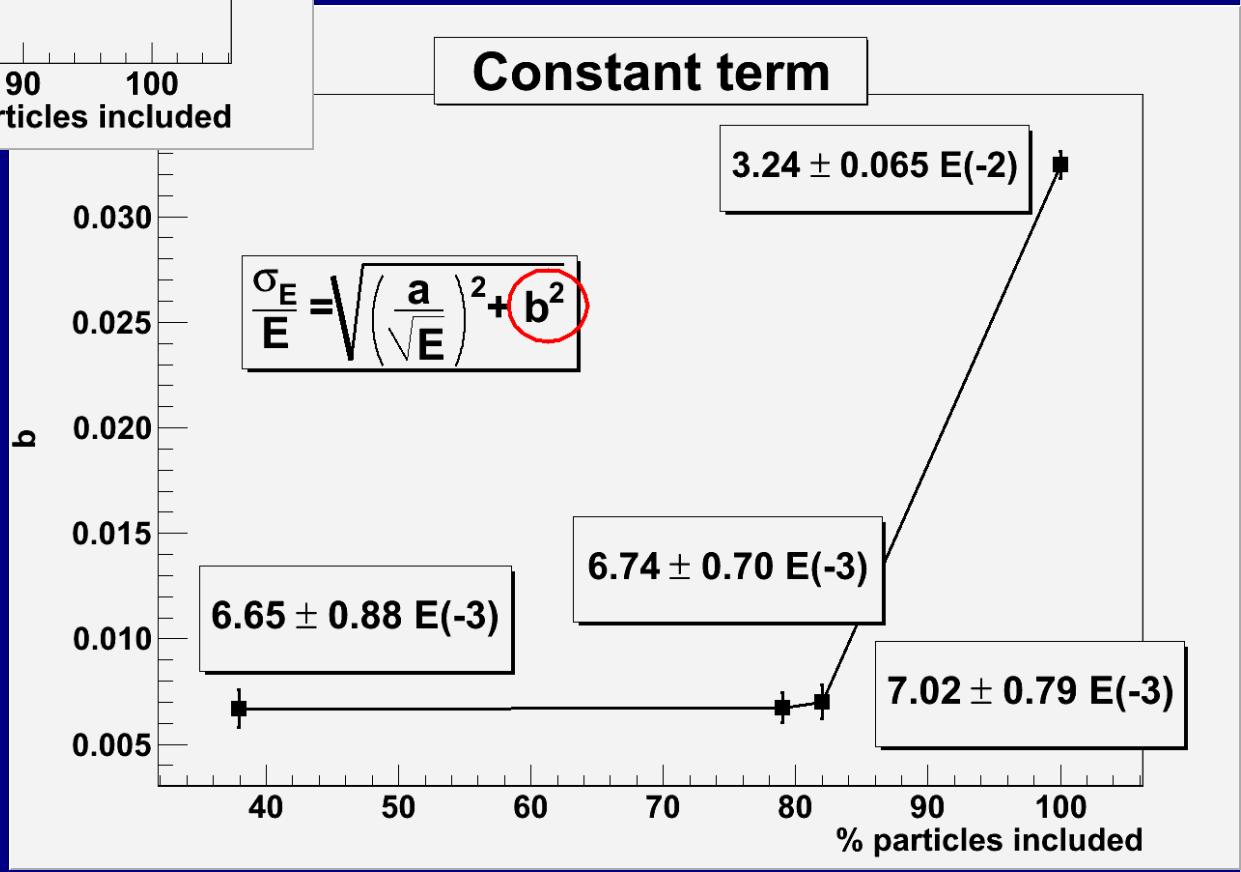


Total Energy Resolution



Fit Parameters

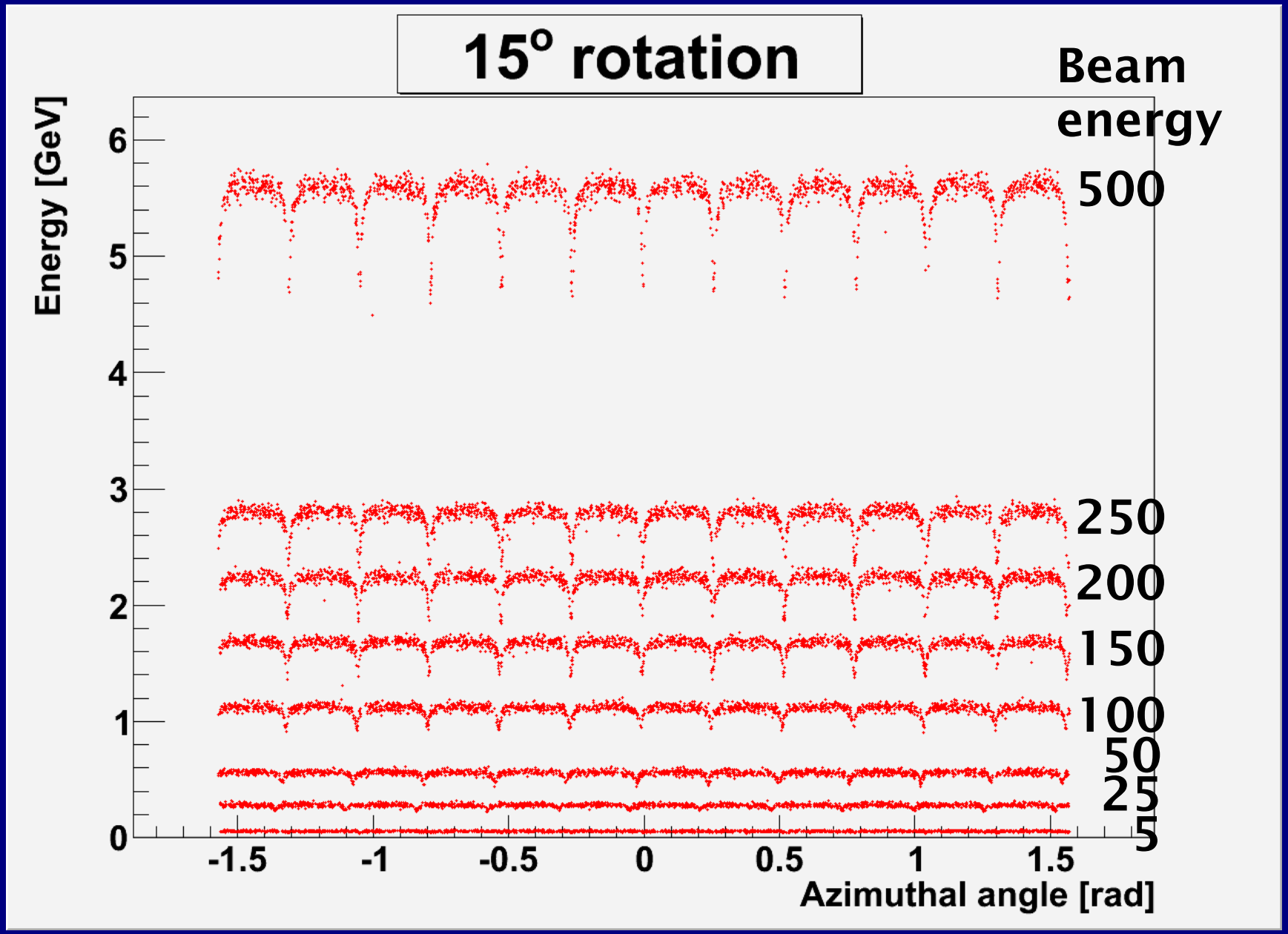




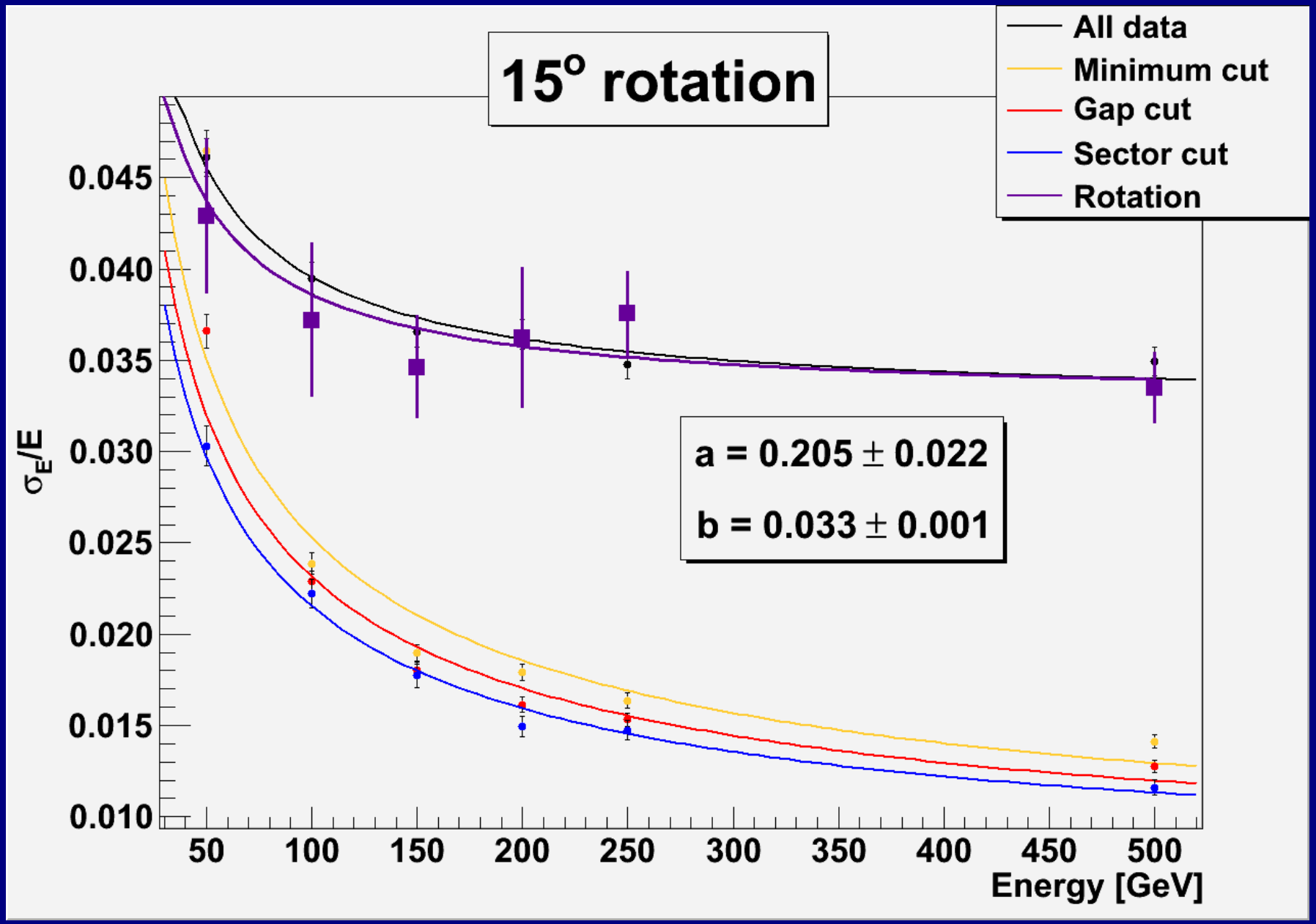
Fit Parameters, Summary

Cut	A	B
None	0.226 +/- 0.012	0.03244 +/- 0.00065
Minimum	0.243 +/- 0.005	0.00702 +/- 0.00079
Gap	0.221 +/- 0.005	0.00674 +/- 0.00070
Sector	0.205 +/- 0.006	0.00665 +/- 0.00088

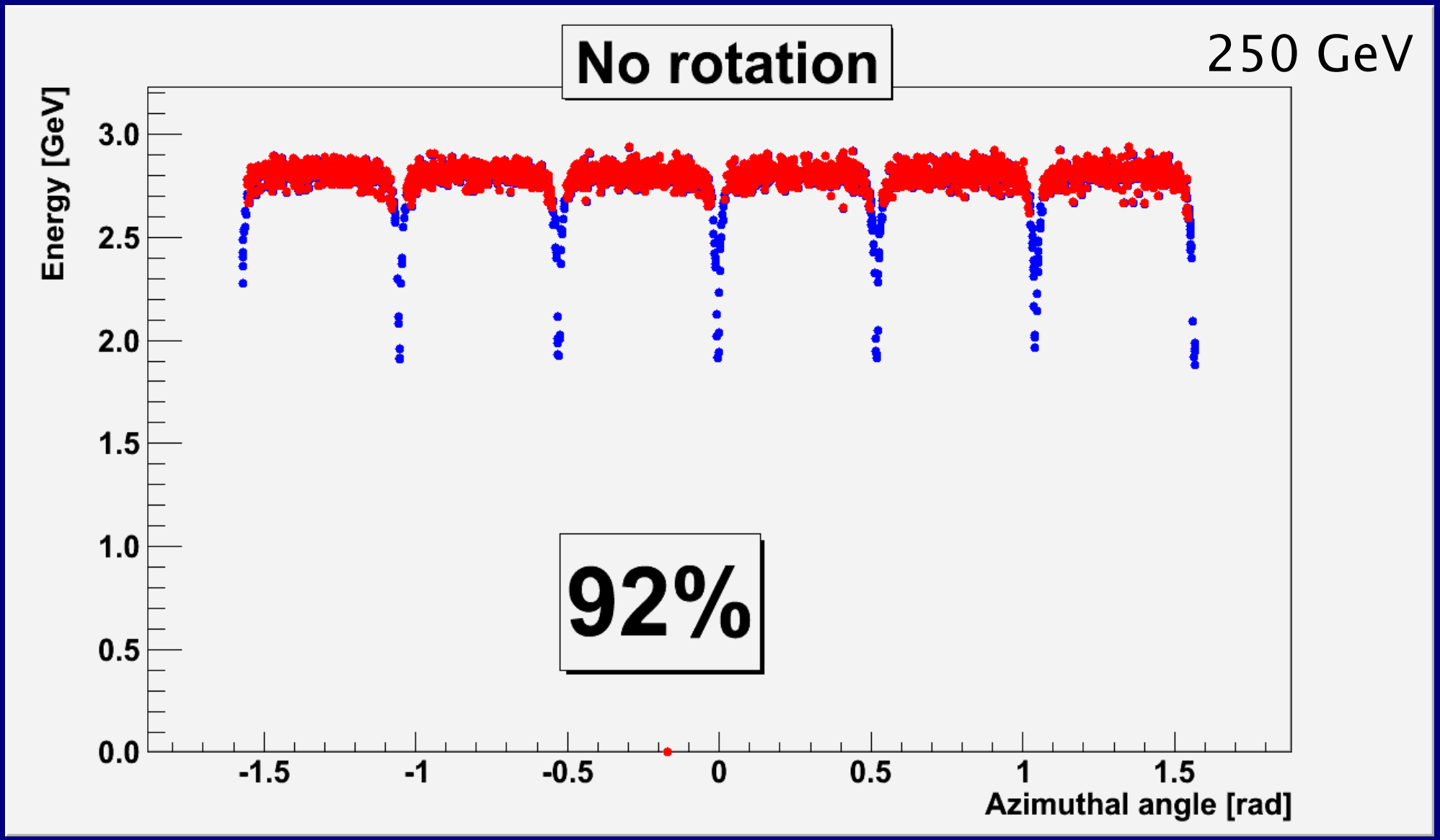
Rotation – Energy Deposition



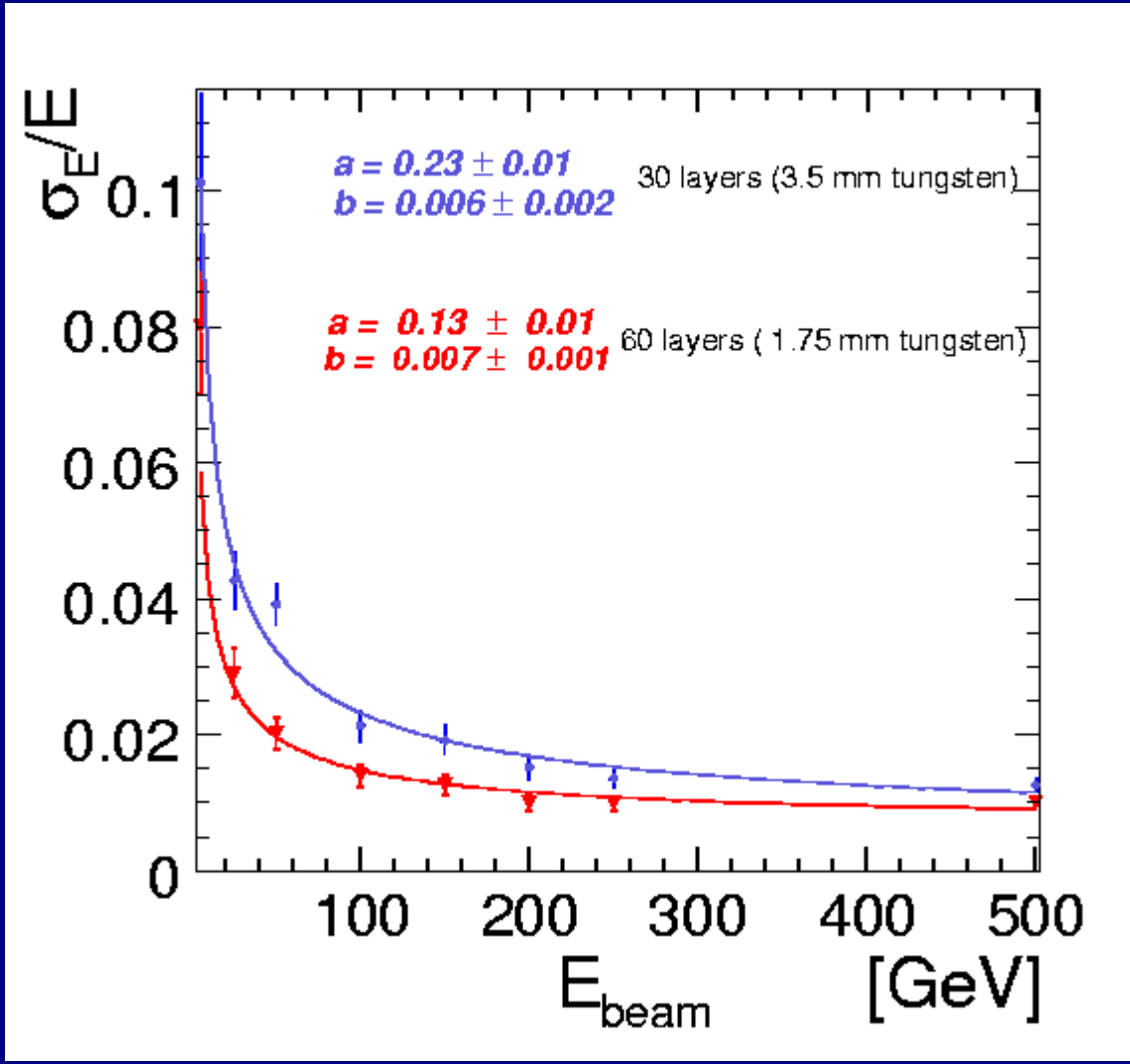
Rotation - Energy Resolution



Aligned layers



E. res v # layers, sector cut



Conclusions

- Energy deposited in and between gaps is diminished, and affects energy resolution
- Hits to tile gaps → constant term
- Between tile gaps → stochastic term
- Cutting particles reduces statistics
- 0º rotation → >90% particles retained
- Phi-based reconstruction and correction schemes will be considered (retain all particles)
- Increasing sampling frequency improves energy resolution, but it is probably very expensive