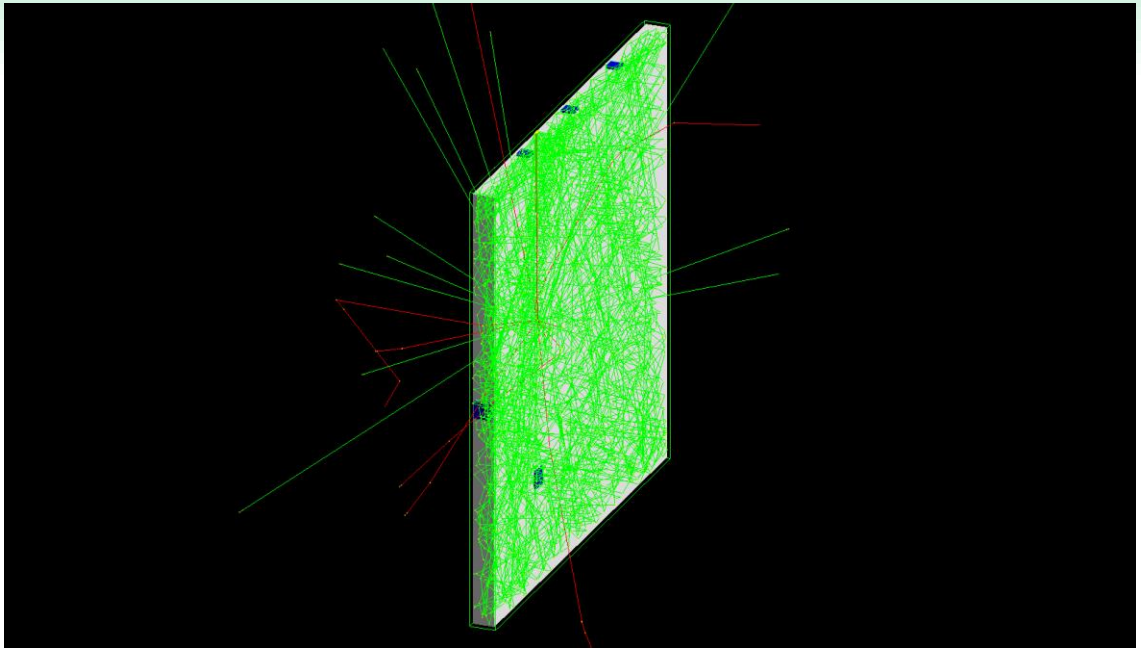
^{90}Sr Simulation

Bari, 26/2/2020

Corrado Altomare, Davide Serini, Fabio Gargano, Leonardo Di Venere



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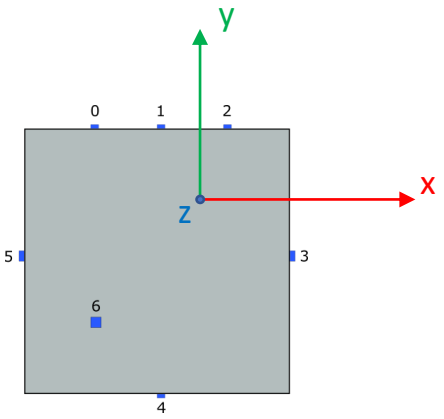
^{90}Sr Simulation

- **Physics**
  - **Physics List for Geant4 FTFP_BERT***
- **Source**
  - **^{90}Sr with G4 radioactive decay simulation**
- **Geometrical parameters**

- **Geometry B1 (5mm) :**
  - **Tile size (100x100x5) mm3**
  - **Source Position: Centered in (x,y) plane at 0.5 cm from Tile in z axes**
  - **SiPM (0,1,2,4) 3x3 mm**
  - **SiPM (3,5,6) 3x3 mm**
  - **Wrapping (TiO_2) Thickness 500 um**

- **Geometry B2 (10mm) :**
  - **Tile size (100x100x10) mm3**
  - **Source Position: Centered in (x,y) plane at 0.5 cm from Tile in z axes**
  - **SiPM (0,1,2,4) 3x3 mm**
  - **SiPM (3,5,6) 3x3 mm**
  - **Wrapping (TiO_2) Thickness 500 um**



*http://geant4-userdoc.web.cern.ch/geant4-userdoc/UsersGuides/PhysicsListGuide/html/reference_PL/FTFP_BERT.html#ftfp-bert

^{90}Sr Emission

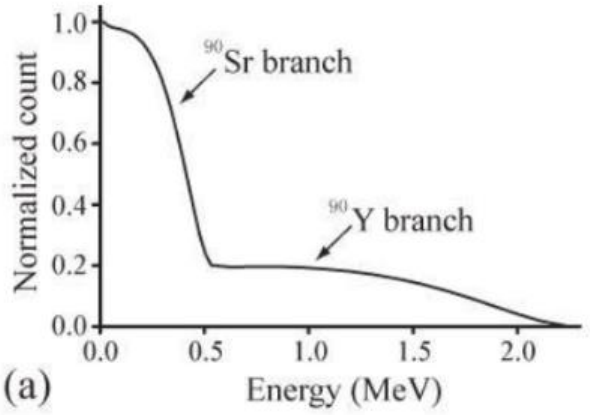
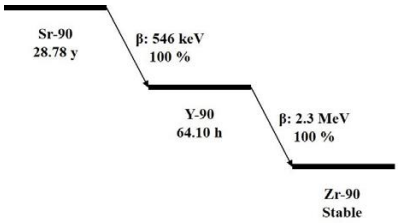
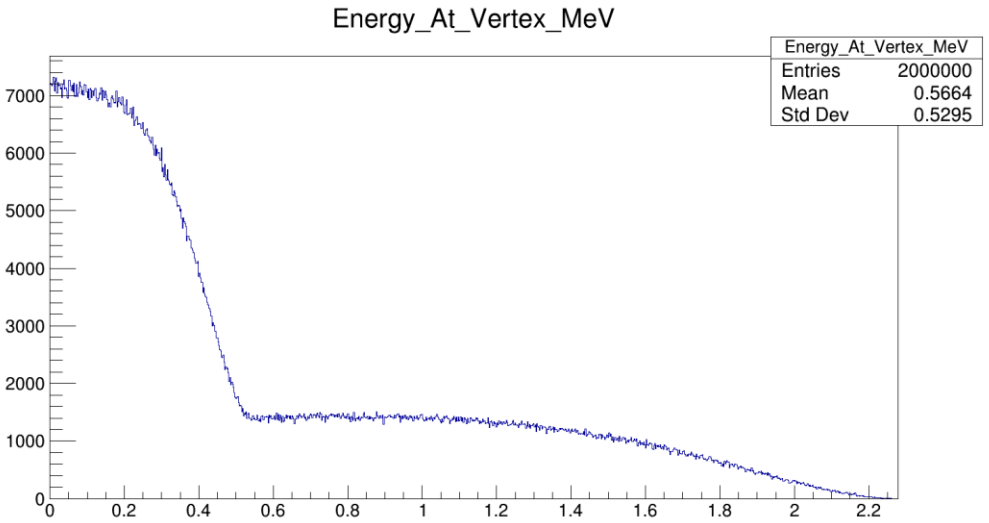


FIG. 7: (color online). (a) Theoretical energy spectra of beta particles emitted from a ^{90}Sr/^{90}Y source.

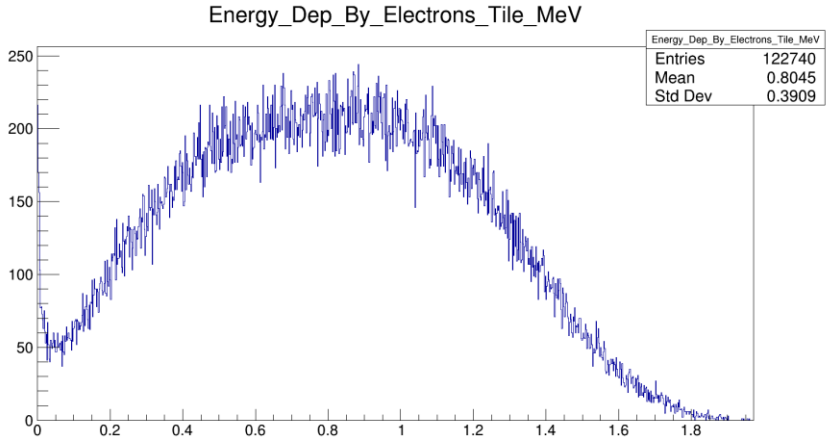




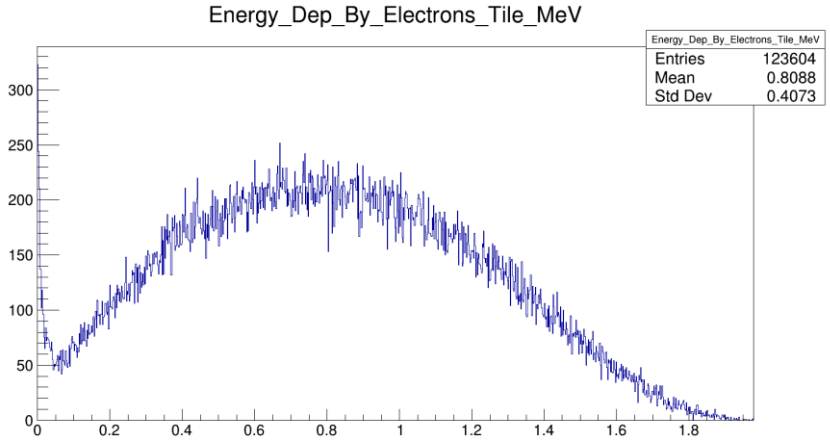
G4 Simulation 1M events -> 2M Electrons by Ions

^{90}Sr Tile Energy Absorption*

Tile B1 (5 mm)



Tile B2 (10 mm)

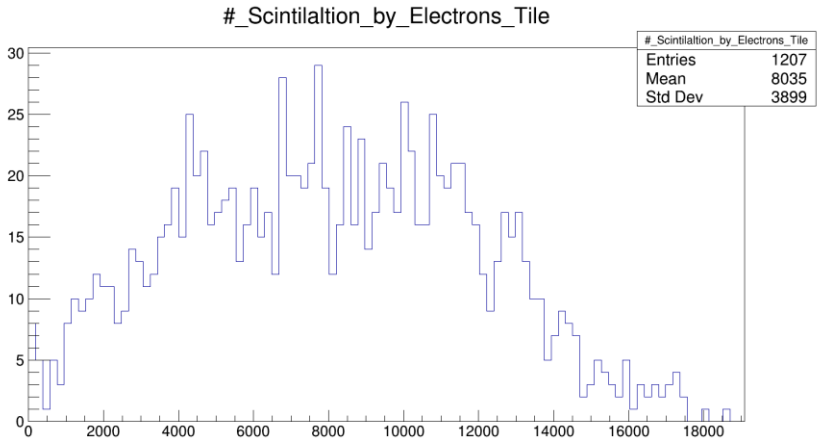


Expected Rate 12%

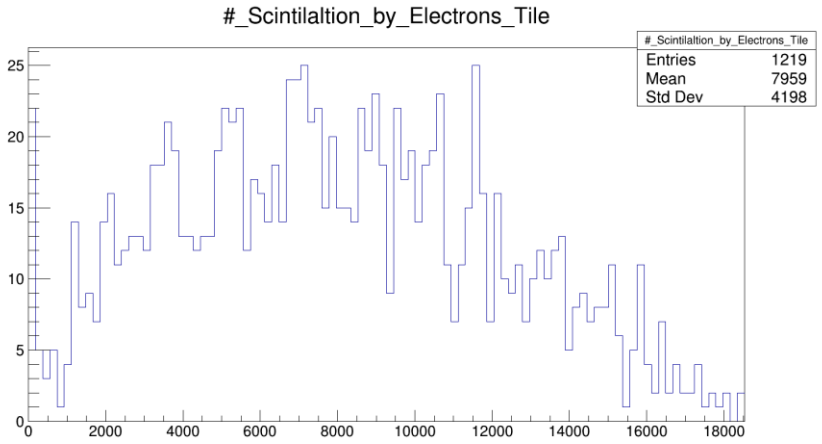
*1 M events simulated

^{90}Sr Scintillation Photons*

Tile B1 (5 mm)



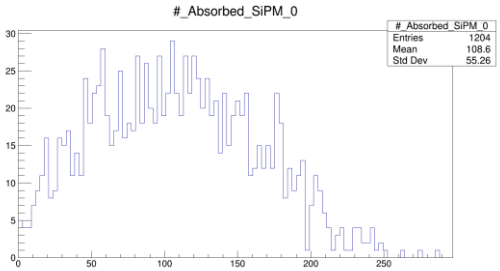
Tile B2 (10 mm)

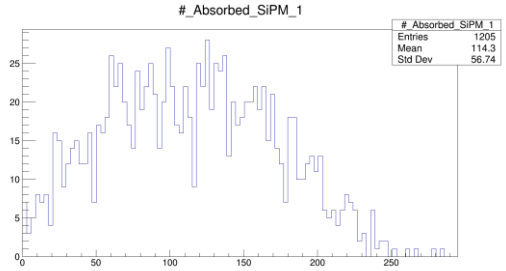


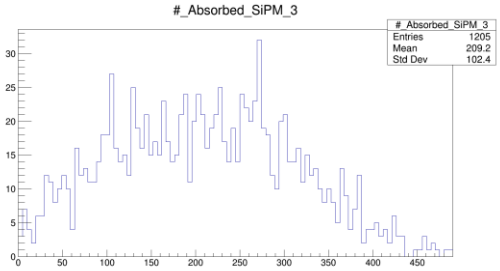
*In optical photon simulation the number of event is reduced from 1M to 10k

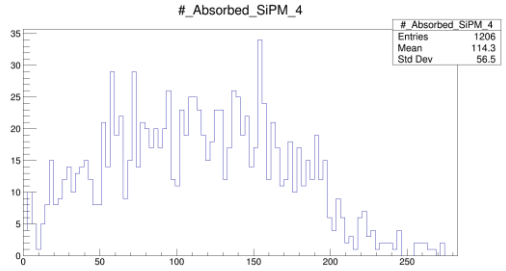
^{90}Sr Absorbed Photons*

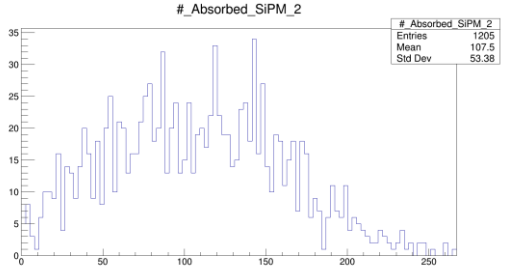
Tile B1 (5 mm)

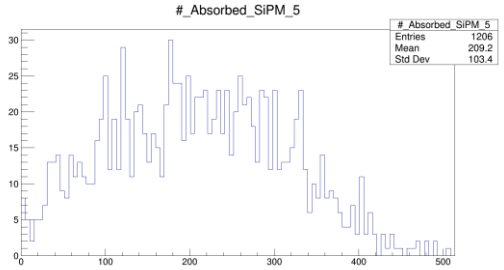


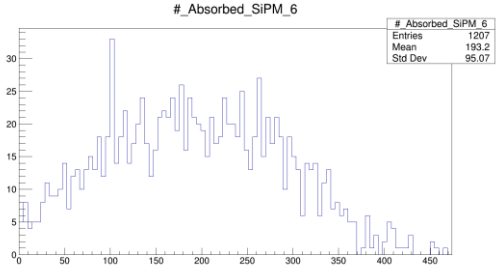








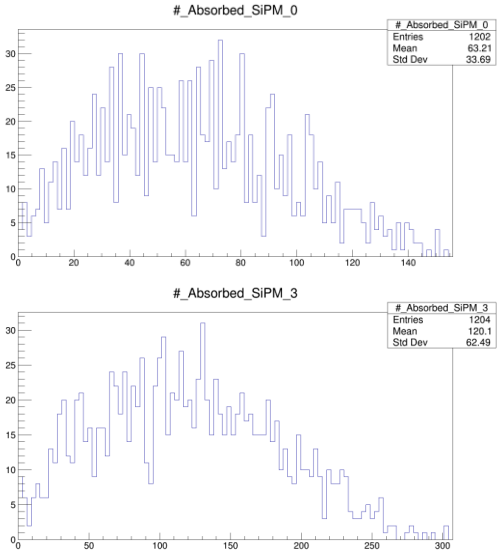


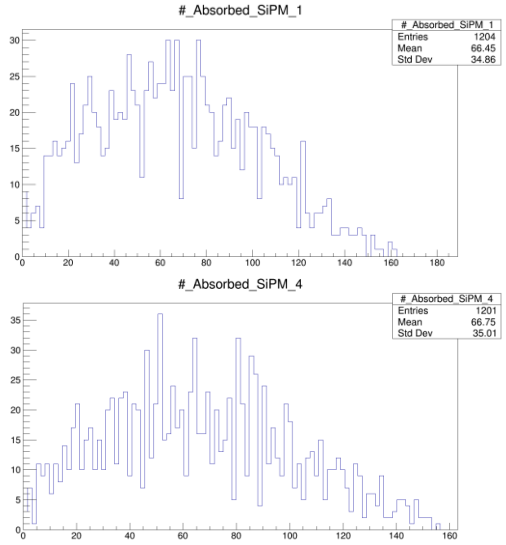


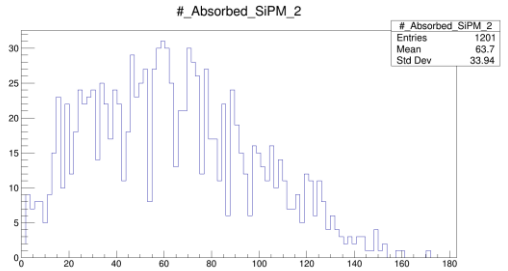
*10k events

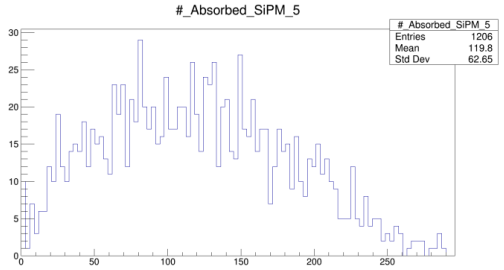
^{90}Sr Absorbed Photons*

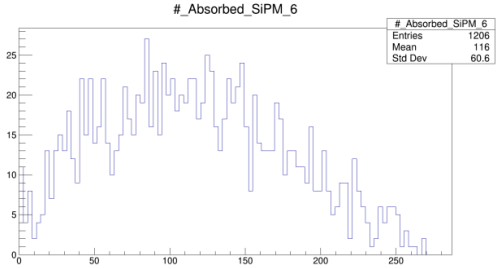
Tile B2 (10 mm)







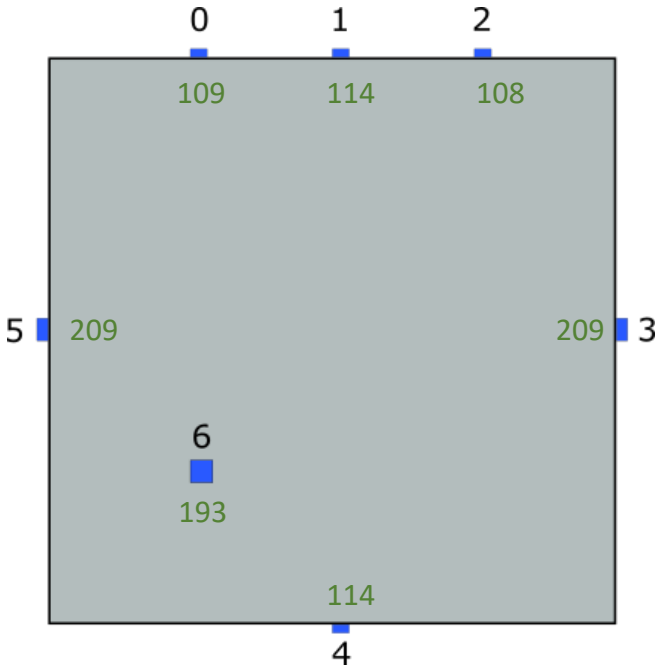




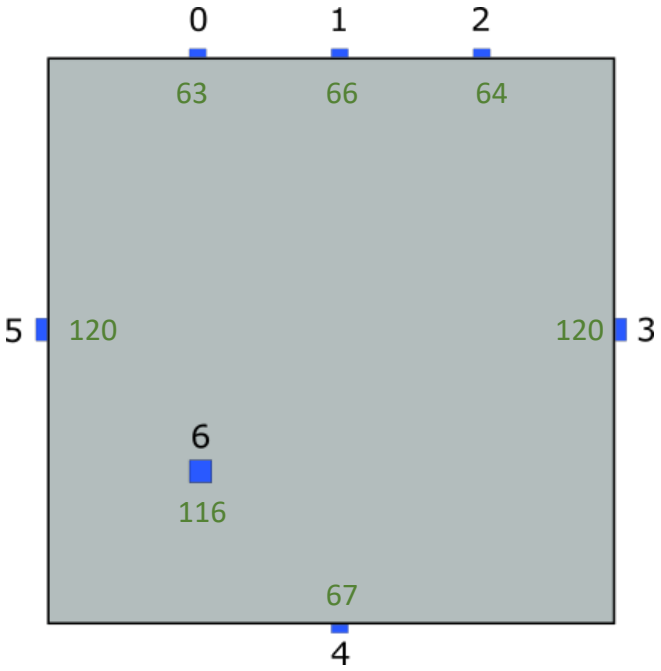
*10k events

Comparison

Tile B1 (5 mm)



Tile B2 (10 mm)

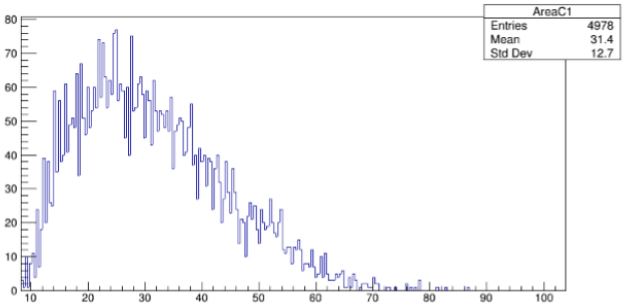


Comparison with data

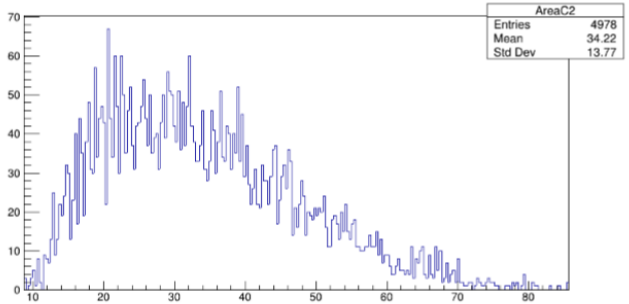
Tile B2 (10 mm)

Lab

ADV side

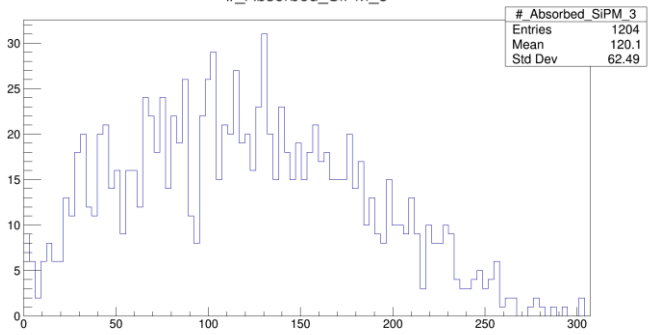


ADV side 2

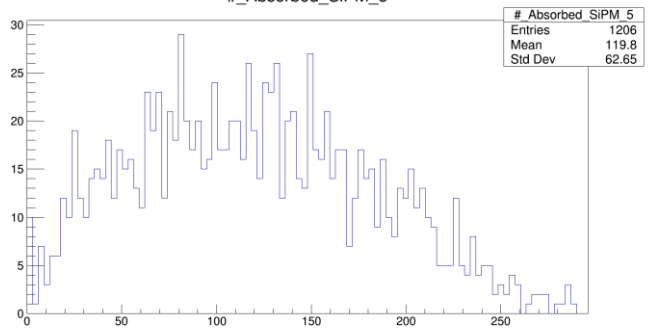


Simulation

#_Absorbed_SiPM_3



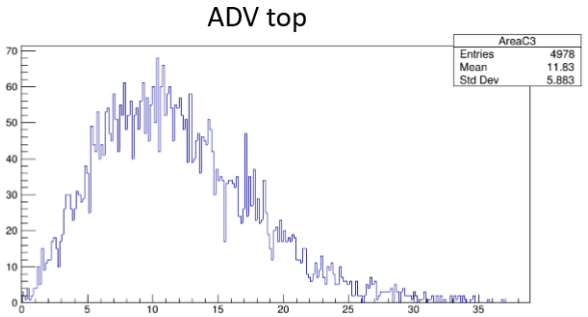
#_Absorbed_SiPM_5

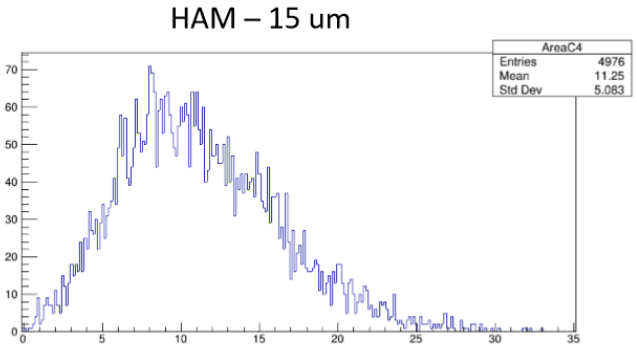


Comparison with data

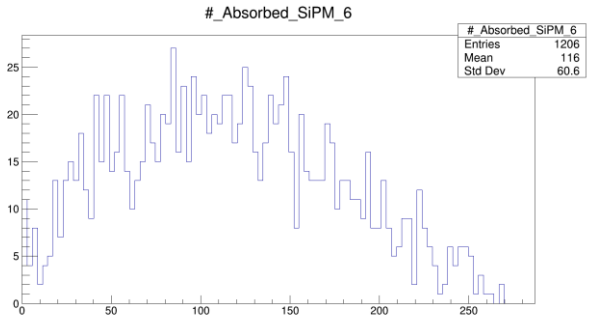
Tile B2 (10 mm)

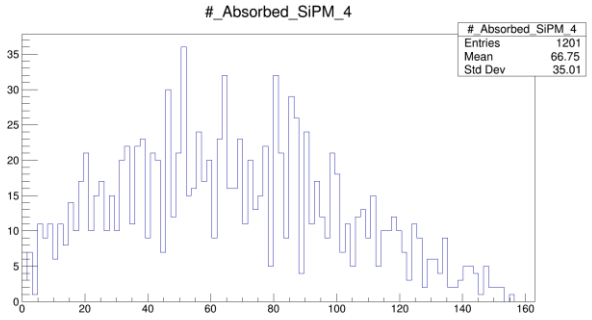
Lab





Simulation

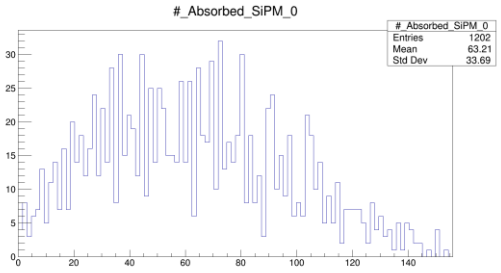


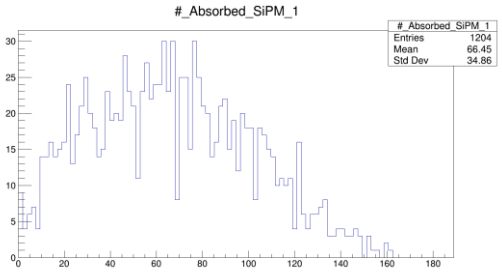


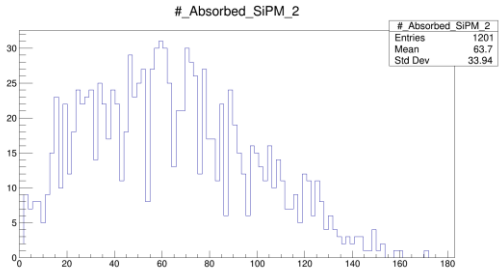
Comparison with data

Tile B2 (10 mm)

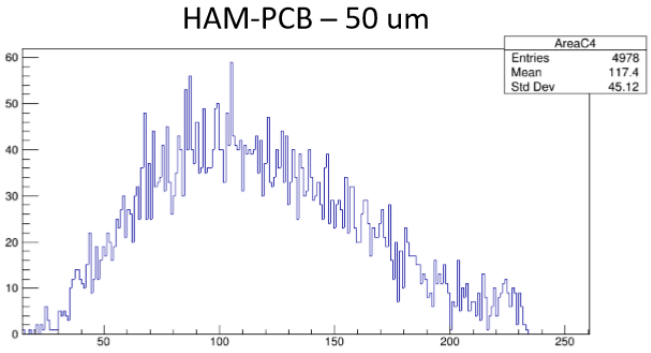
Simulation







Lab



Backup