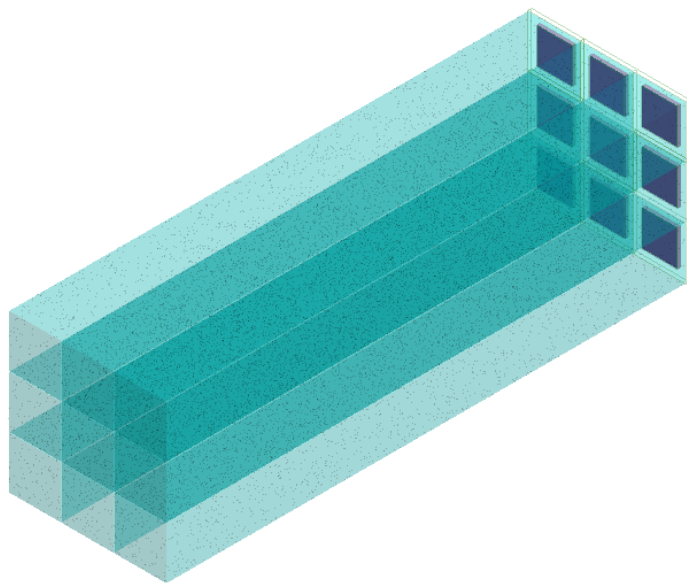


# Geant4 Standalone Optical simulation studies of S14160-6010PS MPPC



Used Code from:

<https://github.com/JeffersonLab/glass-prototype>

Author: Petr Stepanov

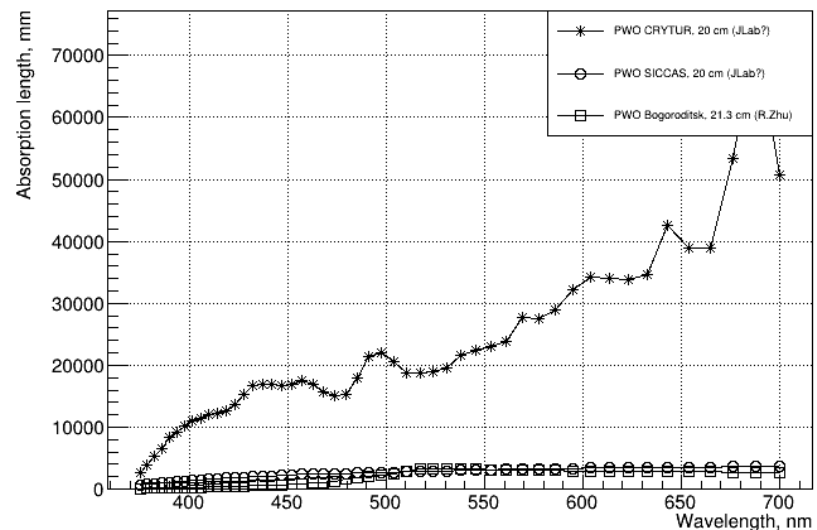
Provided by: Dmitry Kalinkin

# Simulation Setup

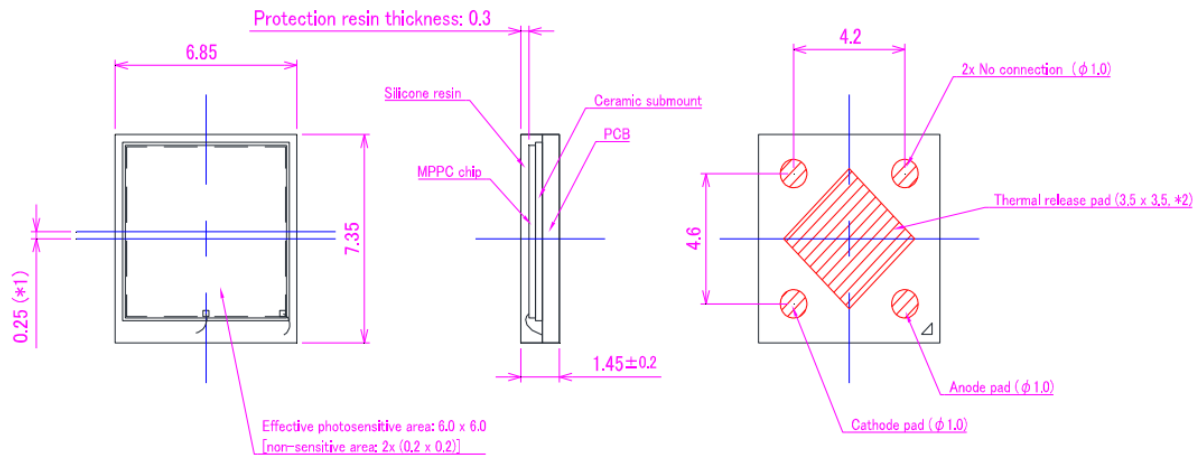
- Material – PWO-CRYTUR
- Matrix – 1x1,5x5
- Wrap material – VM2000
- Physics List – FTFP\_BERT

- 1Mev – 300 Op. Photons
- Number of events - 1000
- Particle - e-
- Finish model – dielectric-metal
- Finish type - unified

Calculated PWO Absorption Length



# S14160-6010PS/6015PS properties



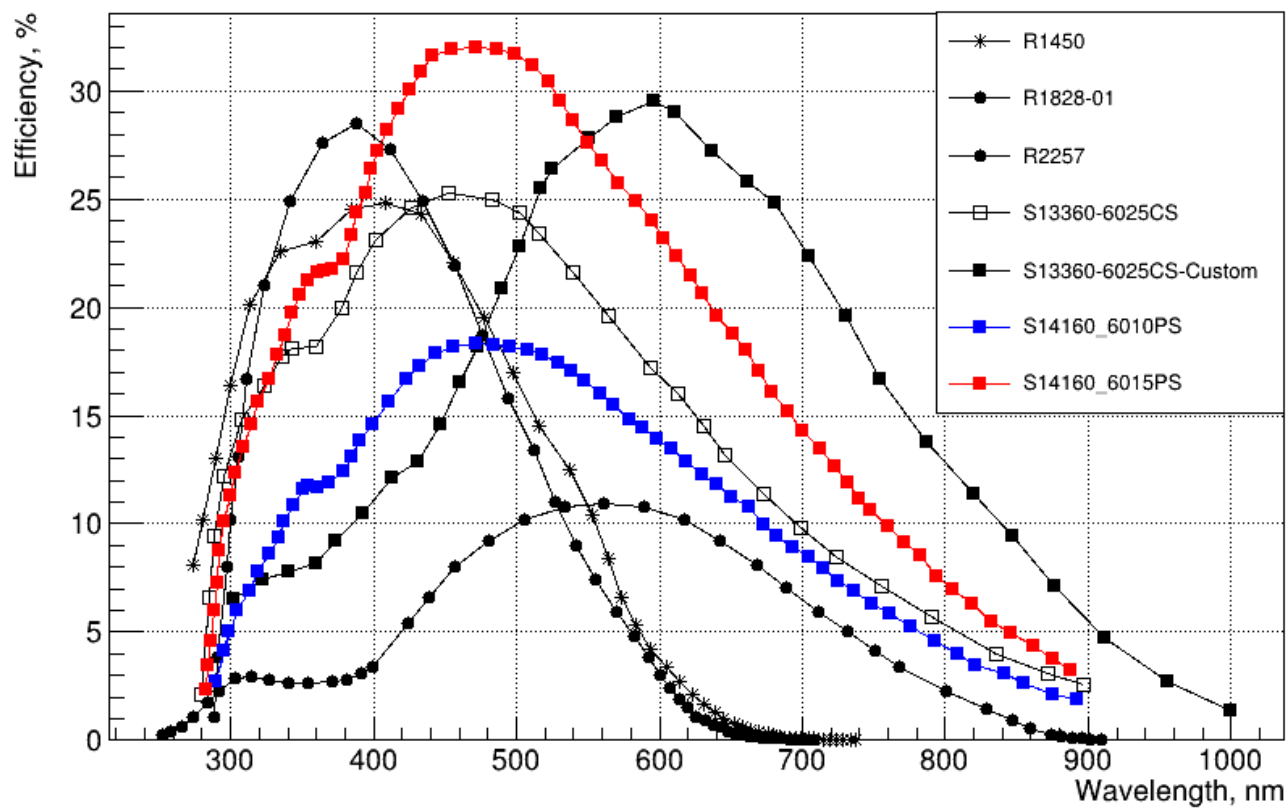
\*1 : Chip center to PKG center

\*2 : The thermal pad is not electrically but thermally connected to MPPC chip.  
It is recommended that the pad is connected to ground plane for thermal release.

General tolerance : ±0.1

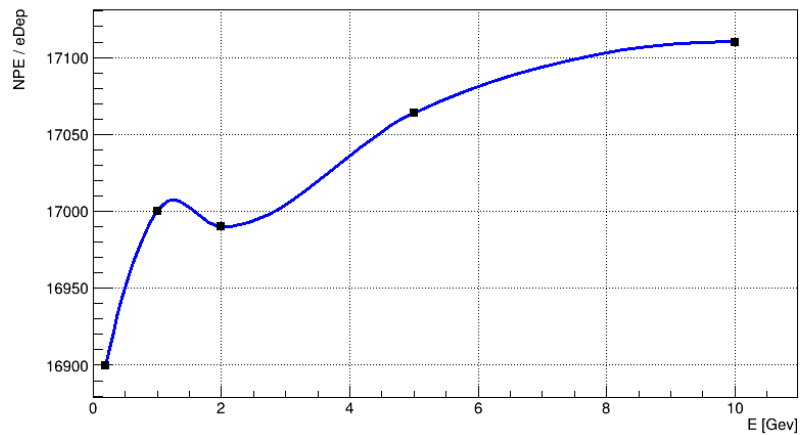
Instead of 4 siPM's with size 6.85mm\*7.35mm on one crystal. One siPM with size 13mm<sup>2</sup> were used.

# Detector Quantum efficiencies

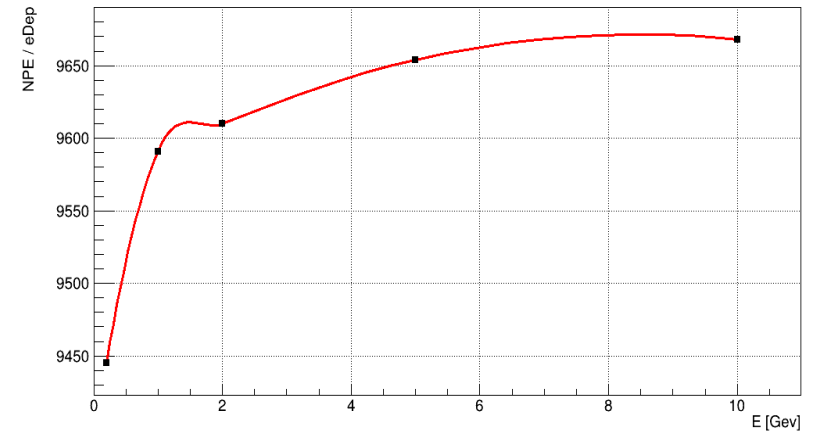


Number of photons that reach the sensors per unit of energy deposited as a function of incident electron momentum,  
5x5 Matrix

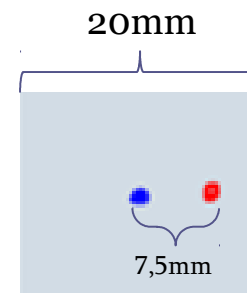
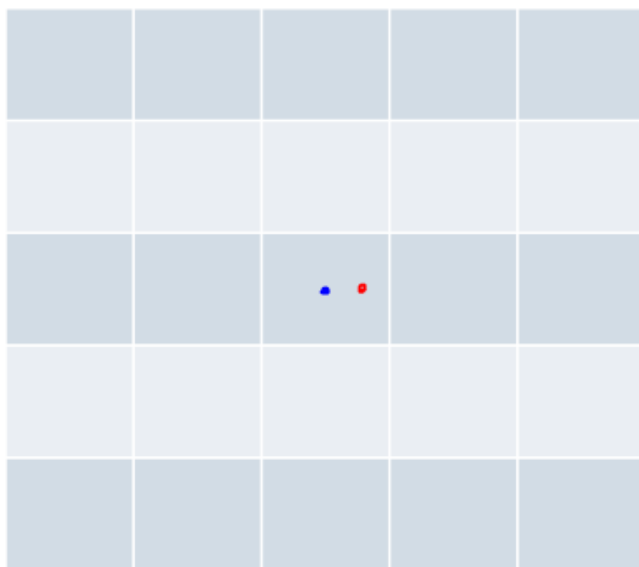
S14160-6015PS



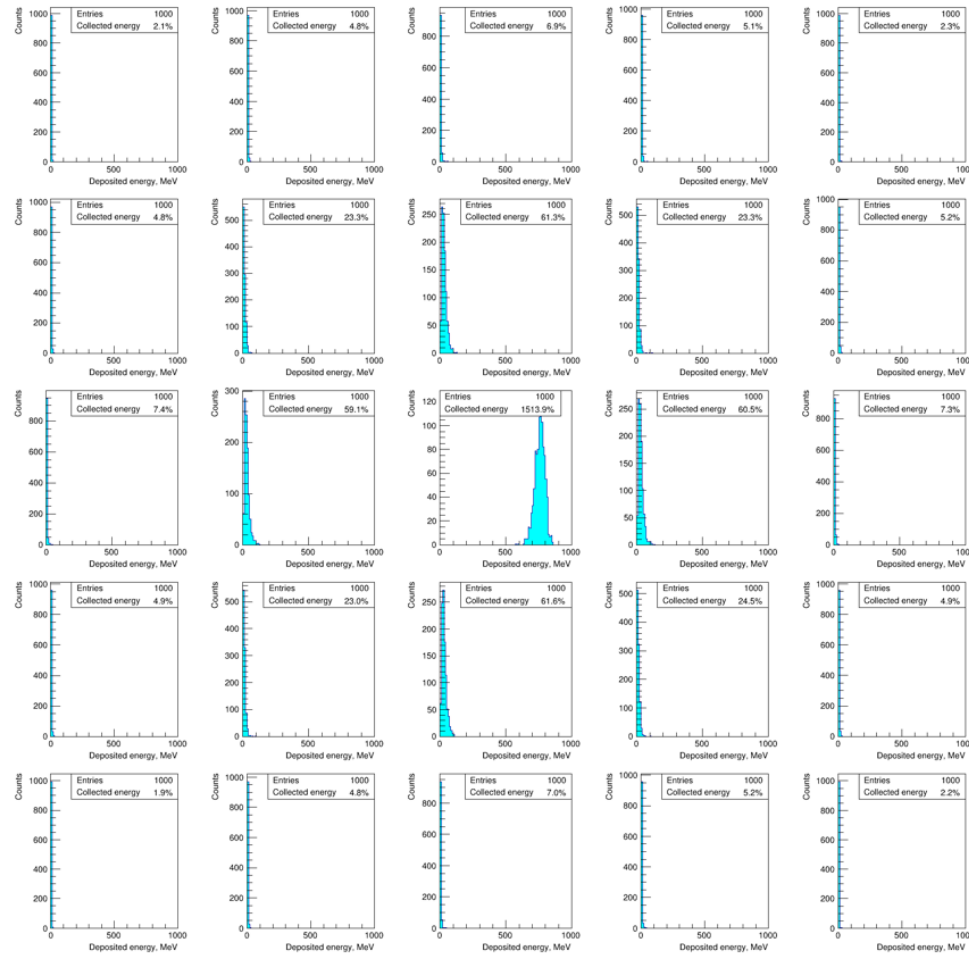
S14160-6010PS



Number of photons that reach the sensors were calculated for 5x5 and 1x1 crystal configurations, by throwing to the center of central crystal and by shifting 7,5mm to the side

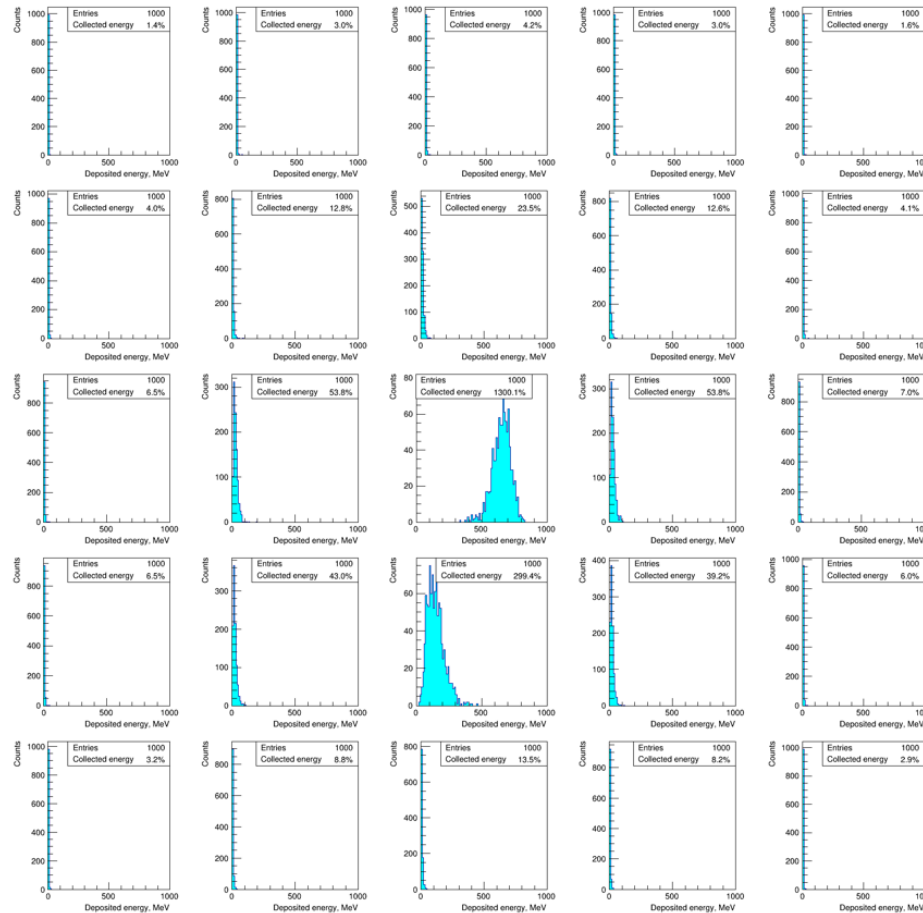


## Deposited energy in each crystal for 1Gev incident electron momentum, center of central crystal

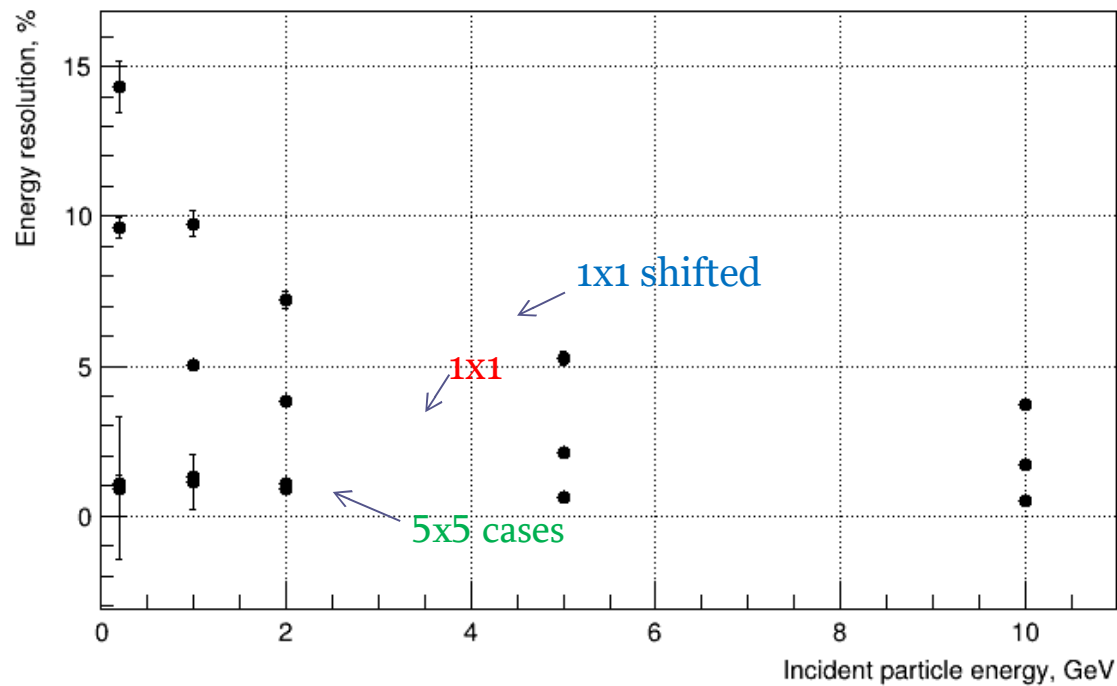




# Deposited energy in each crystal for 1Gev incident electron momentum, shifted by 7.5 mm



Energy resolution for all 4 cases  
(5x5, 5x5 shifted, 1x1, 1x1 shifted)



Number of photons that reach the sensors per unit of energy deposited as a function of incident electron momentum, for all 4 cases

