Simulation of segmented calorimeter: Introduction of diode array and reflection

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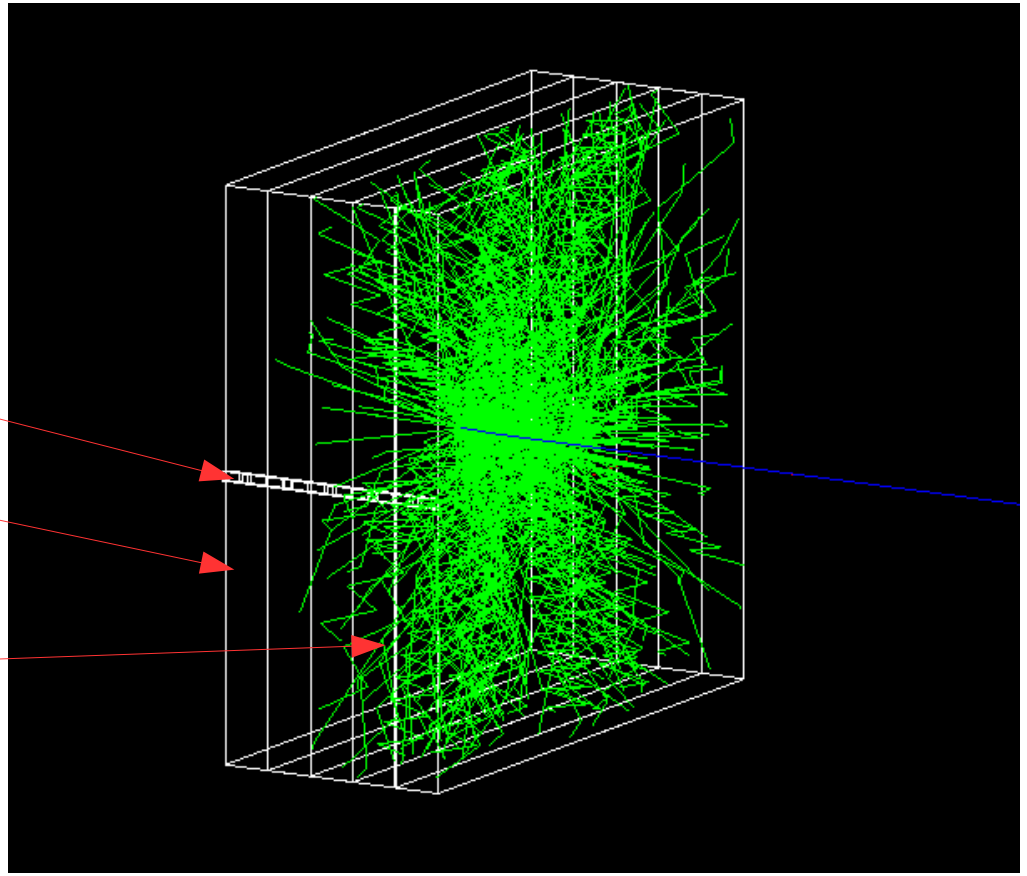
Simulation of segmented calorimeter

New:

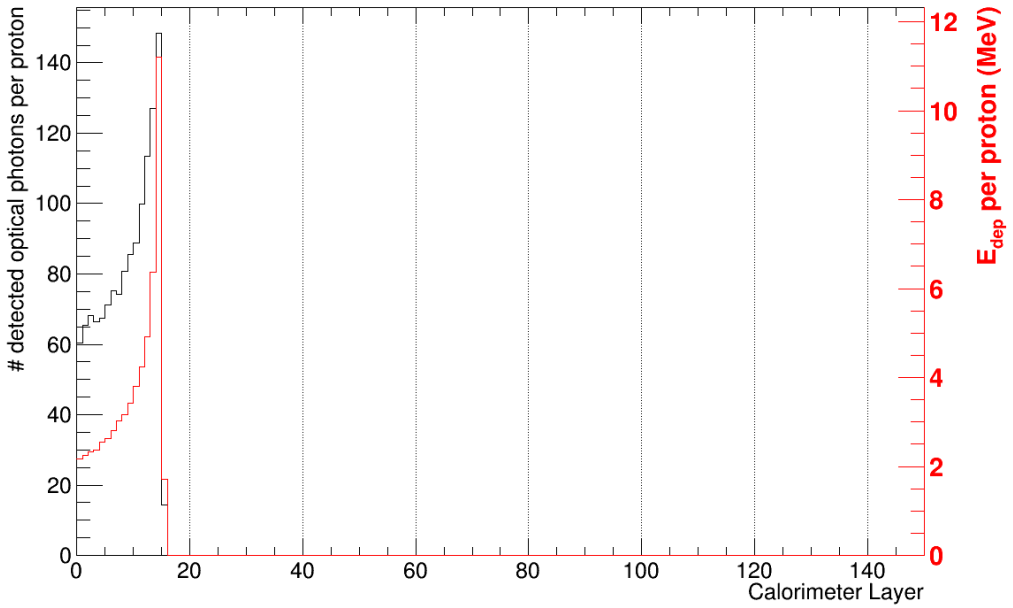
- Array of “diodes” (sensitive detectors)
- Reflection of photons (refraction coefficient of Mylar wrapping)



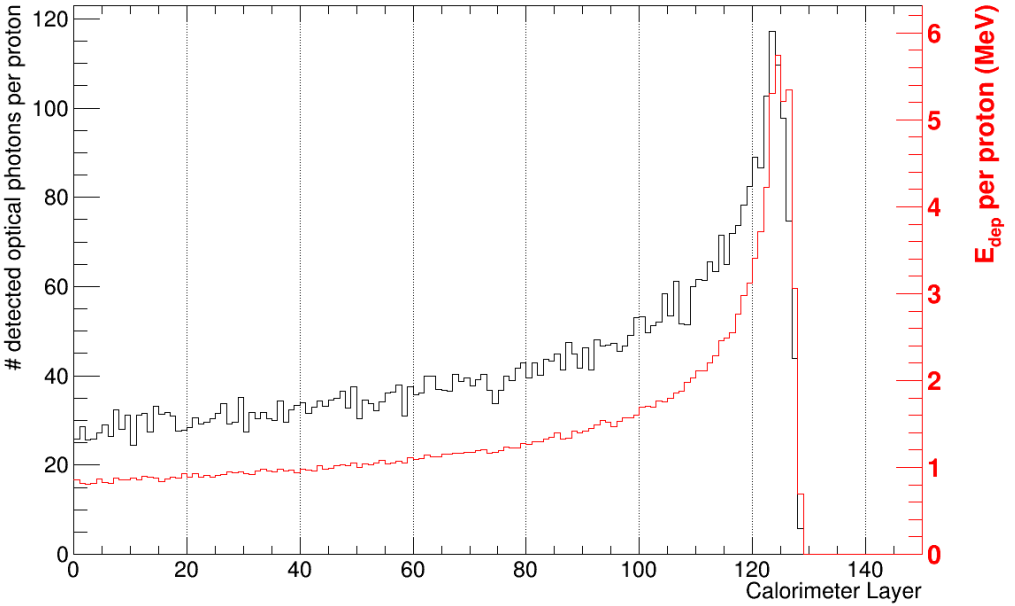
Analysis of Output

- 150x2mm segmented calorimeter
- 60 & 200 MeV proton beam, 10 protons simulated
- Diode array at same y-position as beam
- Plotted is the number of photons hitting the diodes; Bragg peak for comparison
- @200MeV: Curves look shifted! Scintillation yield depends on proton energy loss AND actual proton energy!

60 MeV

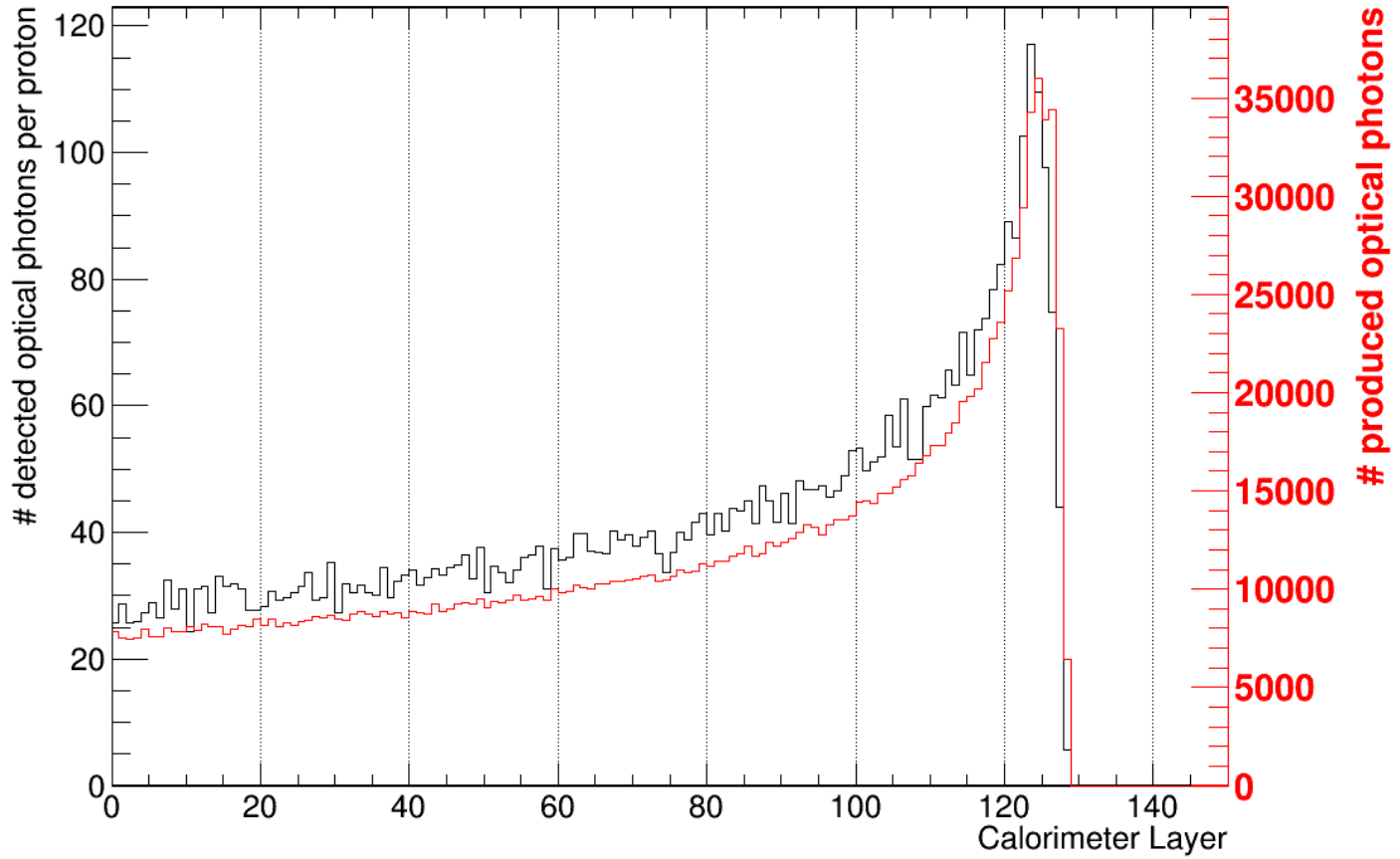


200 MeV



dE/dx corrected with Birk's law

- dL/dx = S / (1/dE/dx + kB)
- Gives TOTAL photon yield (not only those in diode)



To do

- Shift position of diode array and see what happens
- Check all material parameter (where do they come from?)
- Add optical glue between diode and scintillator
- Diode material?
- Reliable procedure needed for how to get the proton energy out of photon yield curve
- Parallelize simulation! (one proton at 200MeV ~ 5-10 minutes)
- Still cannot save images from OGL Viewer