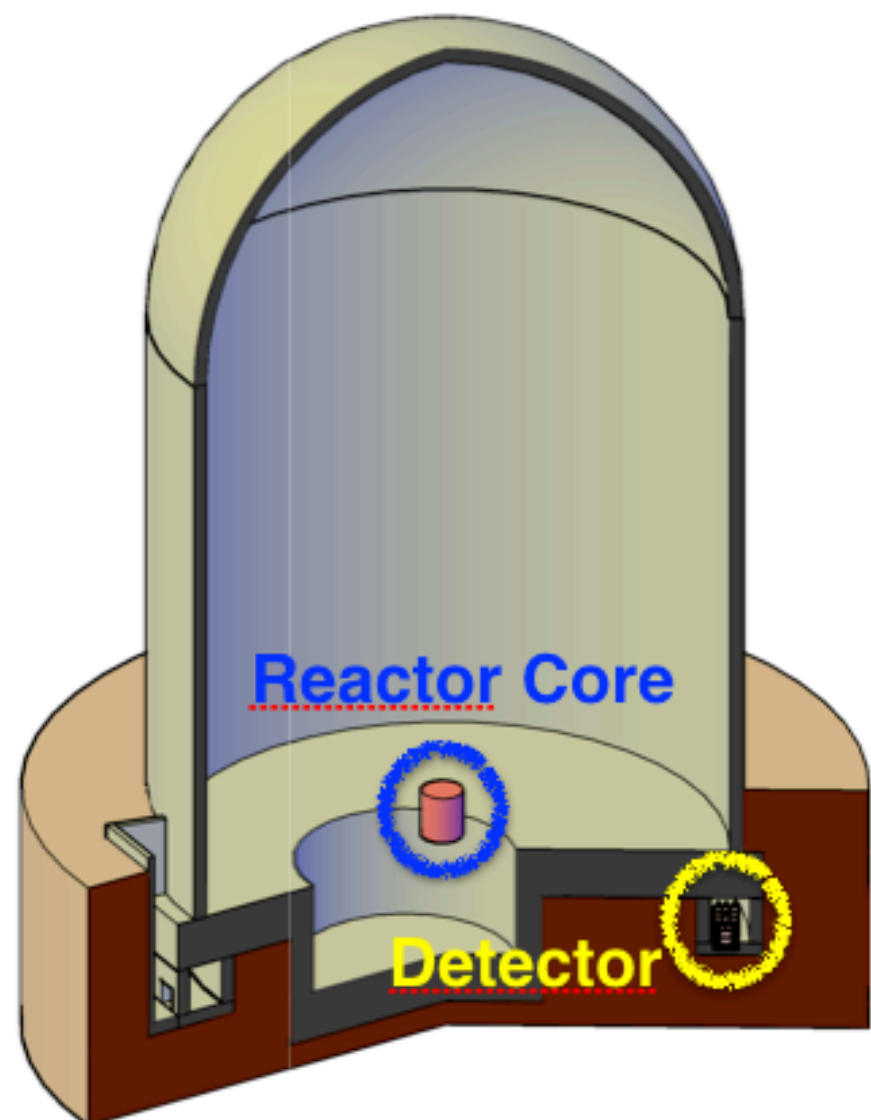


NEOS Detector for Reactor Antineutrinos

Youngju Ko on behalf of the NEOS Collaboration

Experimental Site

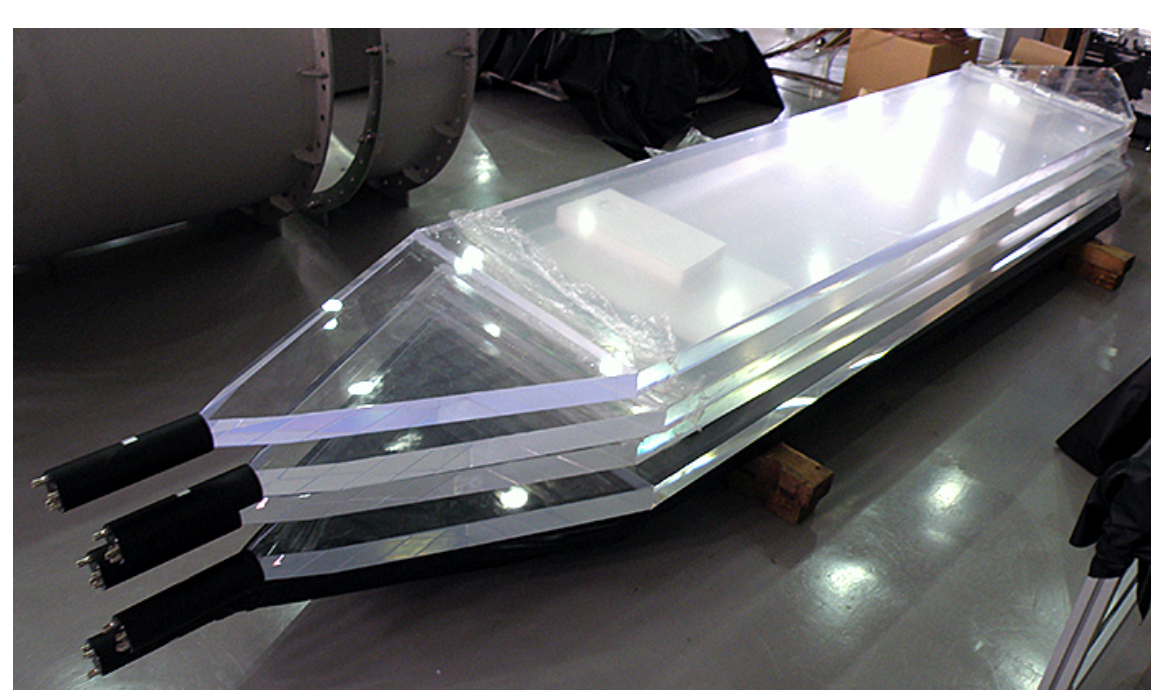


Reactor Unit 5 in HANBIT N.P.P.

- Yeonggwang in Korea
- Commercial reactor with 2.815 GW_{th}
- Core Size (ϕ , h): (3.1, 3.8) m
- Tendon Gallery
- Baseline is about 24 meters
- About 20 m.w.e overburden

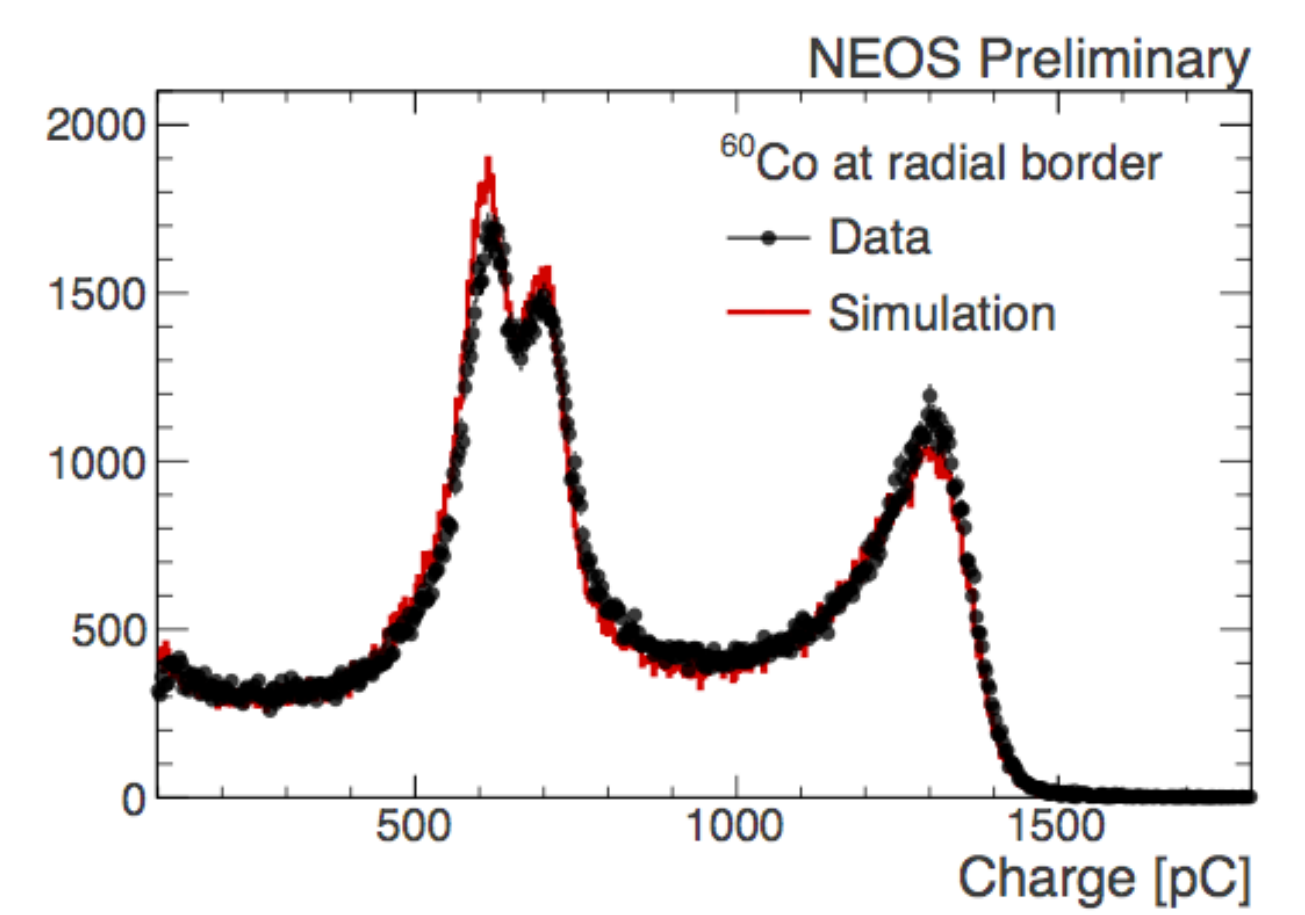
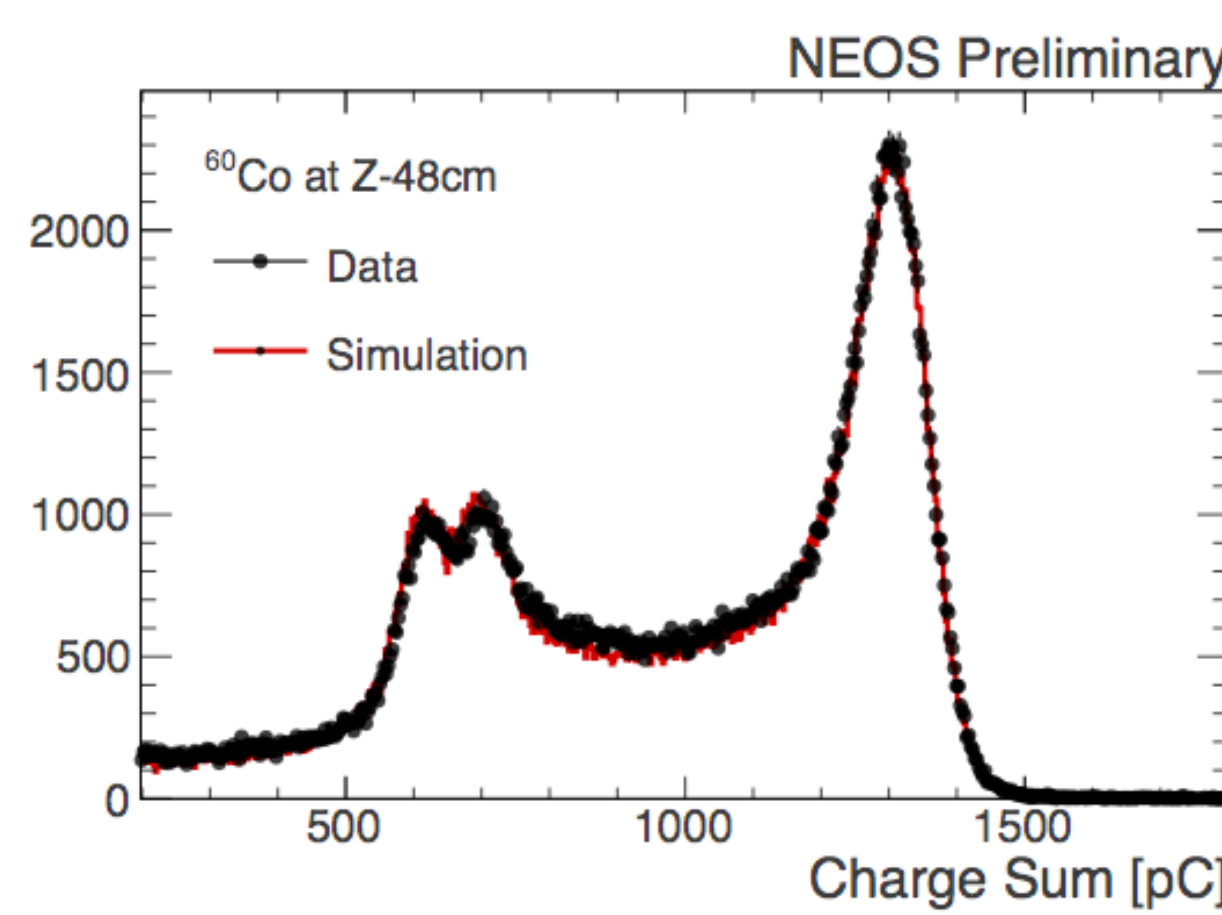
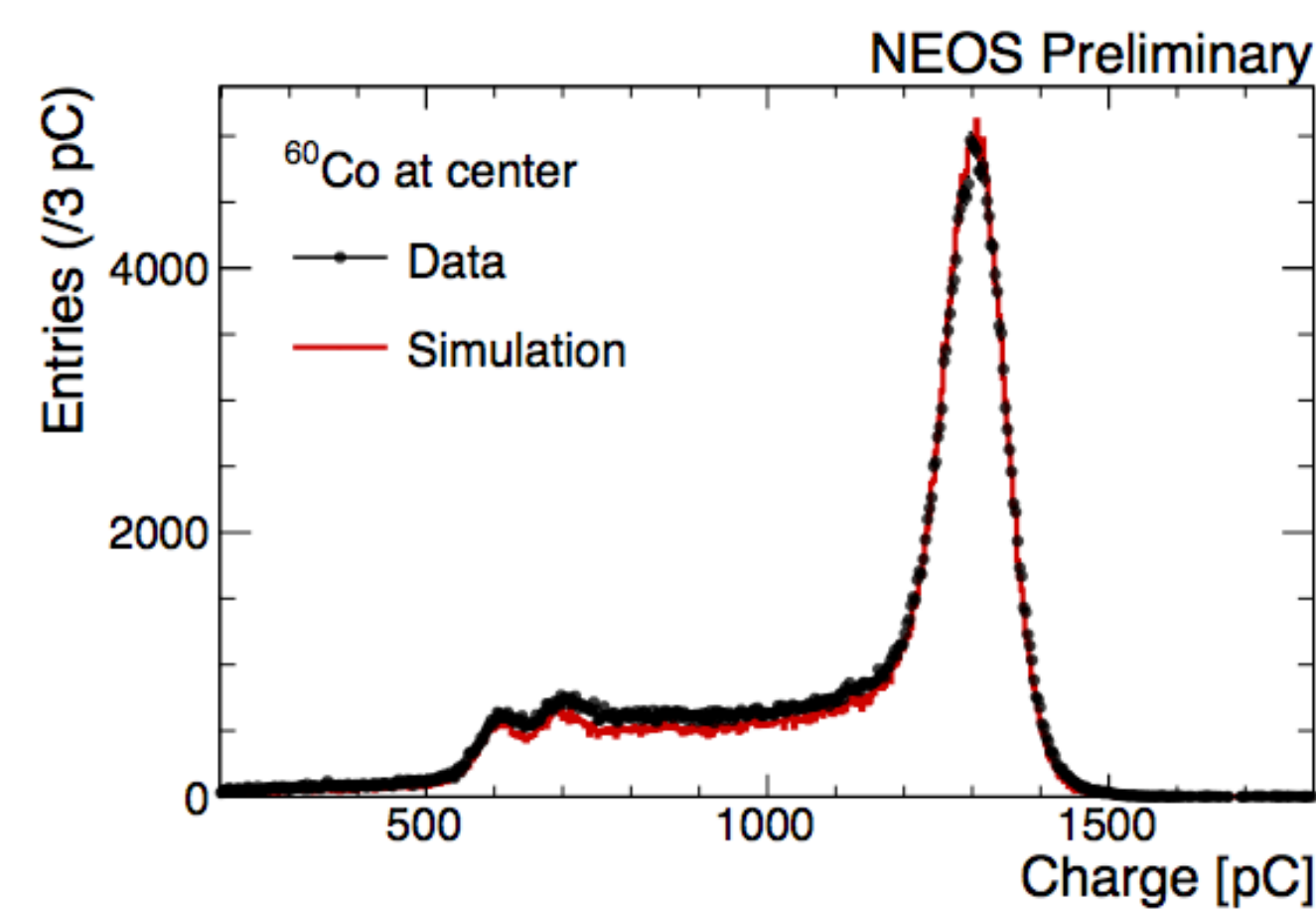
Target

- A cylindrical homogeneous target of 1000 L
- 0.5% gadolinium is loaded.
- Mixture LS: LAB based + DIN based (9:1)

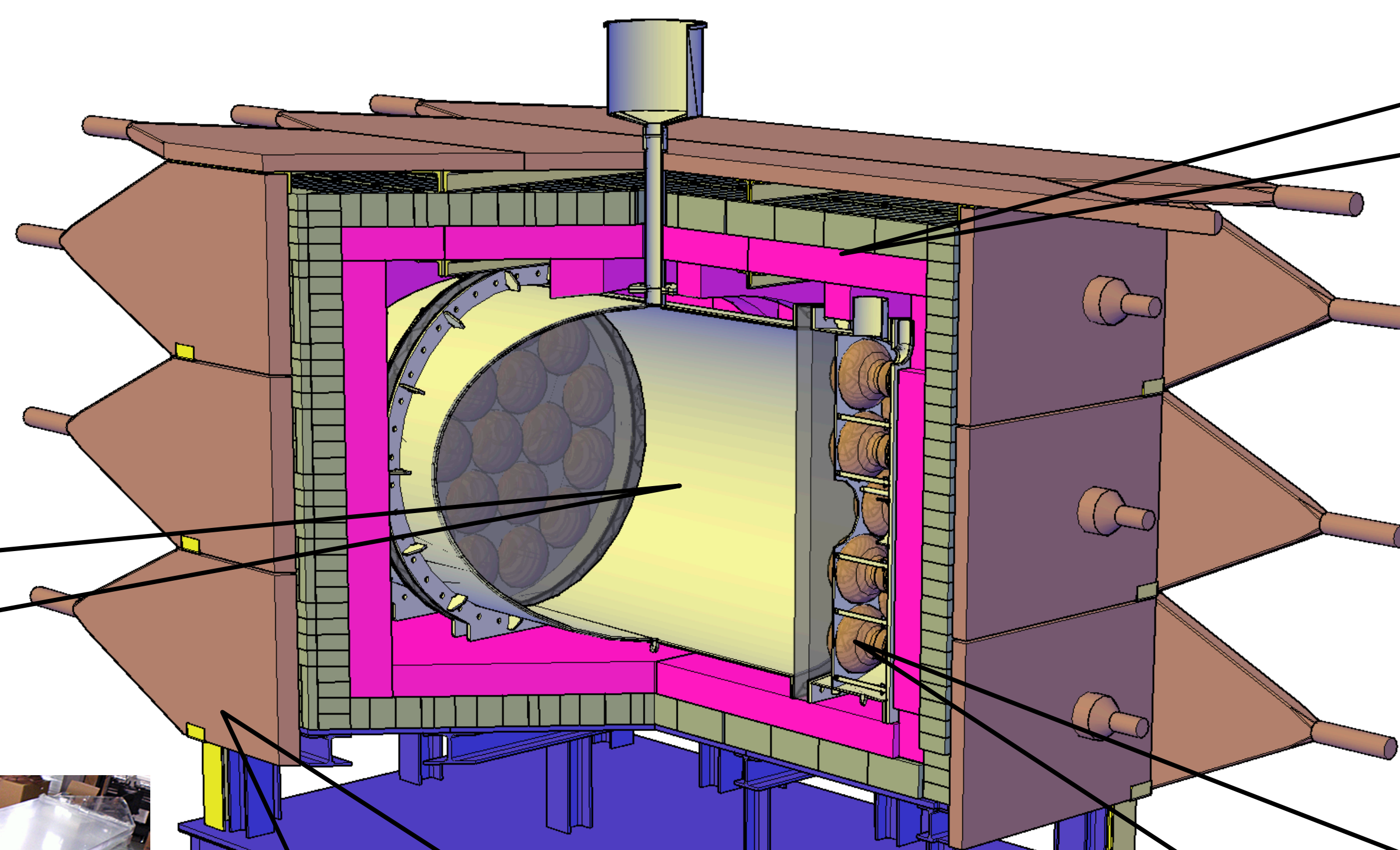
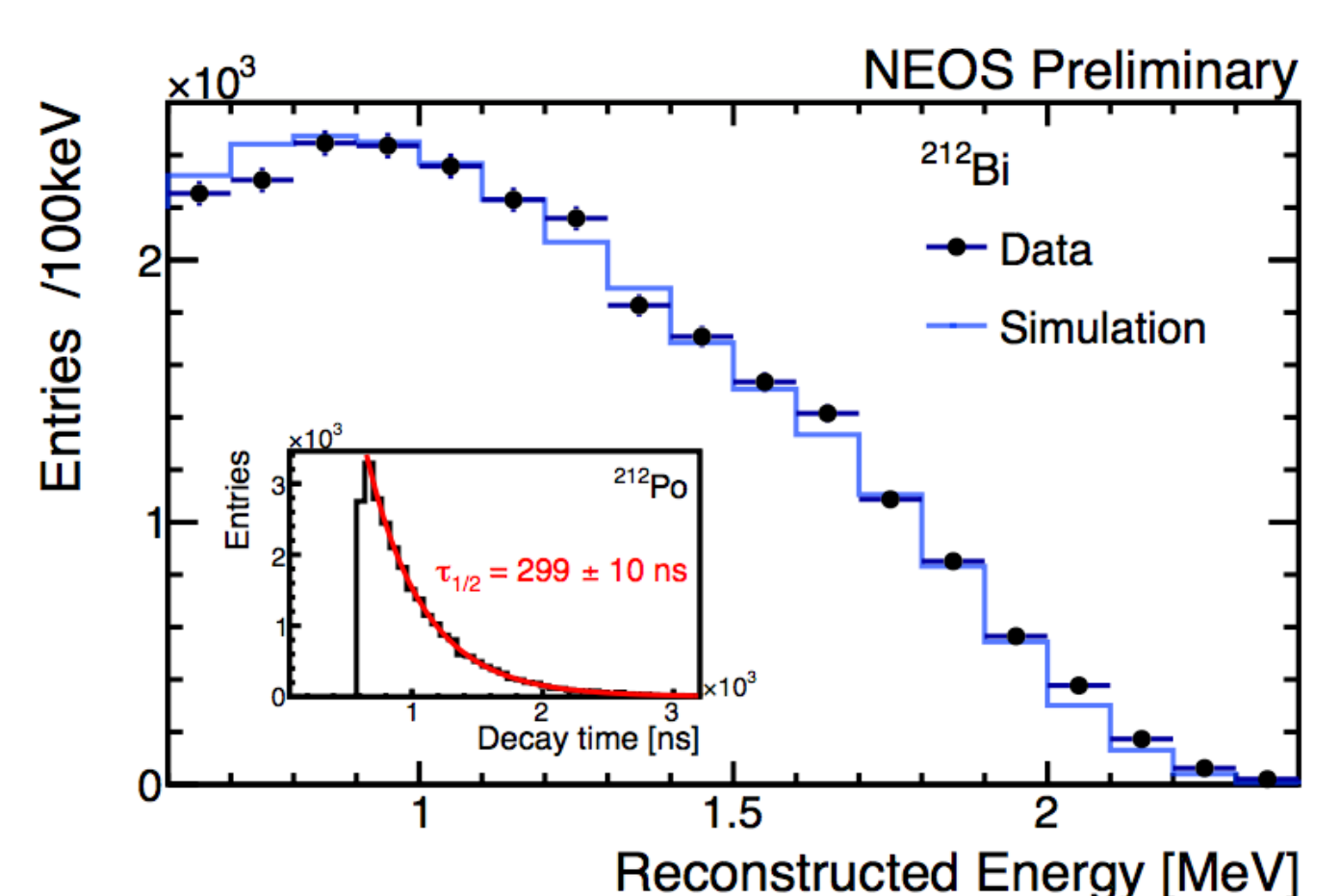
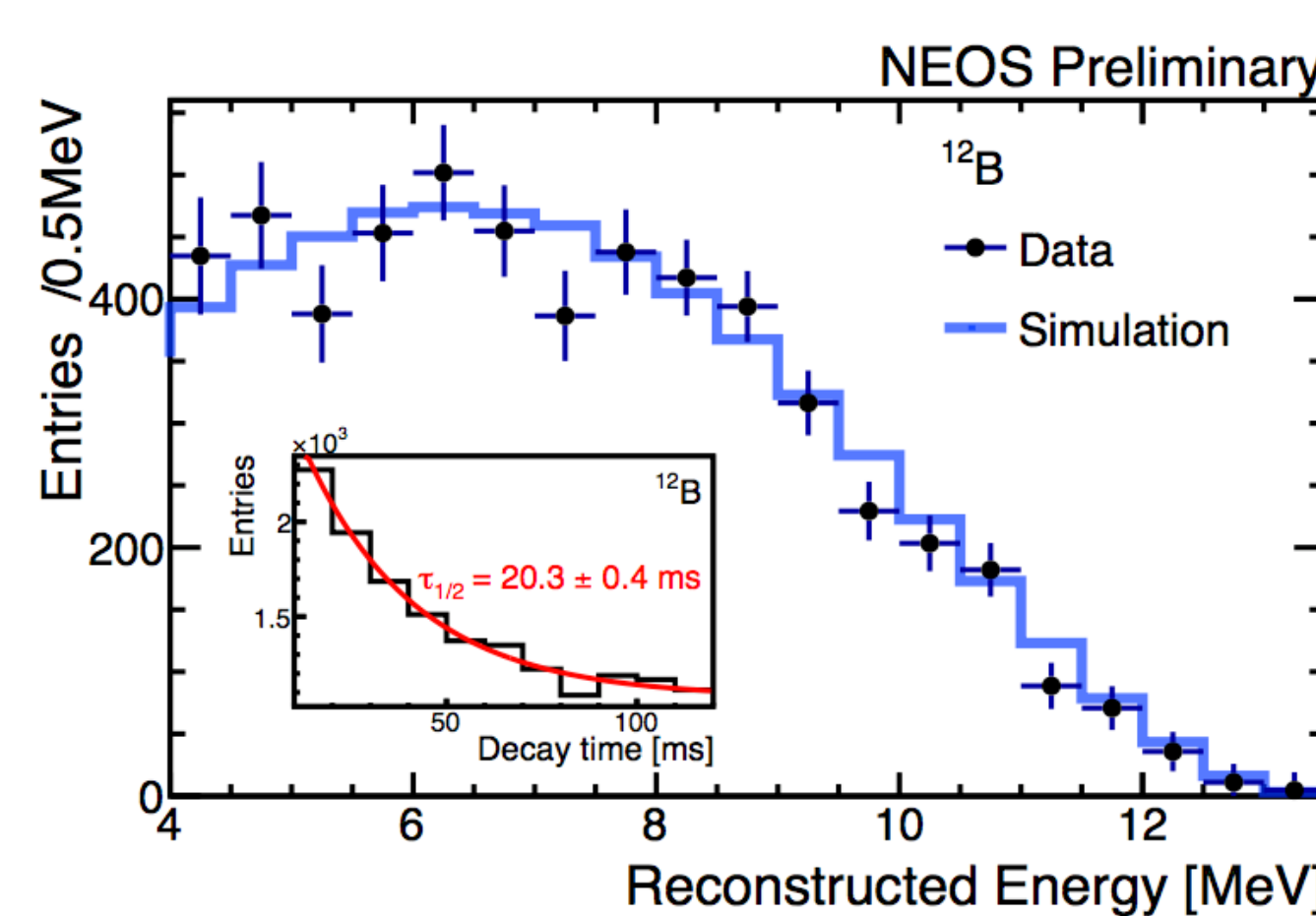
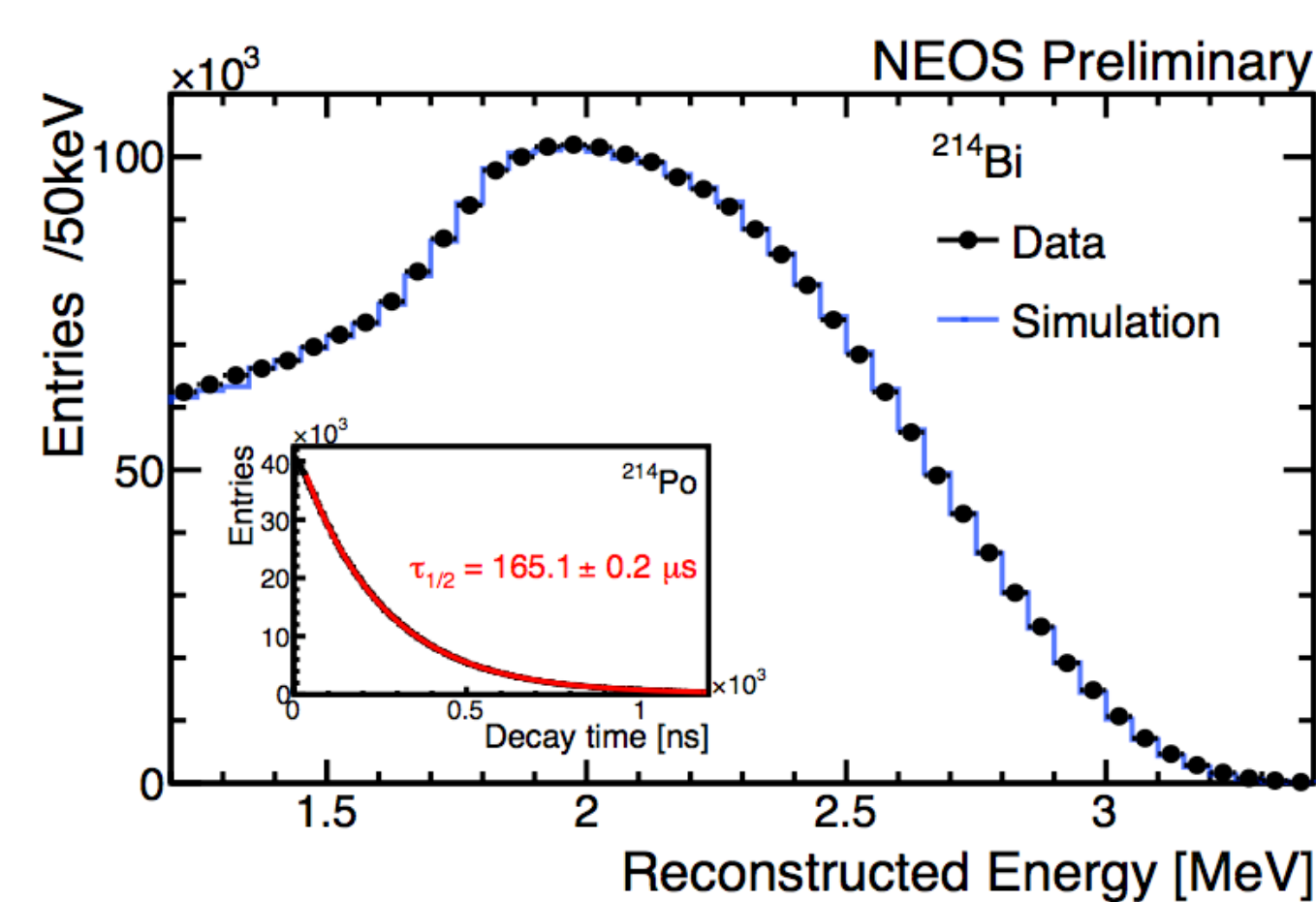


MC Simulation based on GEANT4

Charge distribution of radioactive source at various event vertex positions

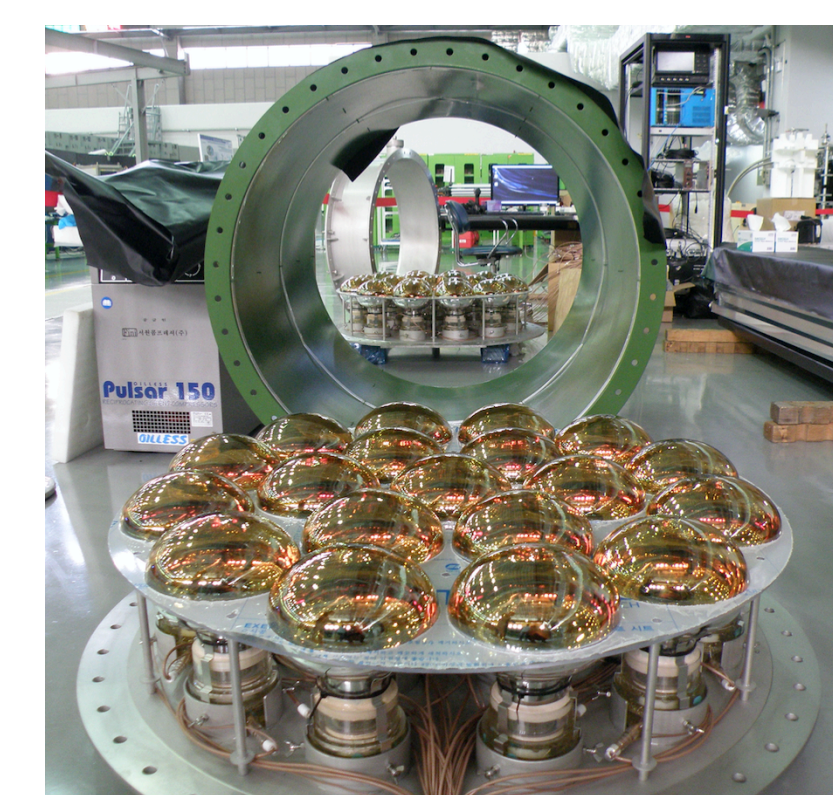


Comparison of β -decay spectrum between MC and data



Shields

- 10 cm borated polyethylene for neutron
- 10 cm Lead for external gamma



Muon Detector

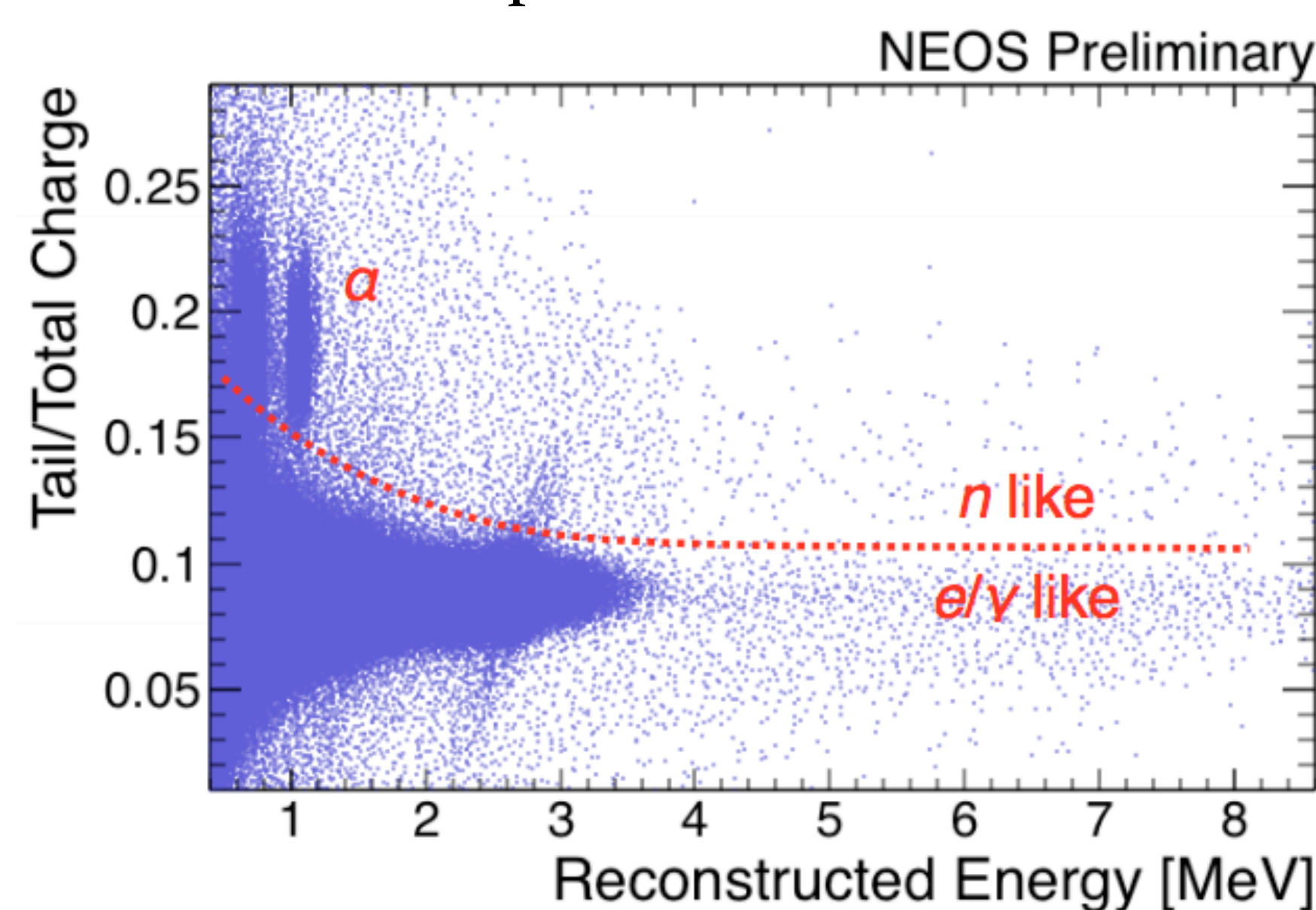
- Muon detector for veto except bottom
- Plastic scintillator

Photo Multiplier Tubes

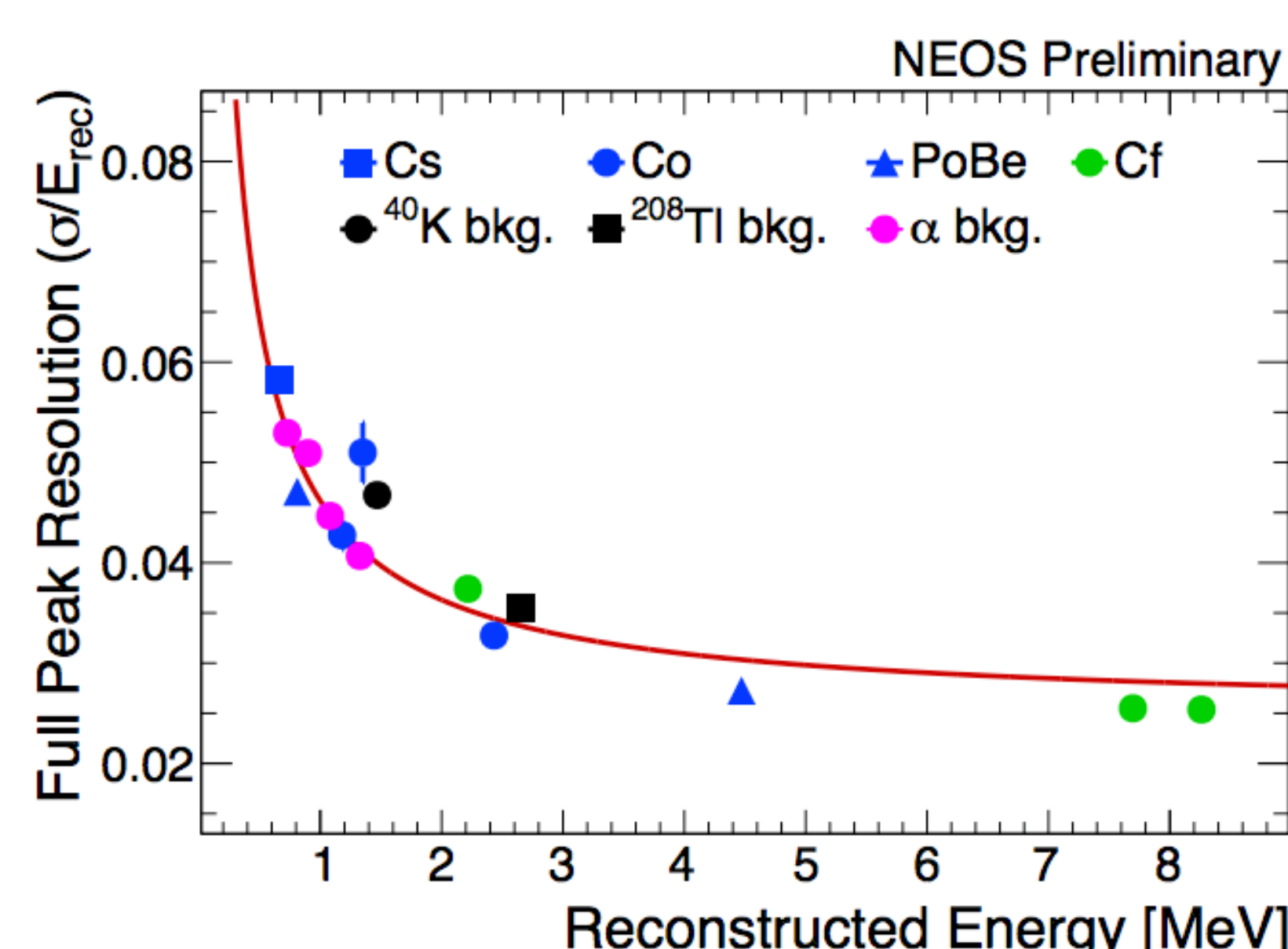
- 2×19 R5912 (8") in mineral oil.
- 12 R877-100 (5") and 18 H7195 (2") for muon detector.

Detector Responses

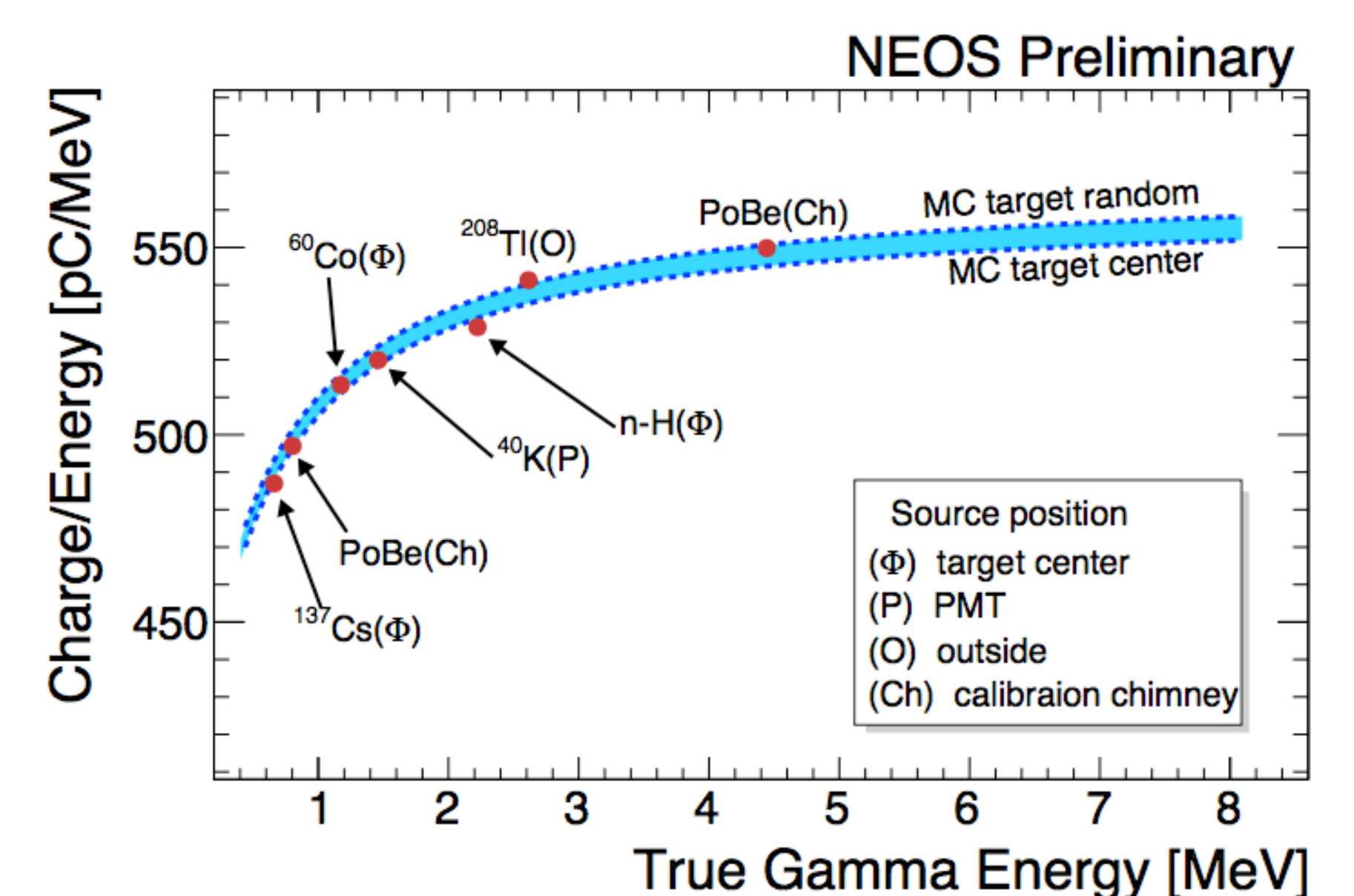
Pulse Shape Discrimination



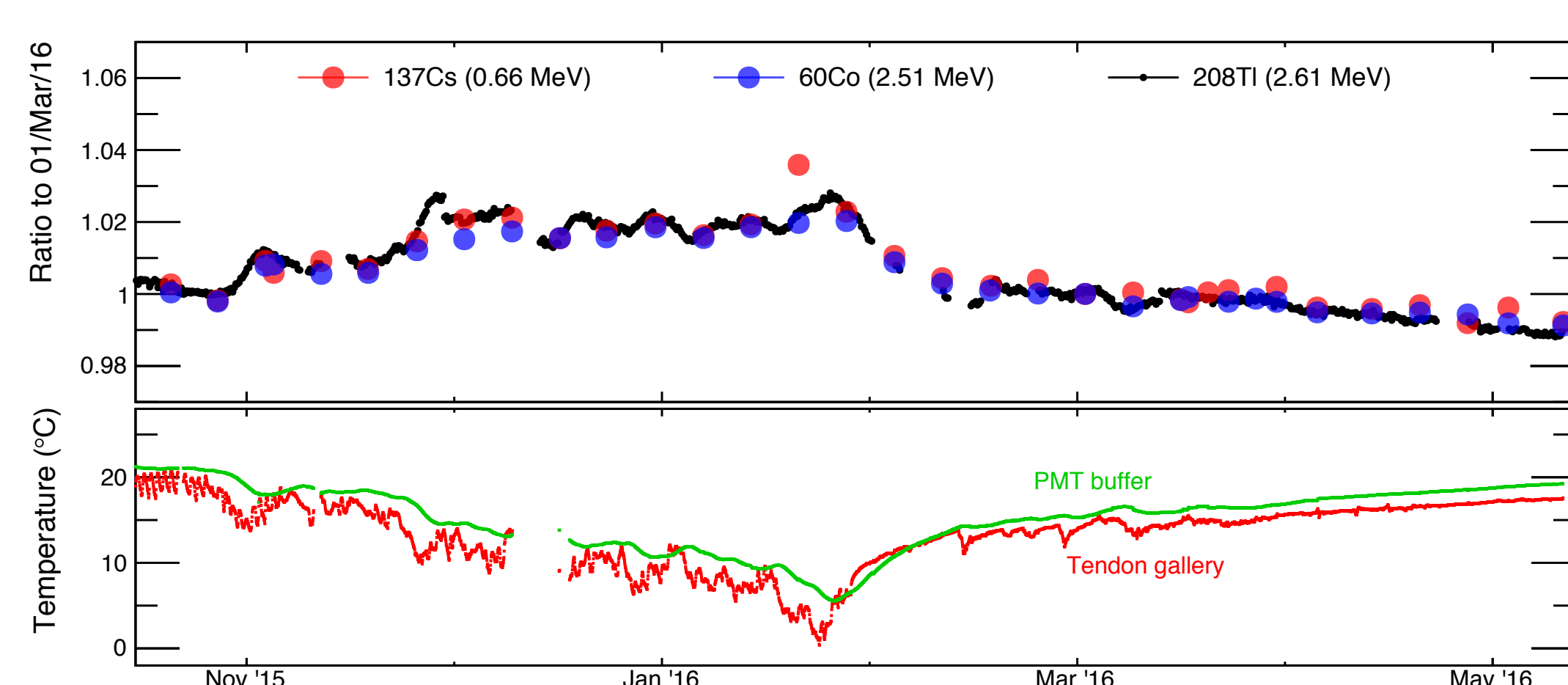
Energy Resolution ($\sim 5\%$ at 1 MeV)



Non-linearity of energy response



Correlation between Charge and Temperature



IBD candidates (on/off ratio ~ 24)

