Brookhaven National Laboratory

U.S. DEPARTMENT OF ENERGY

Synchrotron Radiation in EicRoot with a TPC -- Hit Distributions

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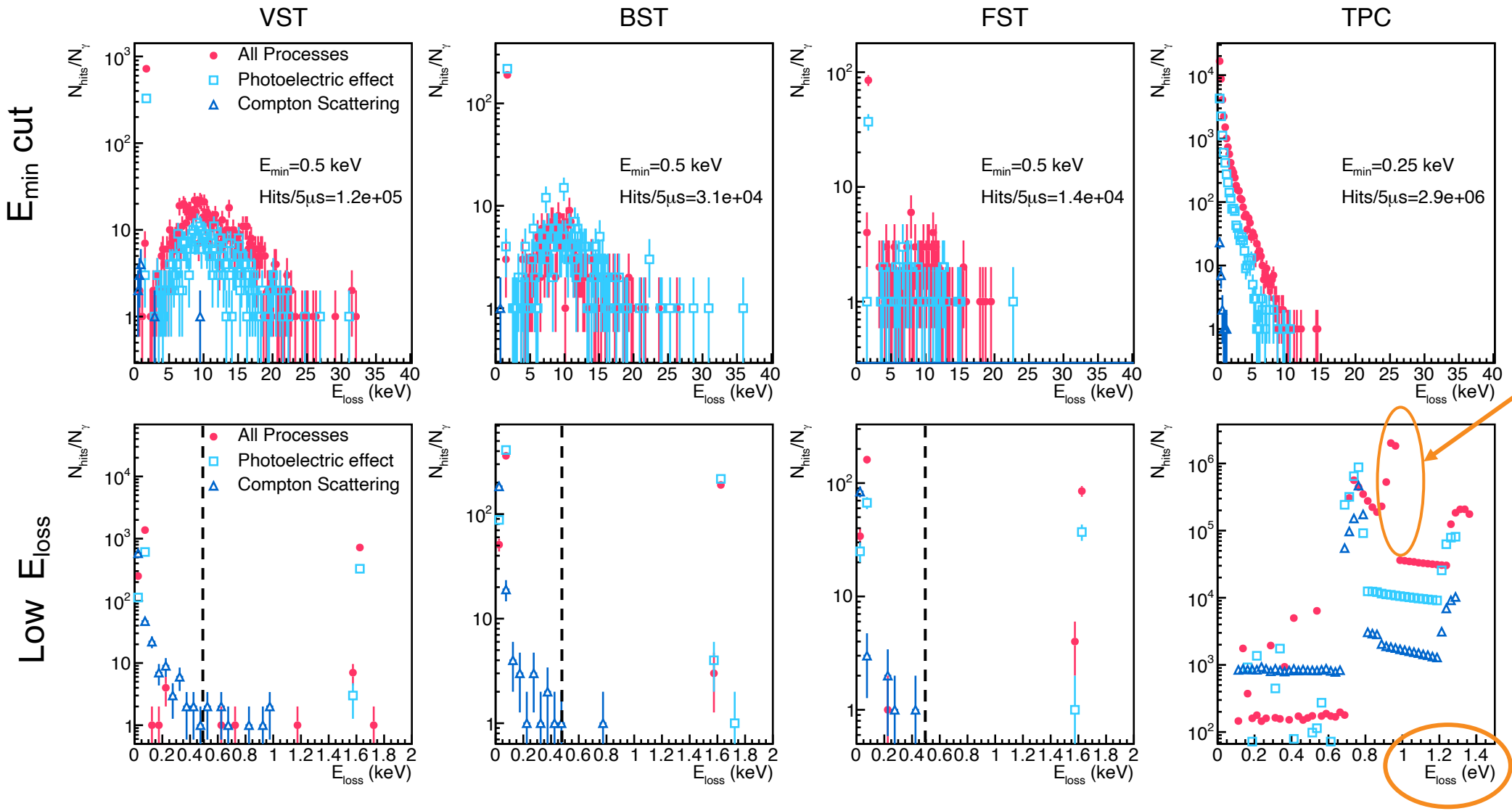
@BrookhavenLab

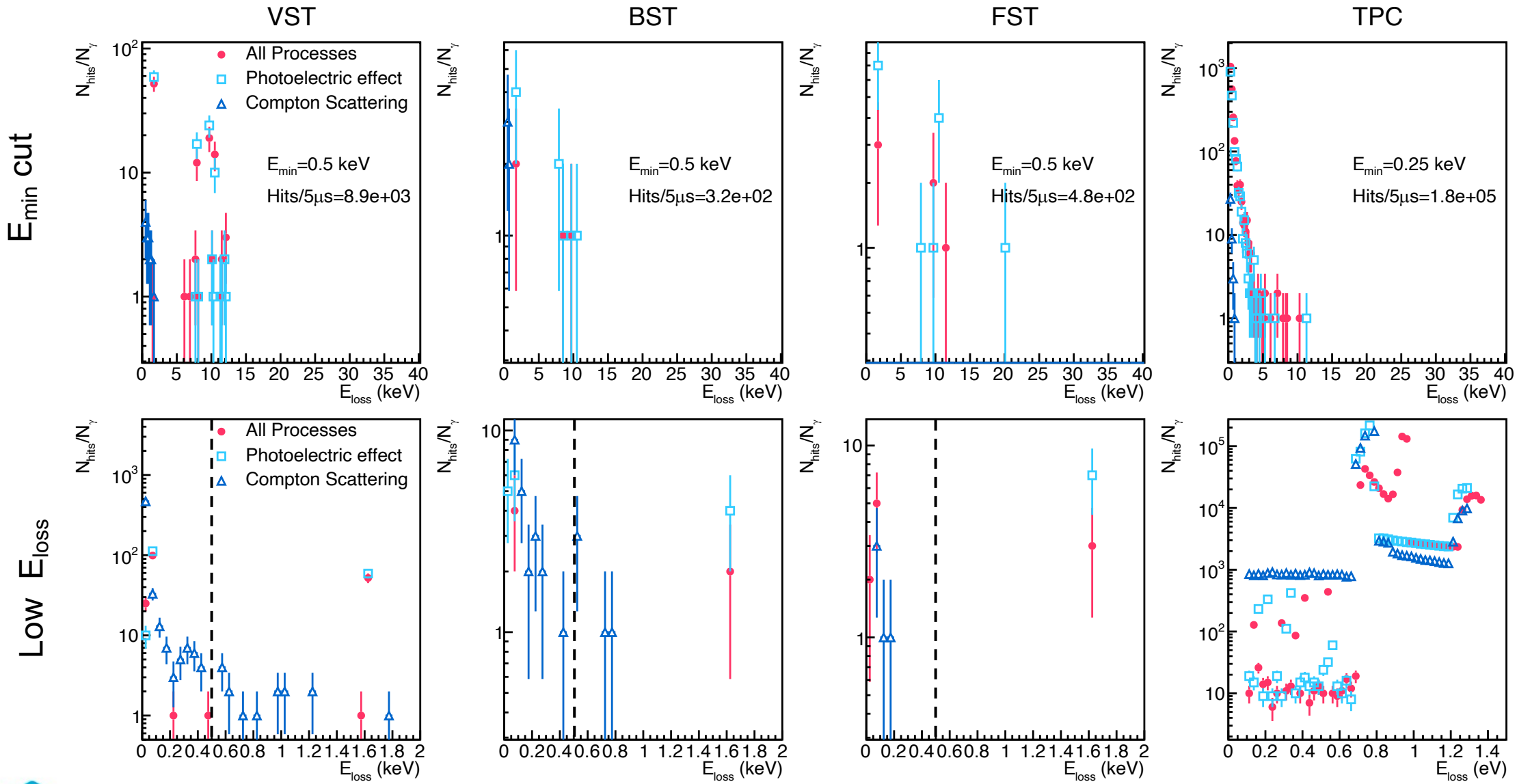
Energy Deposit



Goes away when both photo. elec. eff. and comp. scat. are turned off

w/ Gold Coating

Energy Deposit

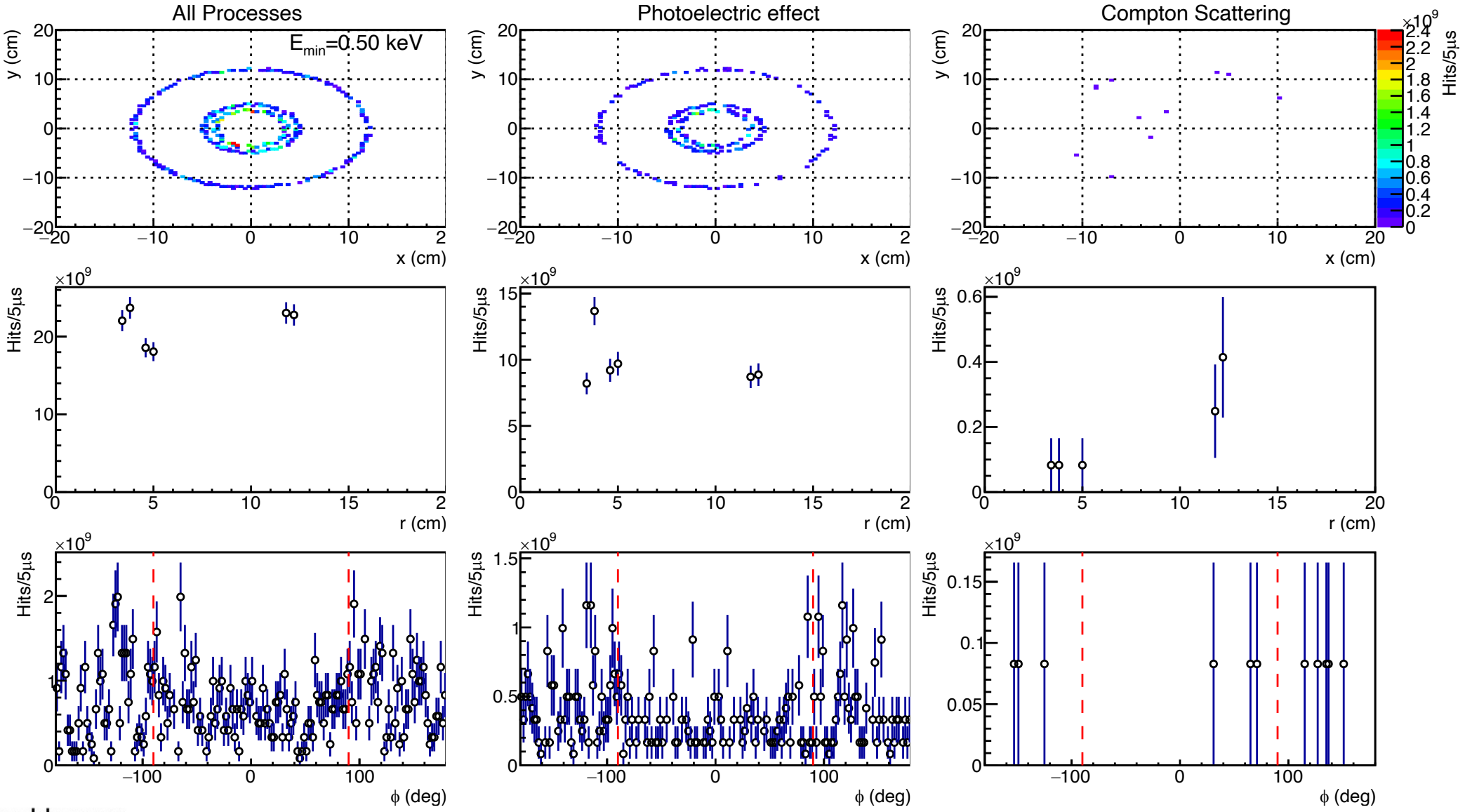


Hit Distributions

No Gold Coating on the Beam Pipe

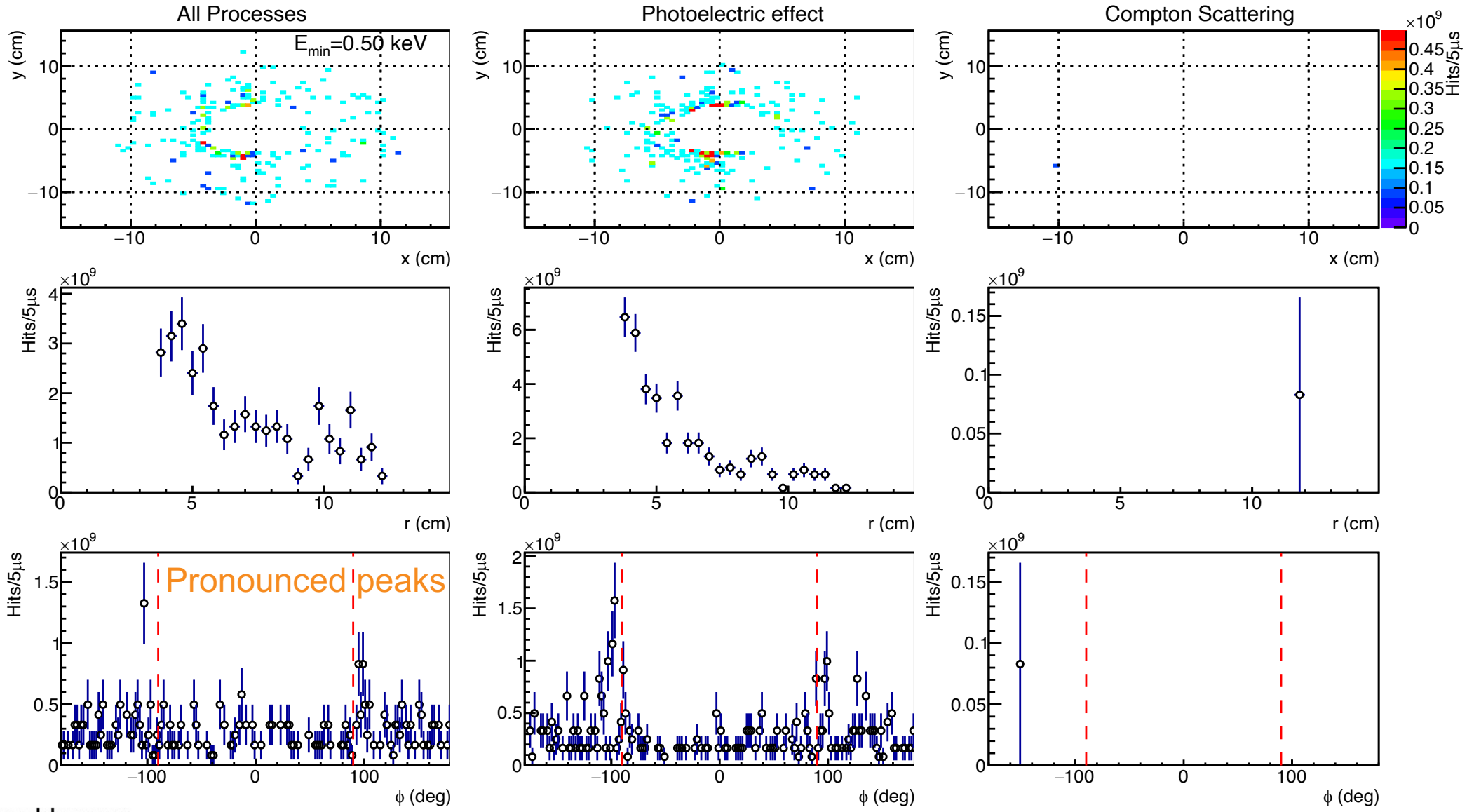
w/o Gold Coating

Secondary Electron Hit Distribution in the Vertex Layers



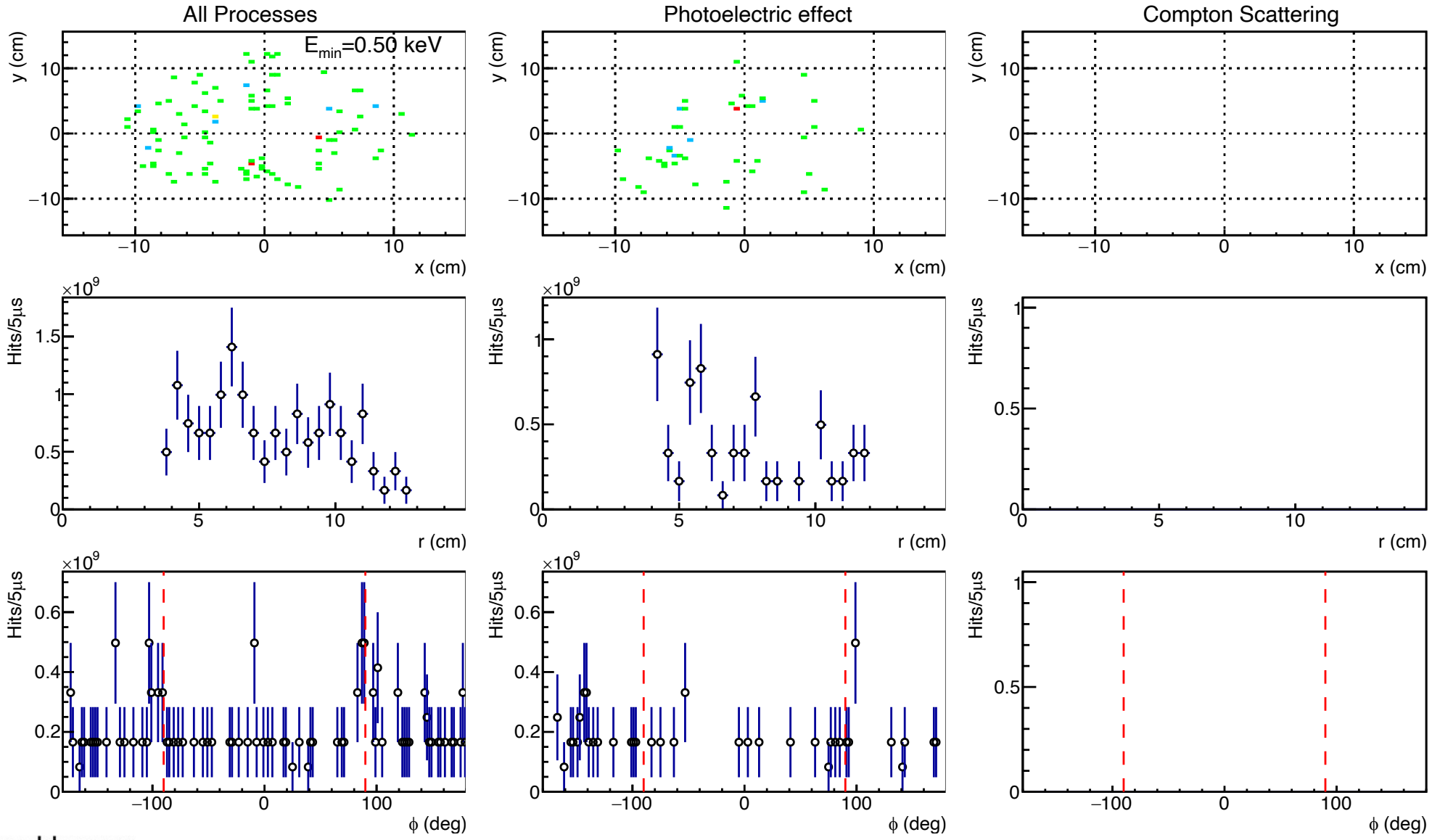
w/o Gold Coating

Secondary Electron Hit Distribution in the Backward Silicon Disks



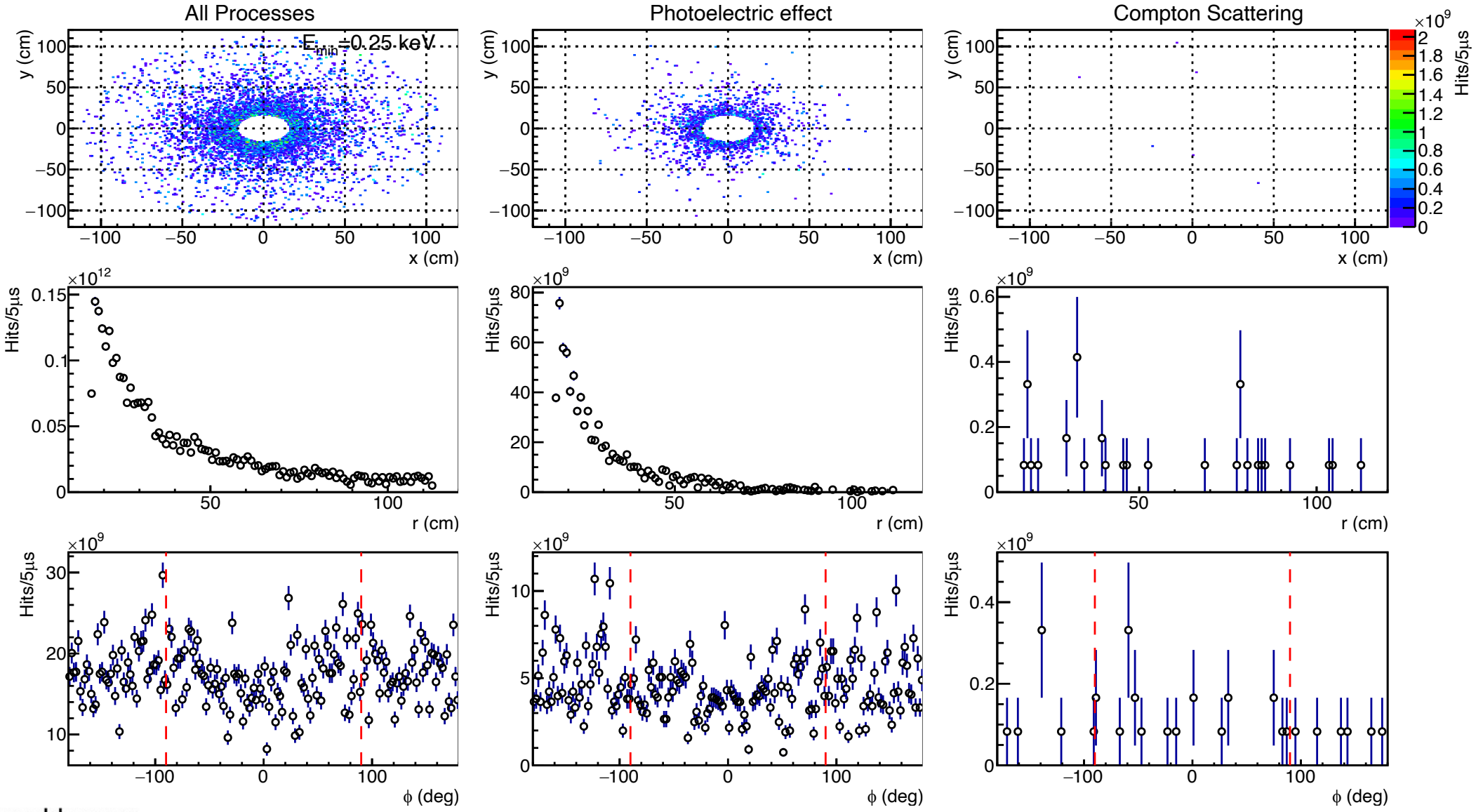
w/o Gold Coating

Secondary Electron Hit Distribution in the Forward Silicon Disks



w/o Gold Coating

Secondary Electron Hit Distribution in the TPC

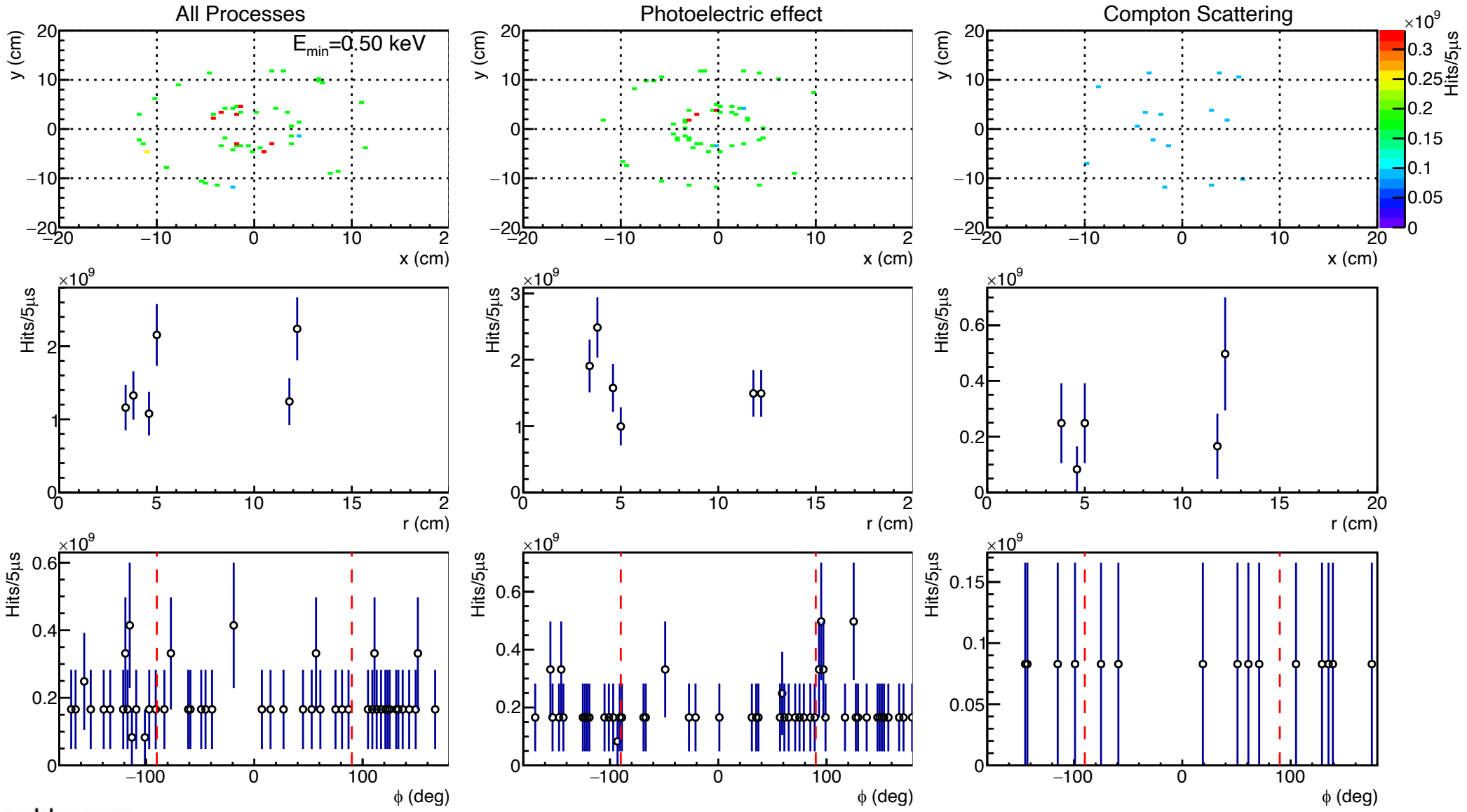


Hit Distributions

With Gold Coating on the Beam Pipe

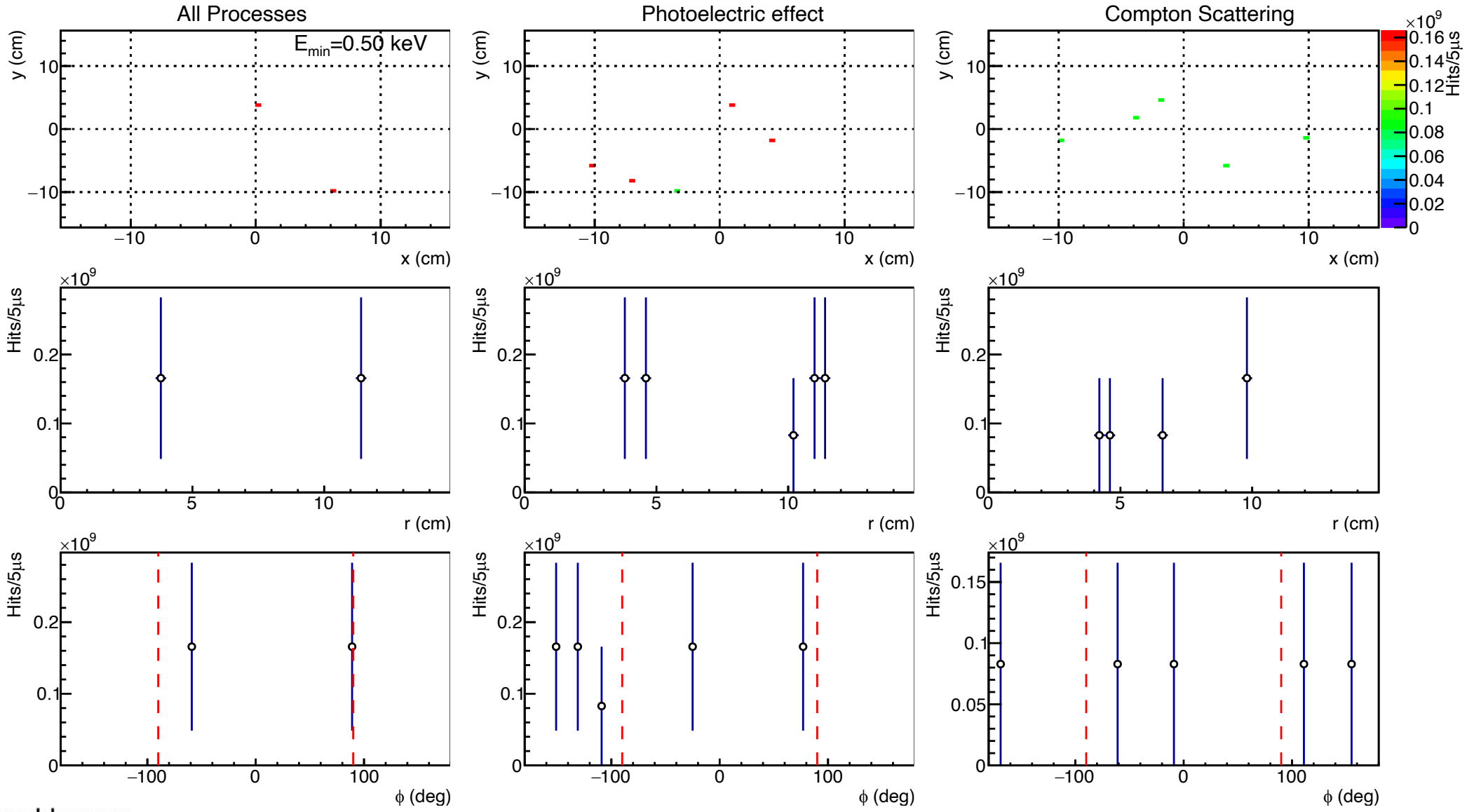
w/ Gold Coating

Secondary Electron Hit Distribution in the Vertex Layers



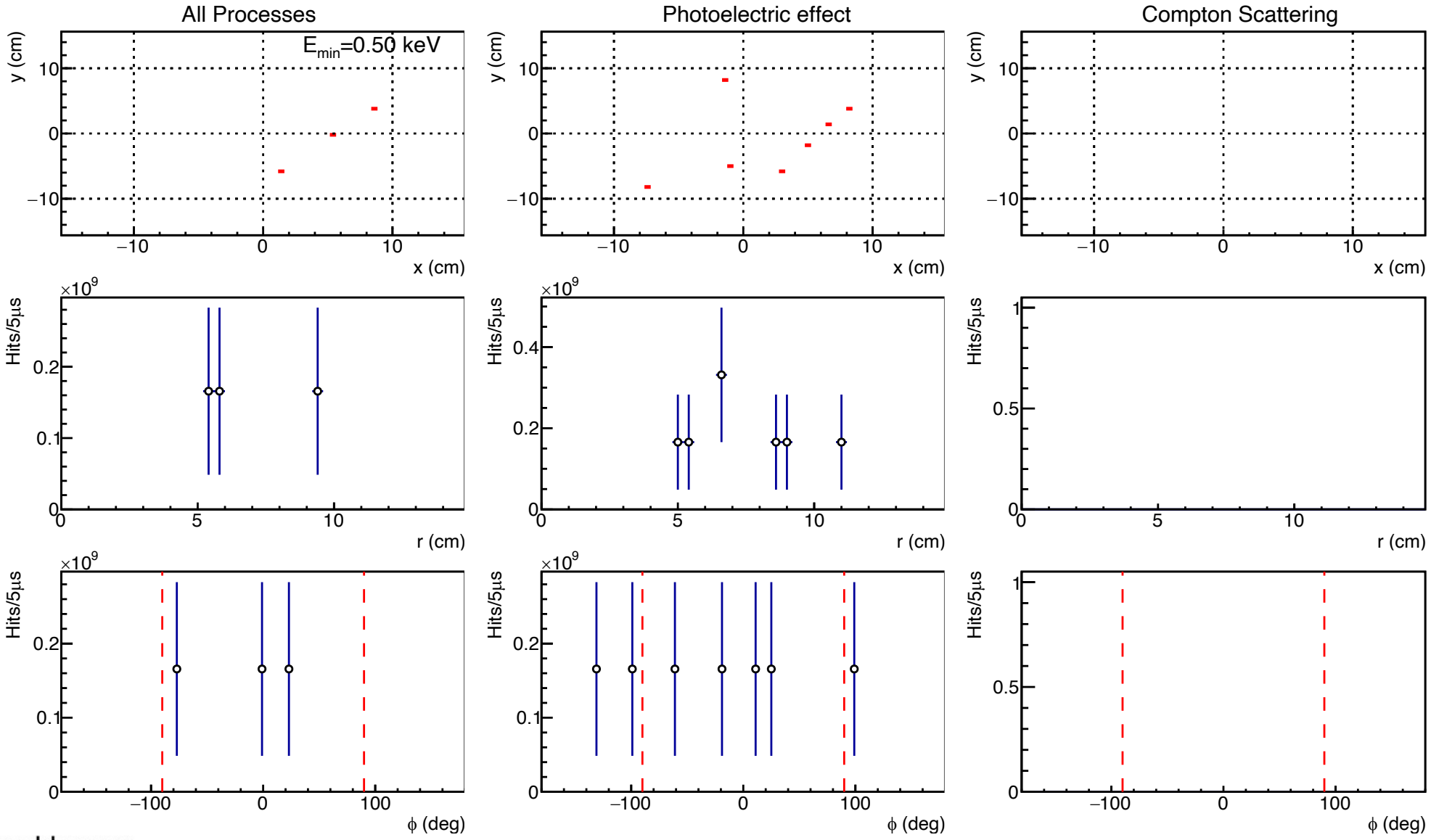
w/ Gold Coating

Secondary Electron Hit Distribution in the Backward Silicon Disks



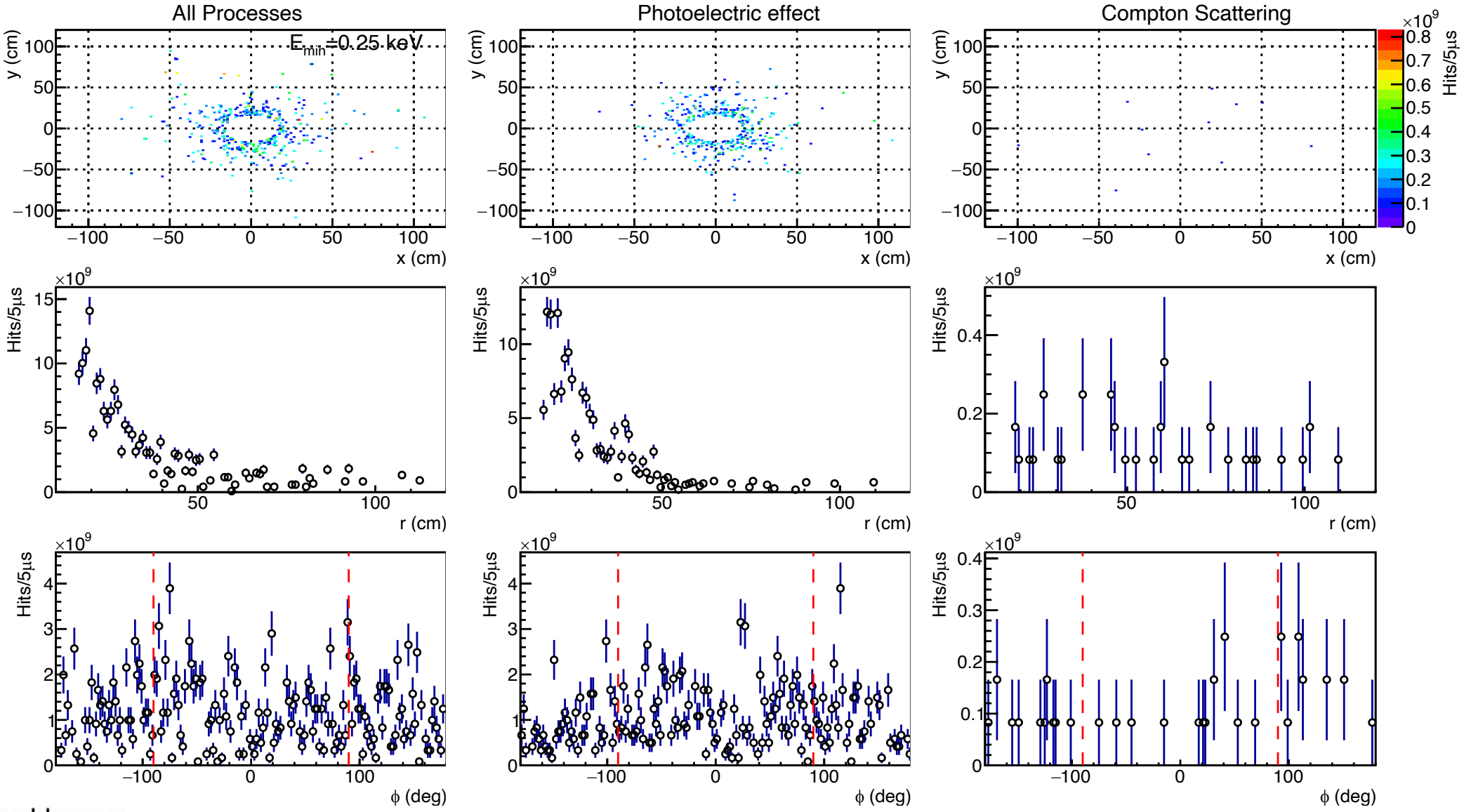
w/ Gold Coating

Secondary Electron Hit Distribution in the Forward Silicon Disks



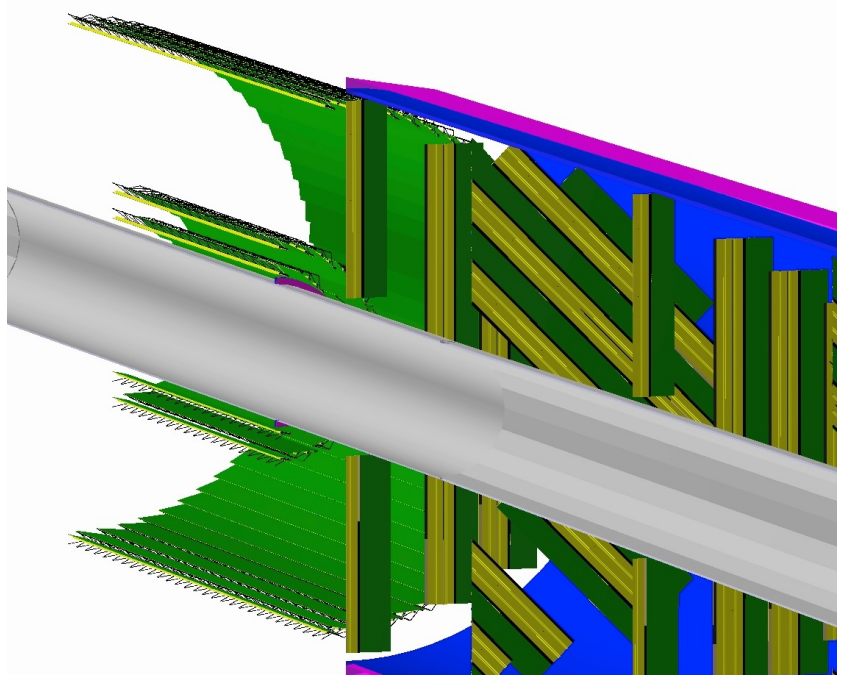
w/ Gold Coating

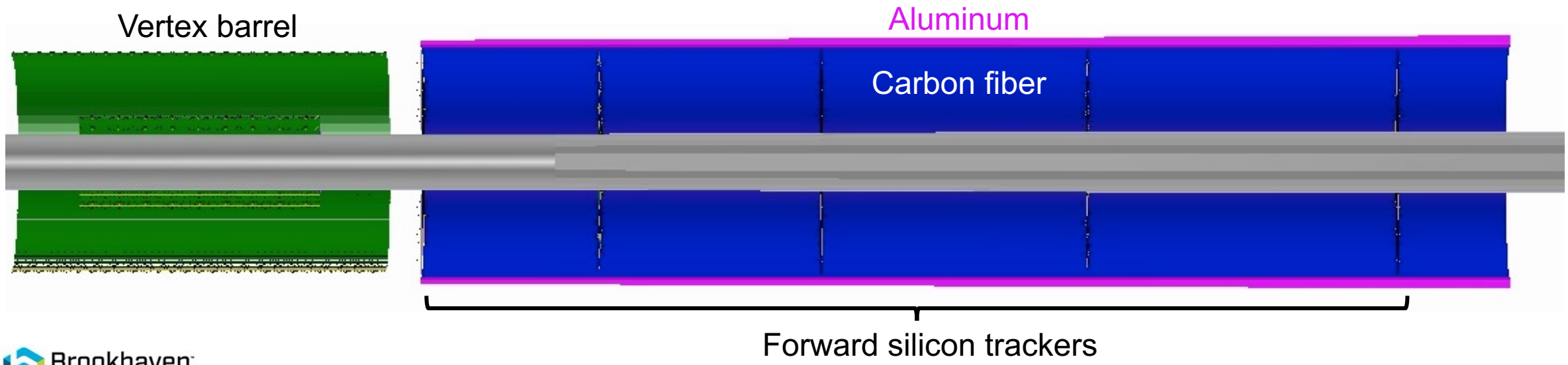
Secondary Electron Hit Distribution in the TPC



Summary

- Investigate the energy deposit spectrum for the very soft hits
- Hit distributions at different sub detectors
  - Clear hot spots at $\phi \sim \pm 90°$ found in the backward silicon trackers
- To-do
  - SR photon effects with realistic material budget: adding supporting/service structures for the inner silicon tracker
  - Beam gas
  - Angular resolutions



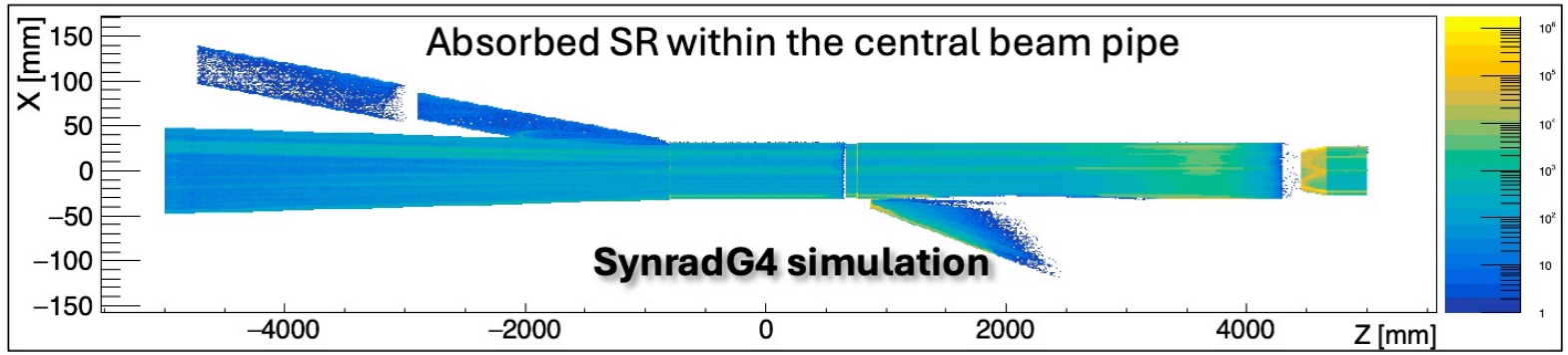


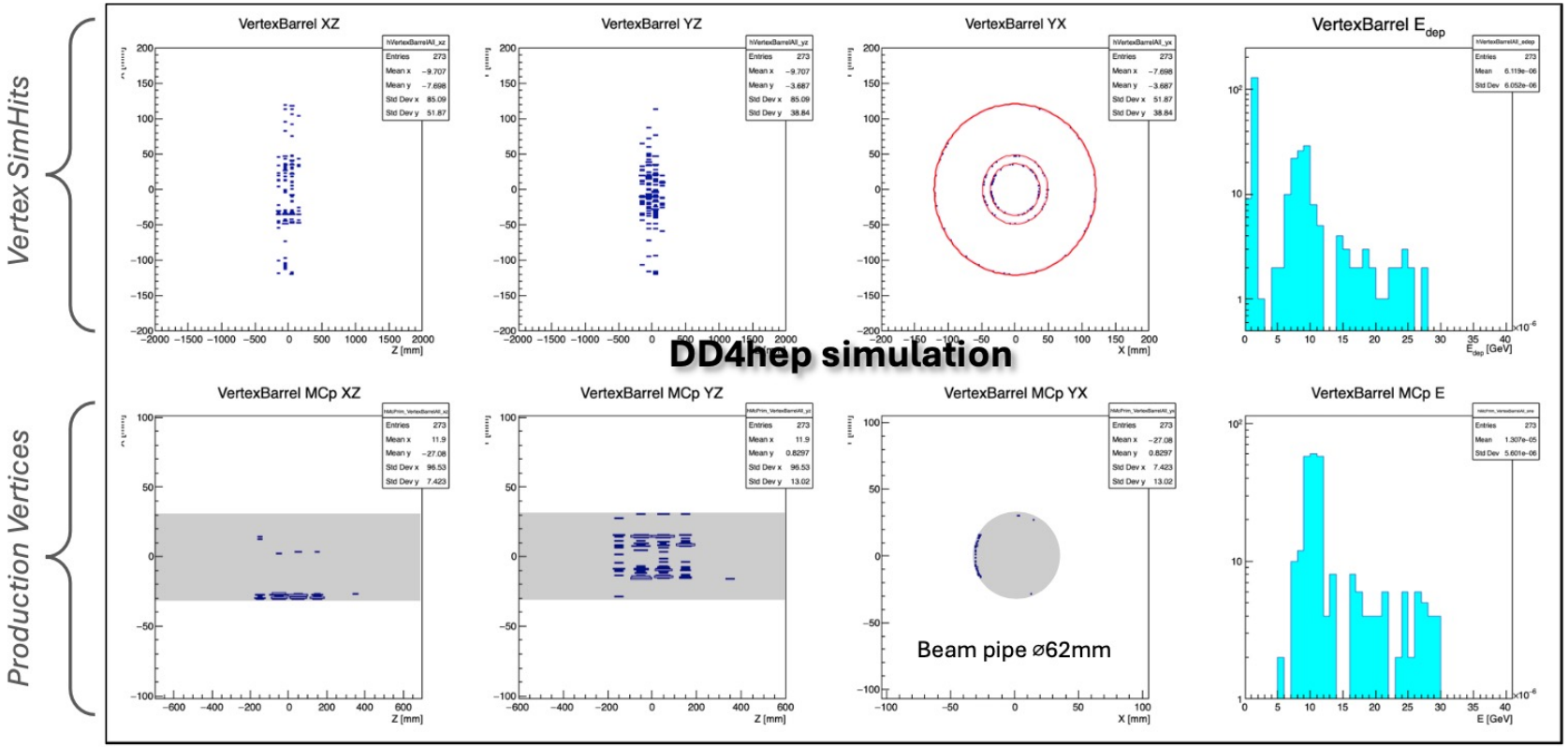
Back Up

Subtitle

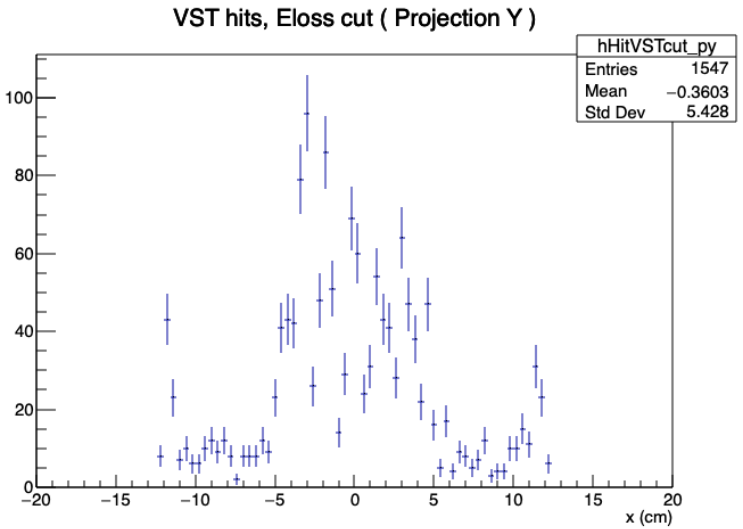
Detector Hits

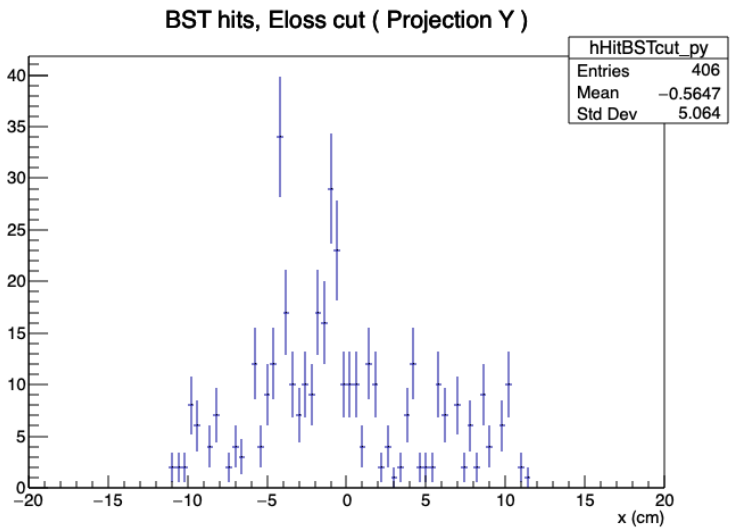
- Most of the SR will be absorbed by thick cryostat beam pipe walls.
- The tracking system sees SR photons primarily from the IP beam pipe.
- Only the SR photons with $E_\gamma > 5$ keV produce hits in the detector.

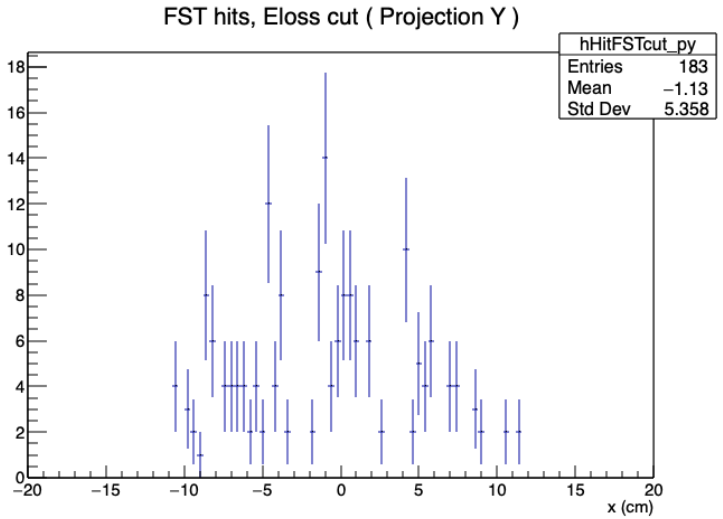


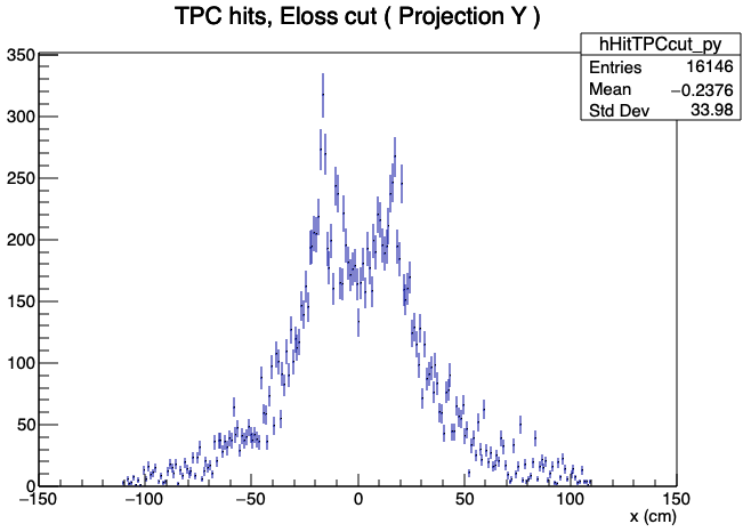


Hit x Distributions



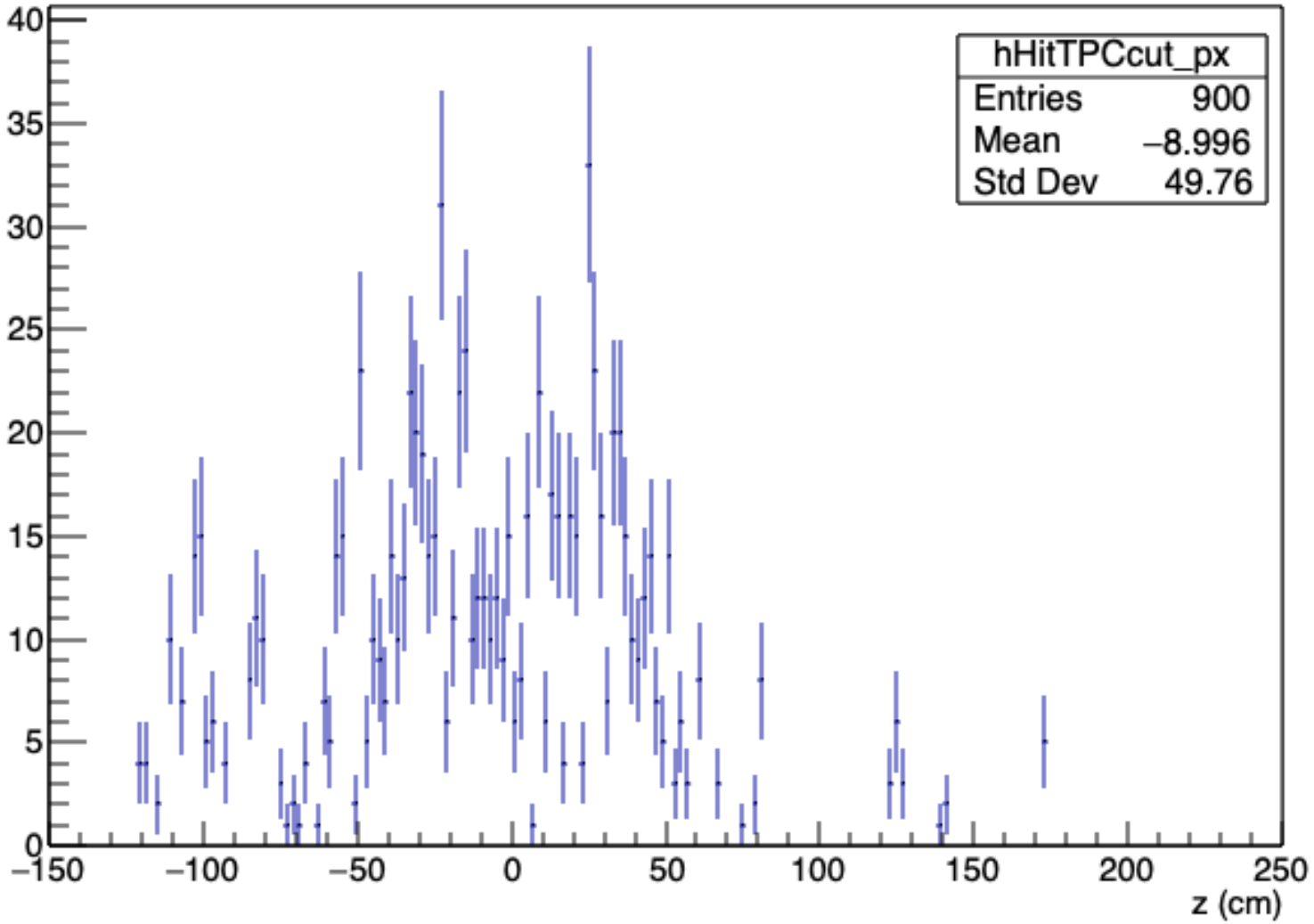






- Without the gold coating
- Emin>0.5 keV

TPC Hit z Distribution



- With the gold coating
- Emin>0.25 keV