

First Look at Synchrotron Radiation in EicRoot with TPC

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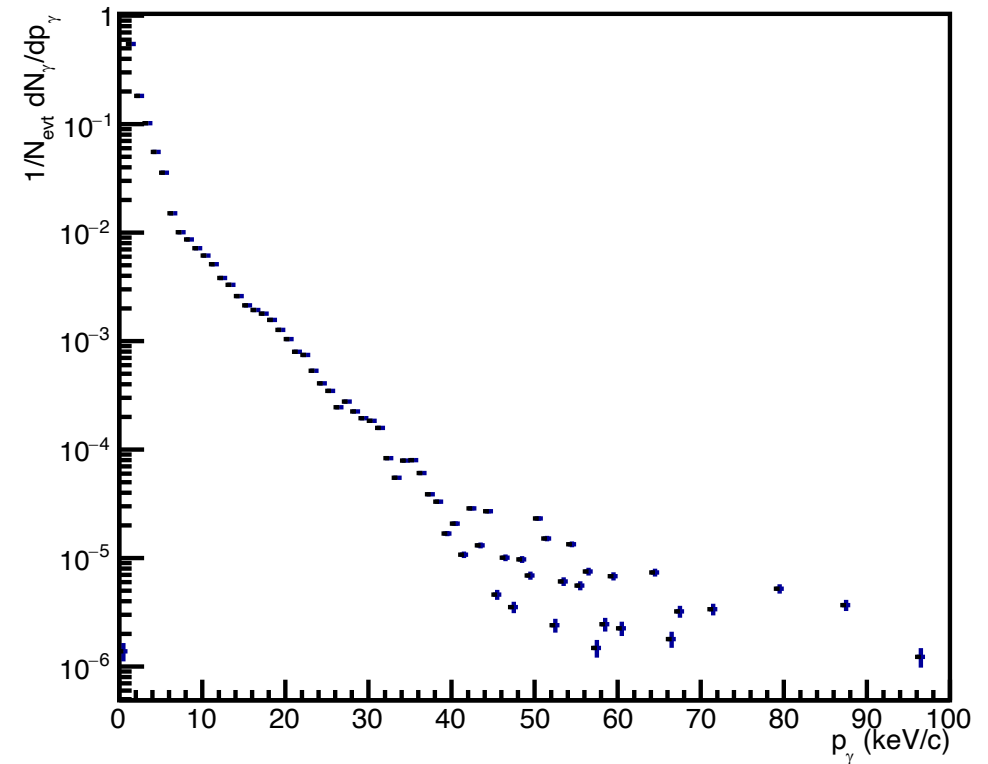
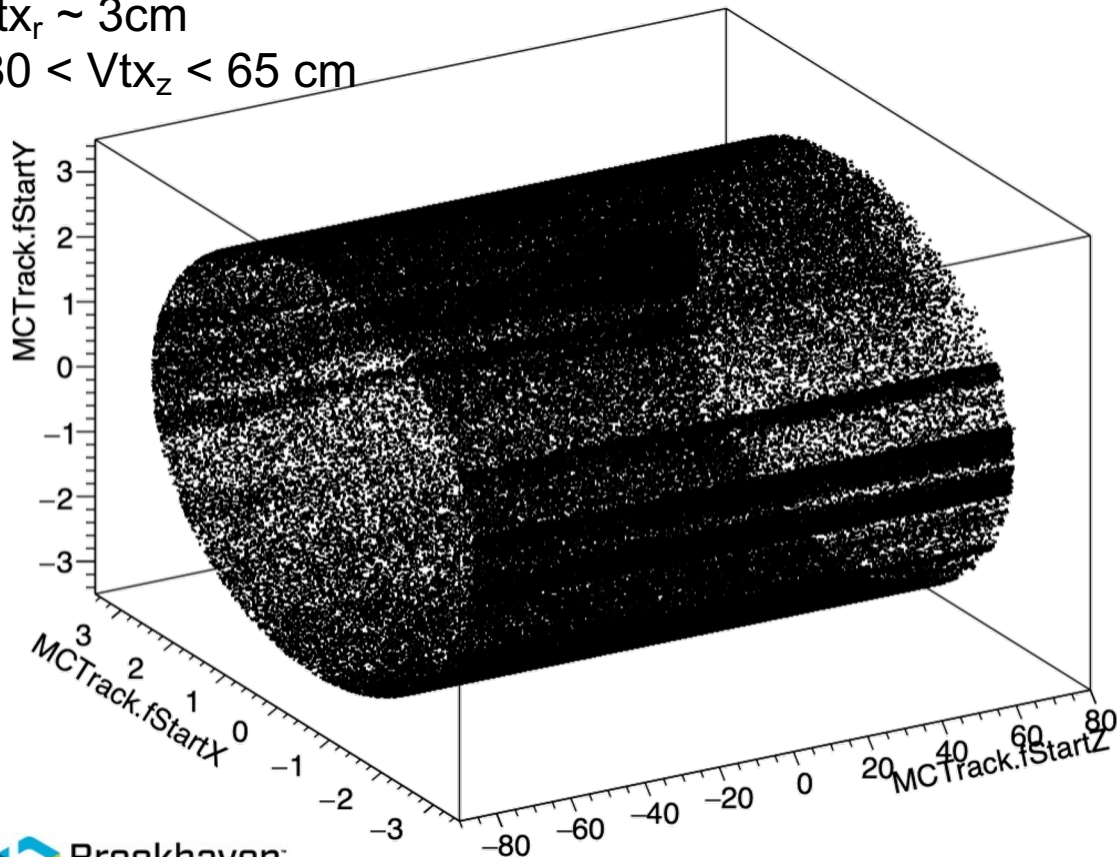
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Synchrotron Radiation Photons

- HepMC file generated by Andrii for ePIC
- 1.2M event in the HepMC file, but the EicRoot output has 19M events. [Need some debugging!](#)
- ~1 synchrotron photon per event
(For reference EIC event rate 500kHz, sPHENIX TPC readout rate 15kHz)

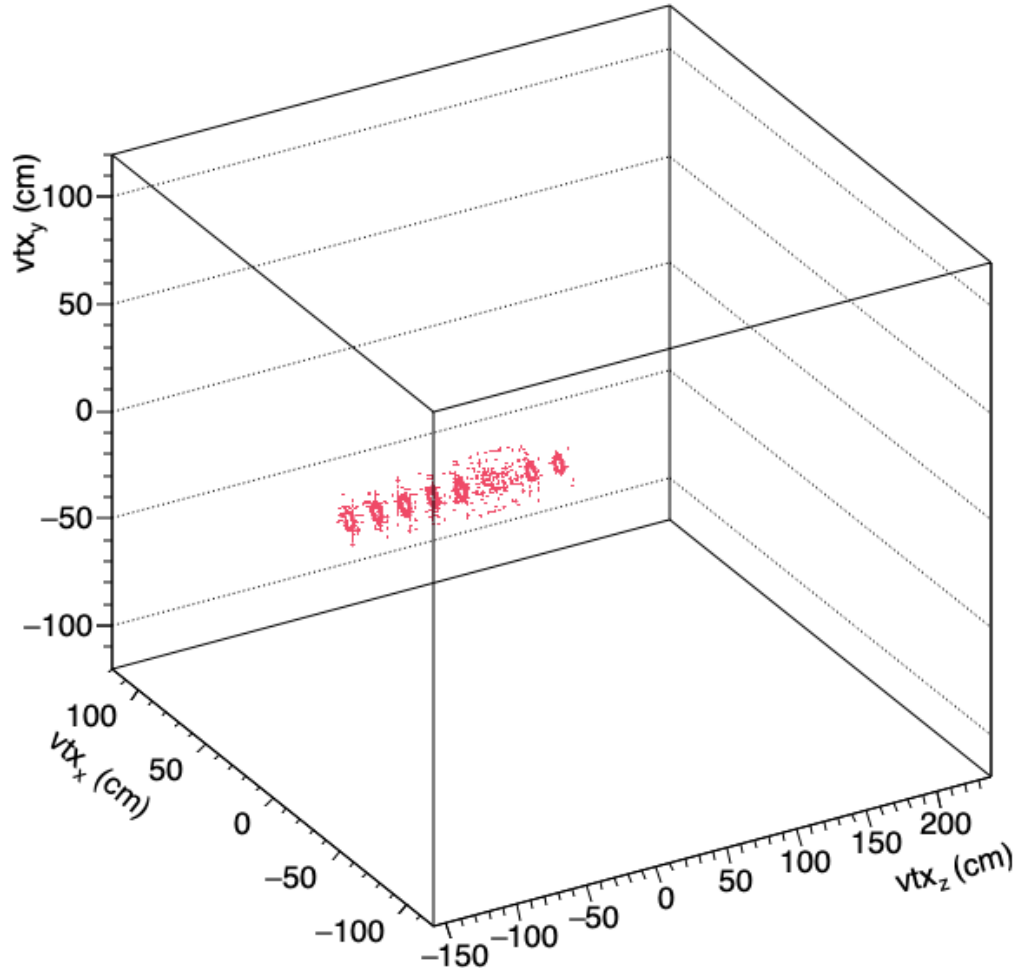
$Vtx_r \sim 3\text{cm}$

$-80 < Vtx_z < 65\text{ cm}$

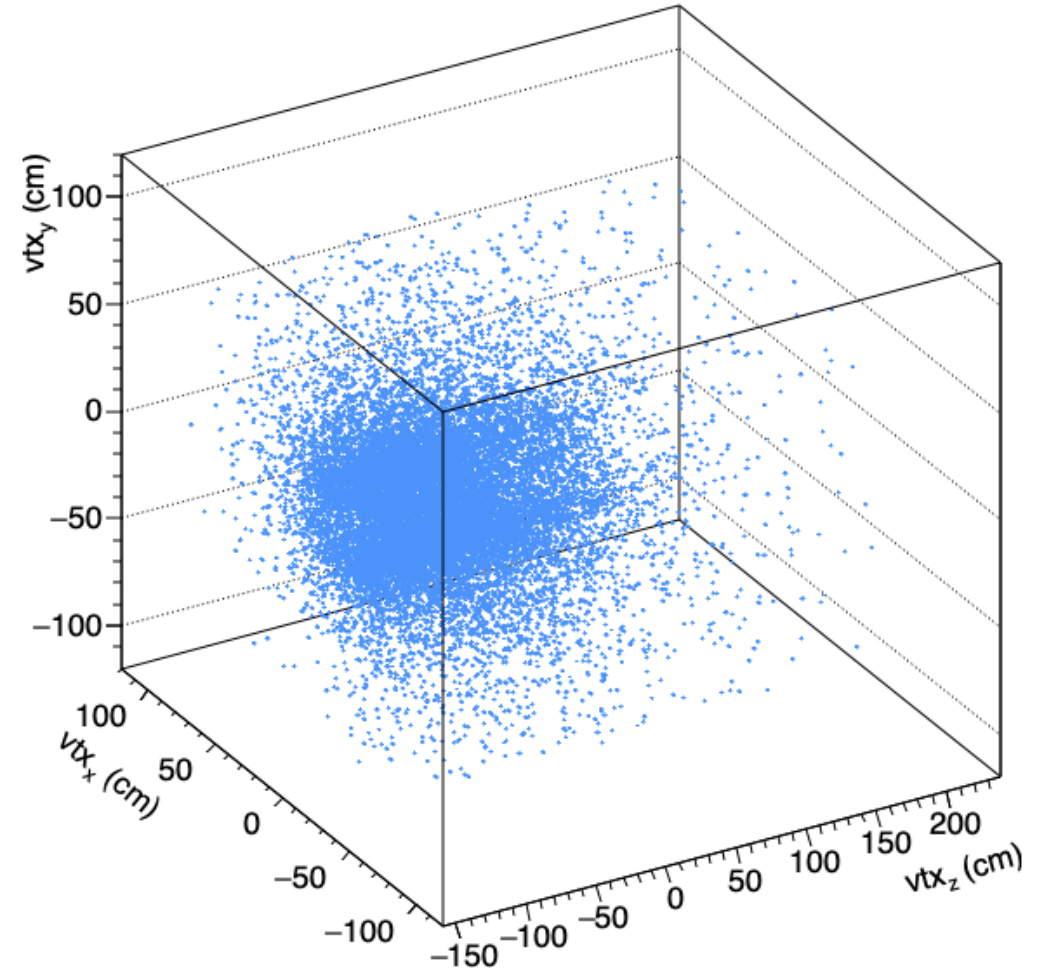


Vertex Distribution of Secondary Electrons

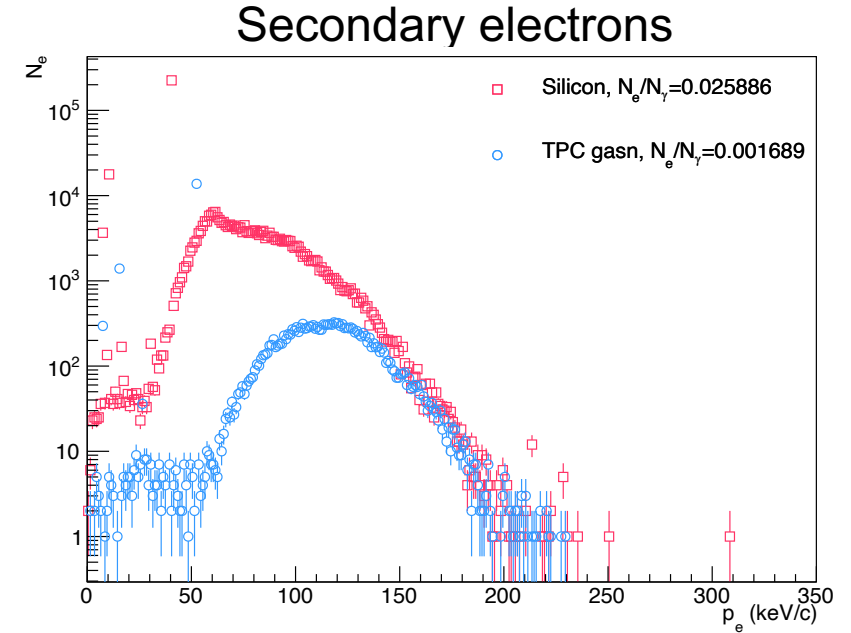
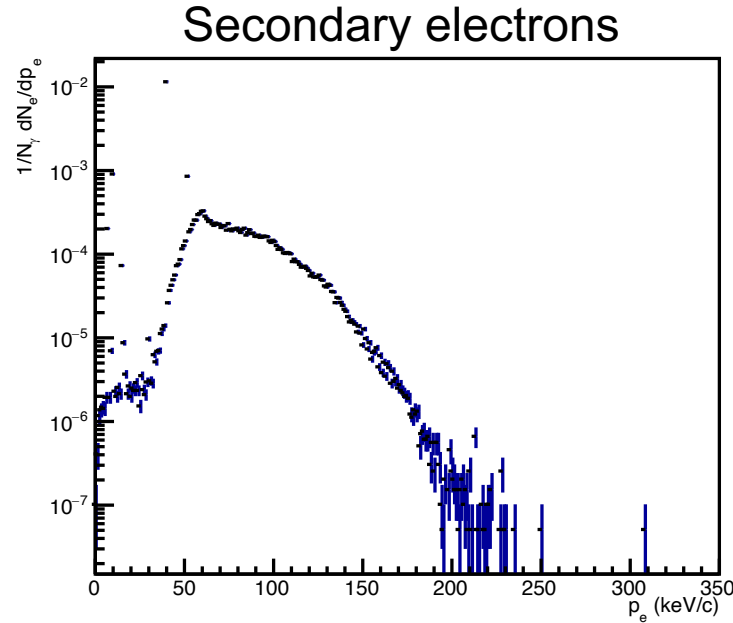
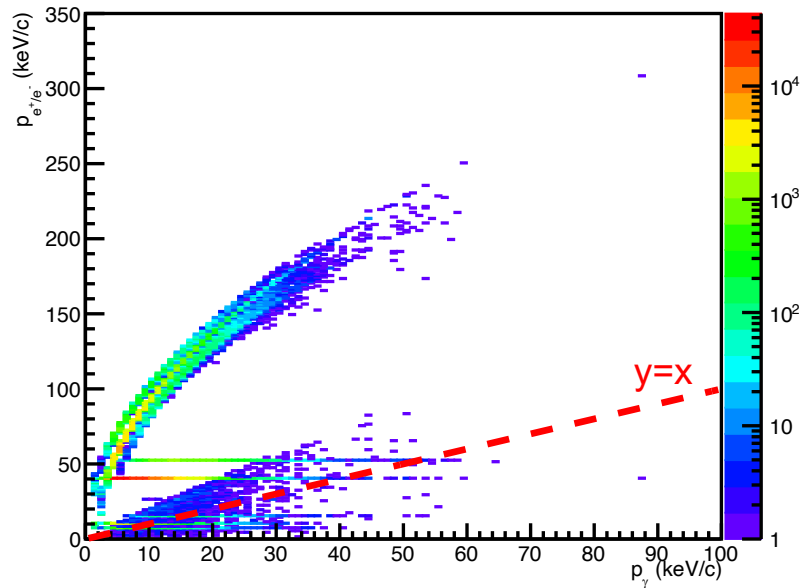
Silicon tracker



TPC

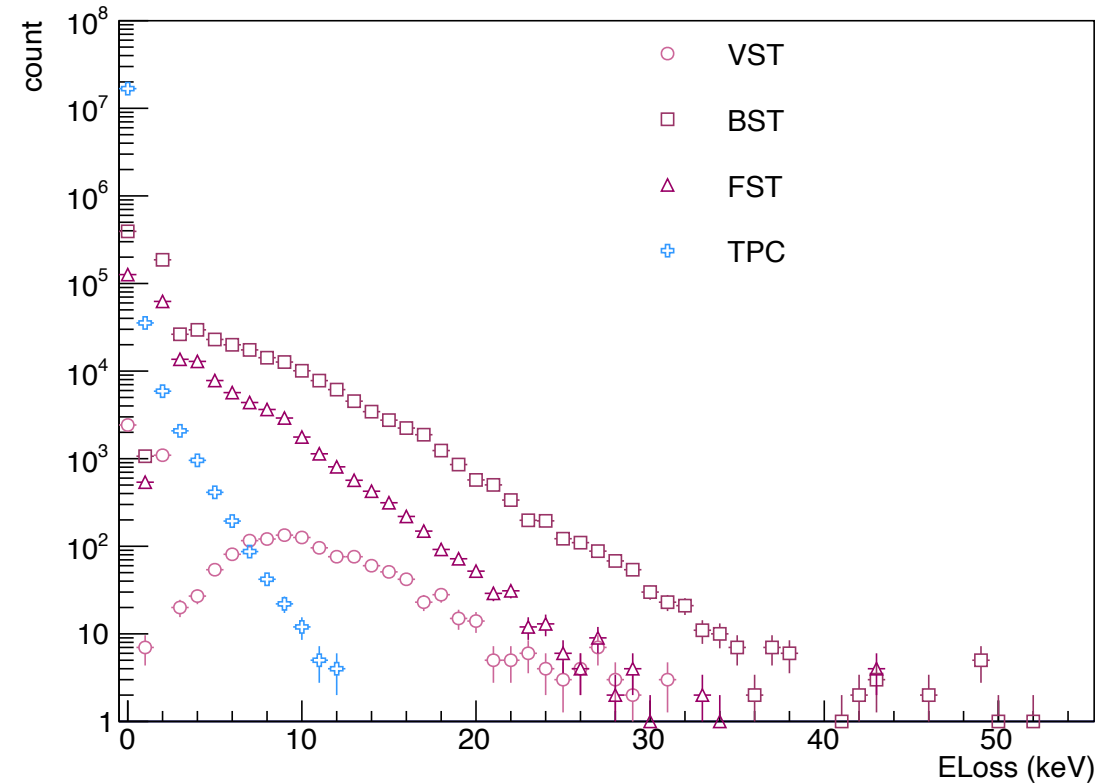
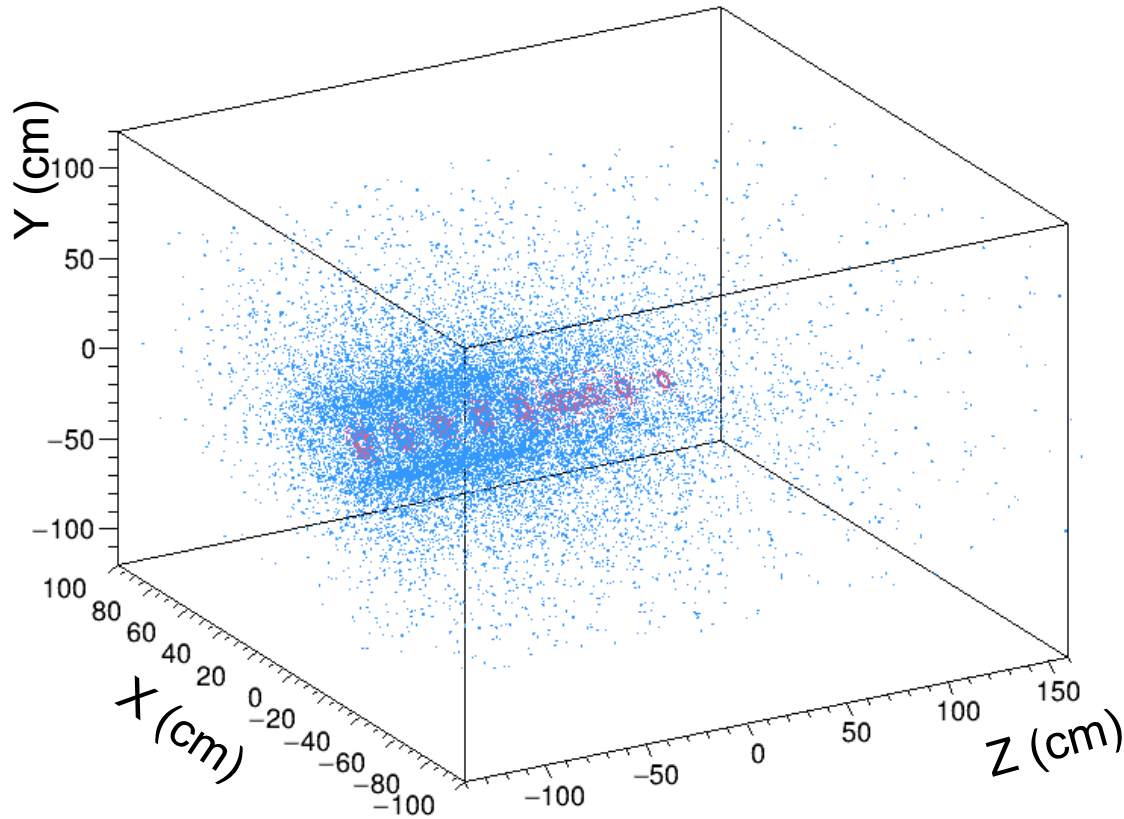


Momentum Distribution of Secondary Electrons



- Excitation line?
- Gap? Different detectors?
- Why e^- momentum is much higher than the input photon?

Hit and Energy Loss of Secondary Electrons



Summary

- First look of synchrotron radiation in EicRoot with TPC
- Synchrotron radiation photons
 - ~1 photon per event
 - Energy < 100 keV
- Secondary electron from synchrotron radiation photons
 - <3% chance of secondary electron generated from synchrotron radiation photons
 - Initial momentum up to 300 keV
 - Energy loss peak at 1-2 keV, and up to 50 keV in the silicon tracker
 - Energy loss peak at 1-2 keV, and up to 10 keV in the TPC
- Need some debugging!