Week 3 Review

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ZDC Simulation Review Week 2

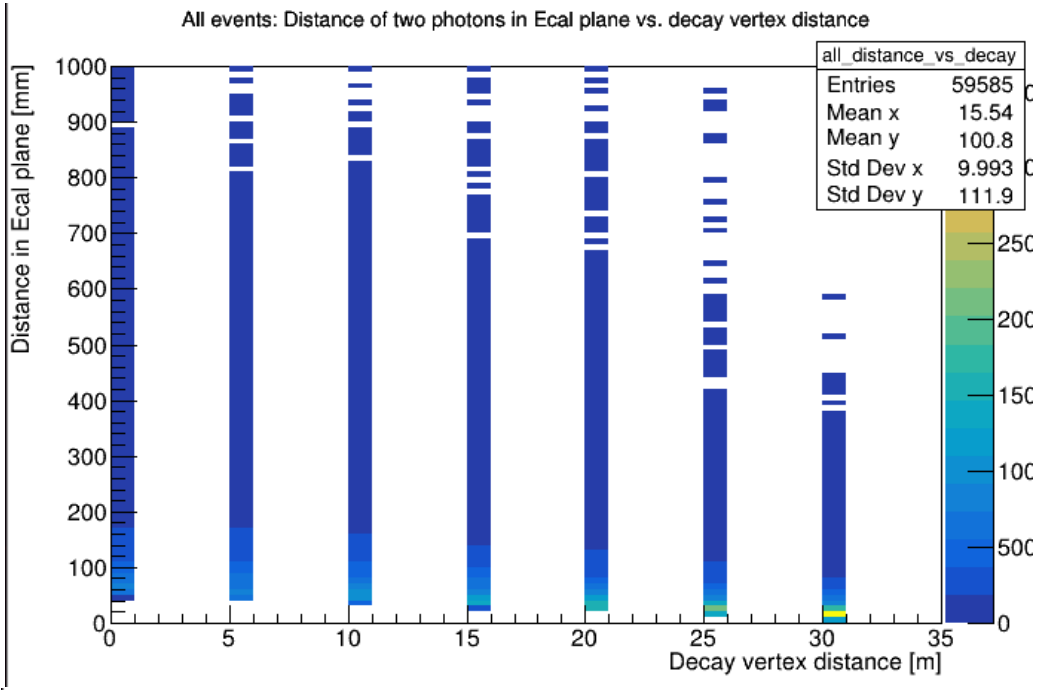
- Generated 3D hitmaps for simulated data for different particles to visualize what the hits in the ZDC look like
- Located and were able to edit both the old and new ZDC geometry files
- Objectives were to work on photon angle study and see how the location of pion (along the proton beampipe) affects the distance between the photons

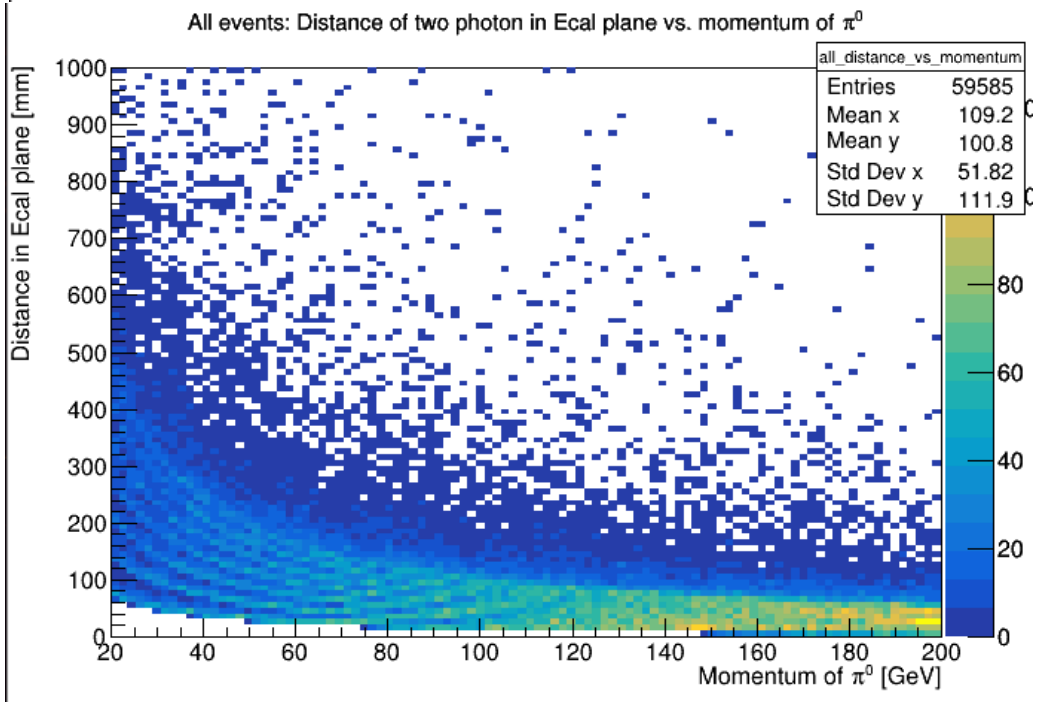
ZDC Simulation: Simulation and Visualization

- Problem with simulation software that only particles in tracking region had MCParticle information
- Fixed by extending tracking region: we can now observe complete showers of lambda in the ZDC
- Found a way to force simulation software to produce only lambda->pi0+n
- Started work with EIC software team to display simulated data on new ePIC visualization software Firebird
- This should allow us to visualize the difference in showers between ZDC with WSi and without

ZDC Simulation: Pion Distance Study

- Created pions (20 to 200 GeV) at 5m intervals along the p beam pipe (0m, 5m, 10m, 15m, 20m, 25m, 30m)
- The distance of the two gamma in ecal plane vs pion energy and vs pion decay distance





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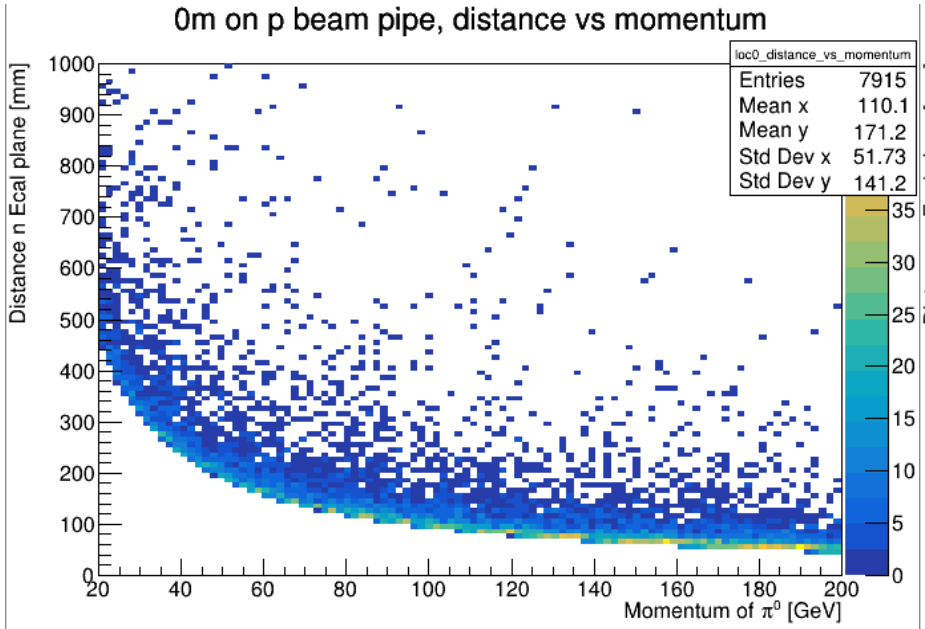
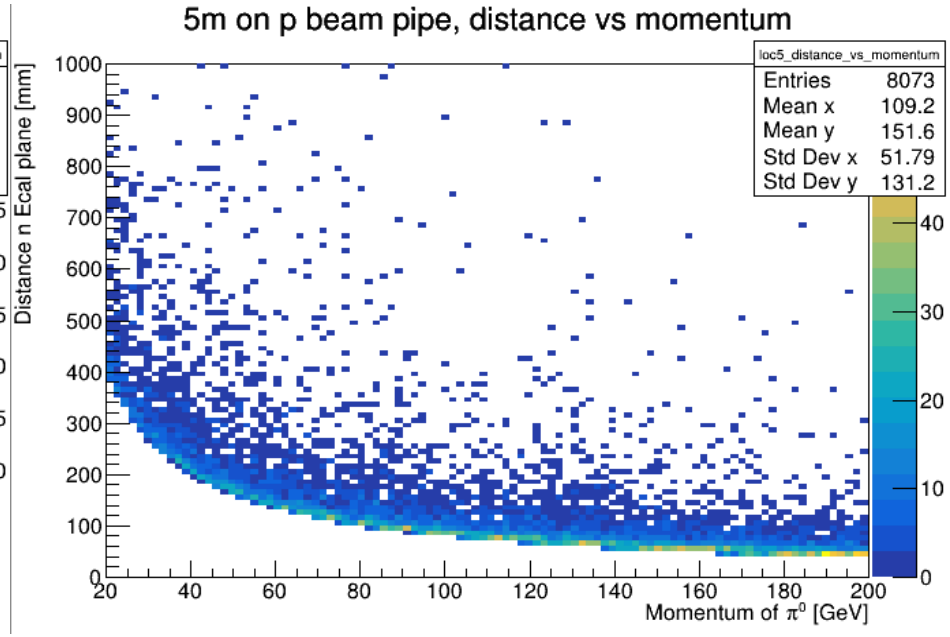
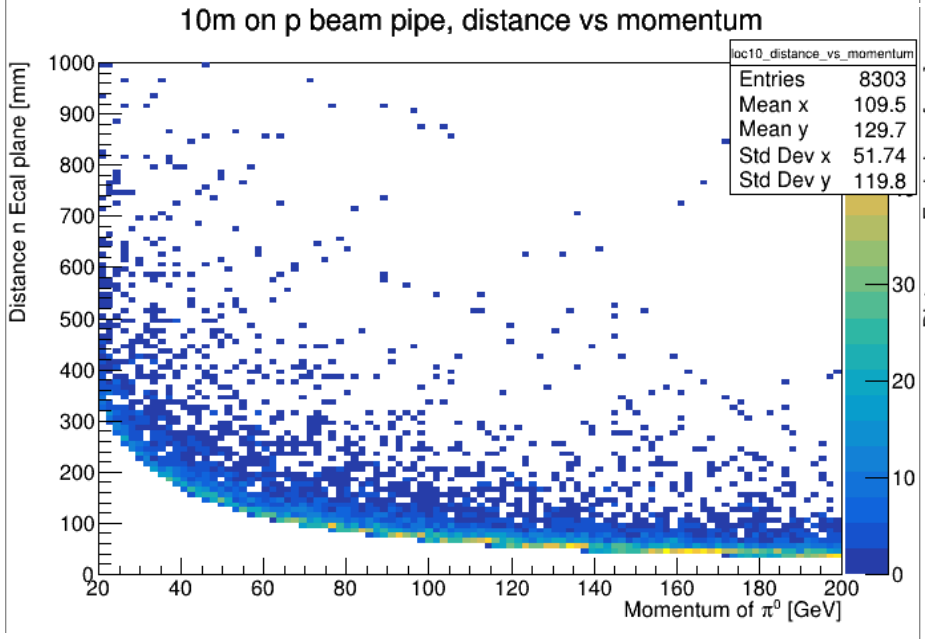
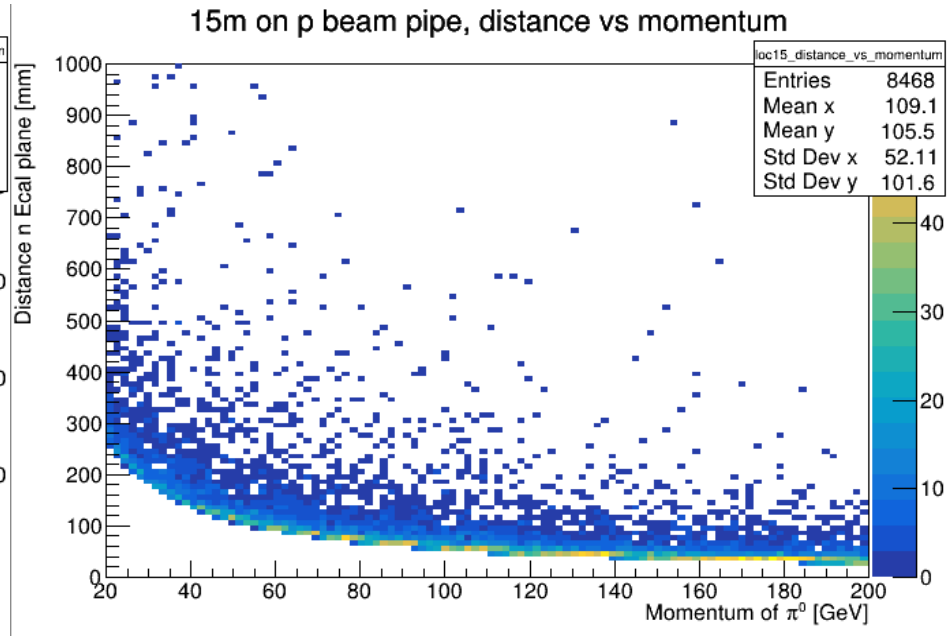
Pion Plots 1









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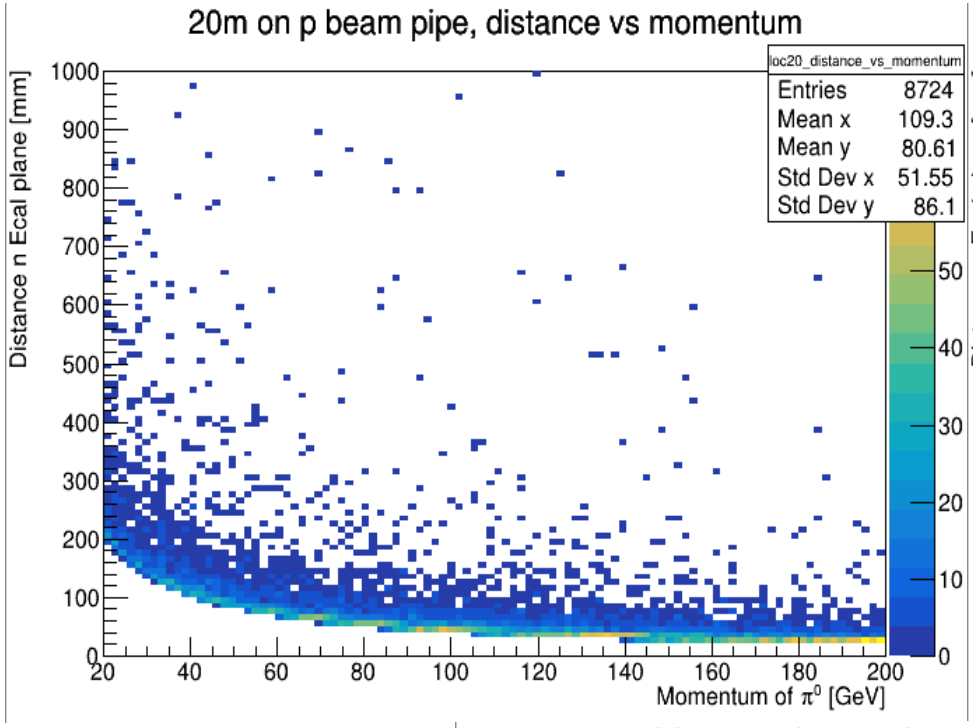
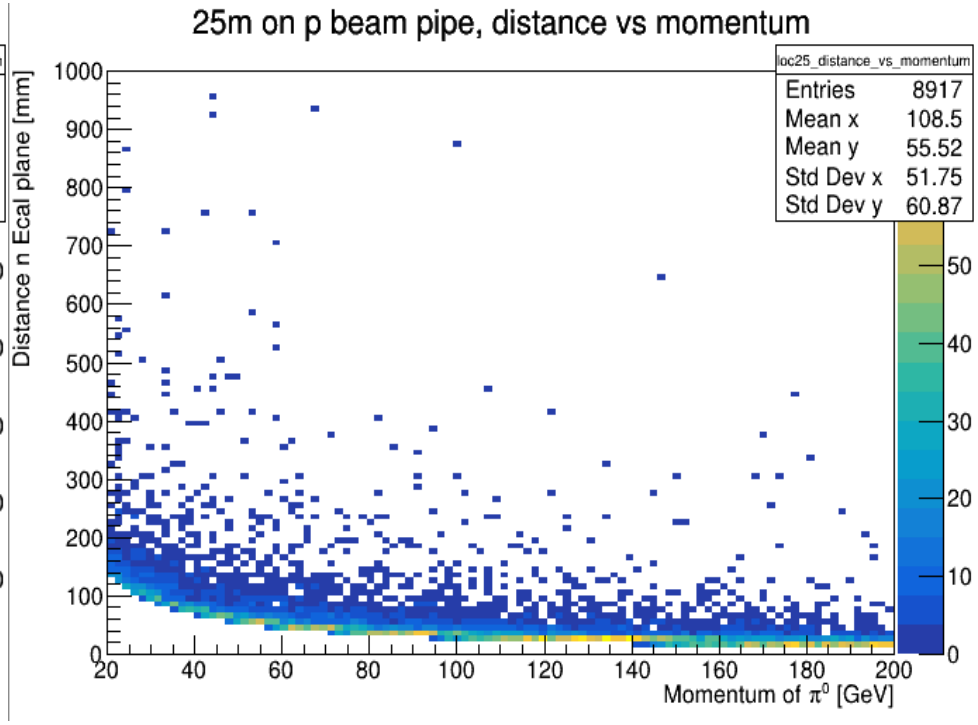
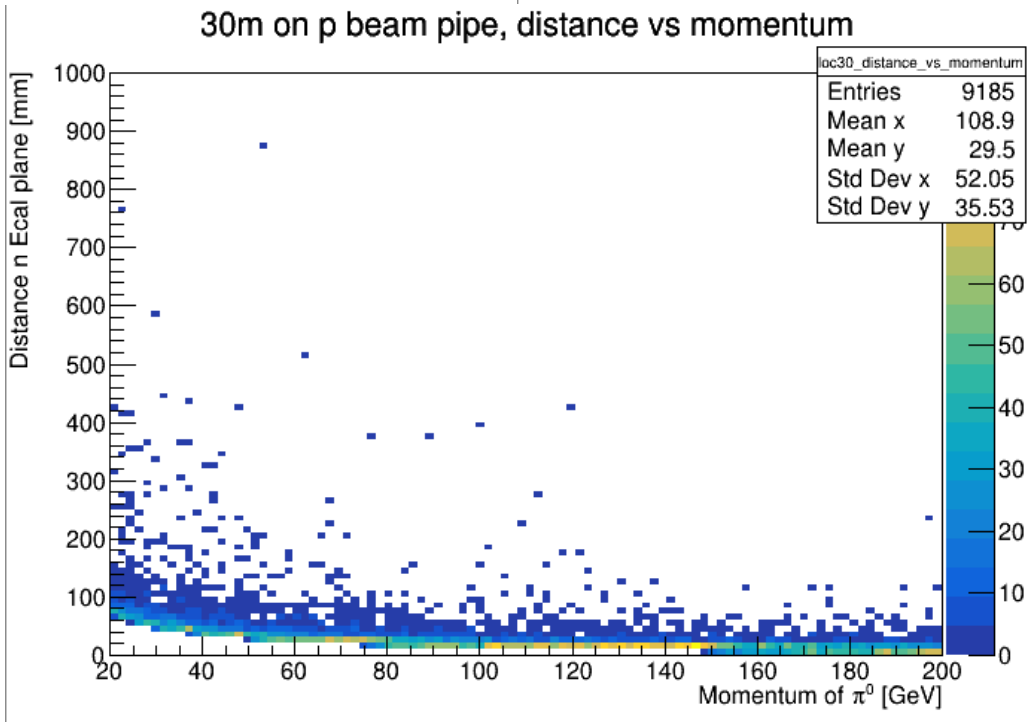
Pion Plots 2







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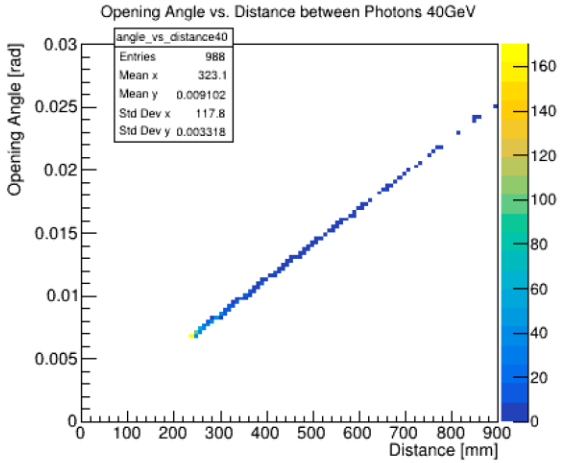
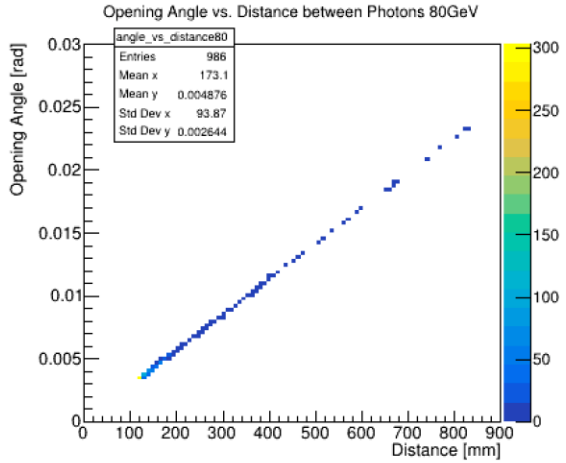
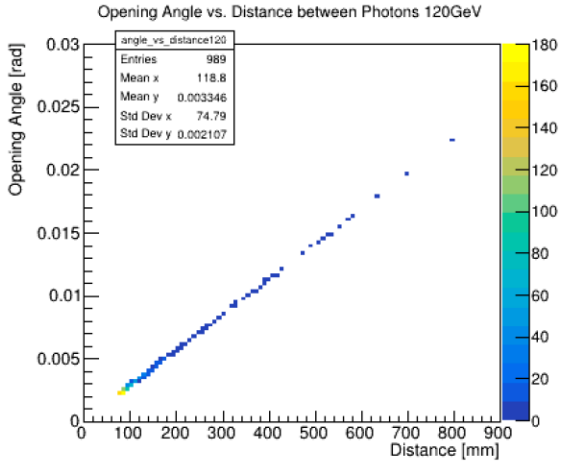
ZDC Simulation: Photon Angle Study

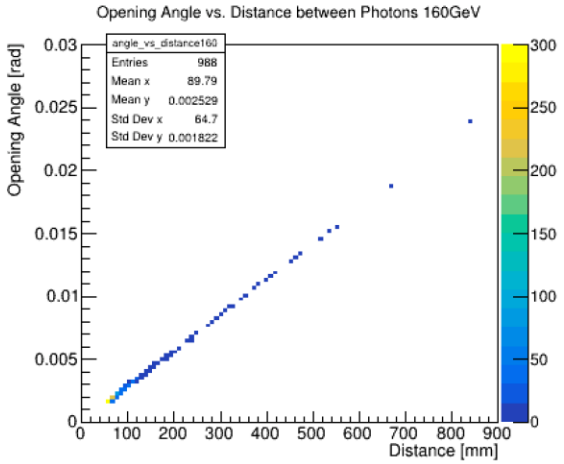
- Simulated pion events with momentum ranging from 40-200GeV to see relationship between the opening angle of the photons and the pion momentum
- As expected, the higher the pion momentum the closer the photons are so the more difficult it is to distinguish between the clusters
- Based on simulated Lambda data though (see in a later slide) the pion is not expected to have very high momentum so we should be able to distinguish between the clusters

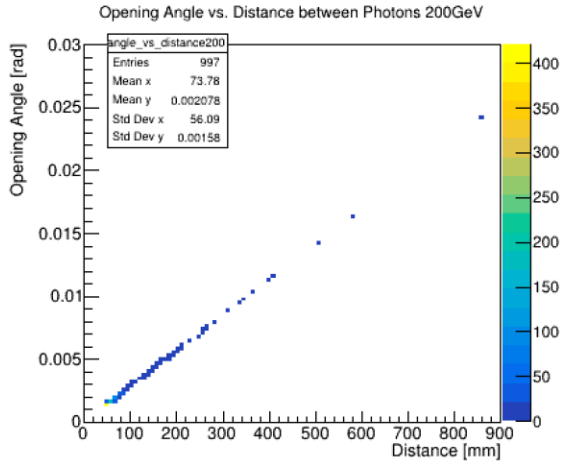
ZDC Simulation: Photon Angle Study











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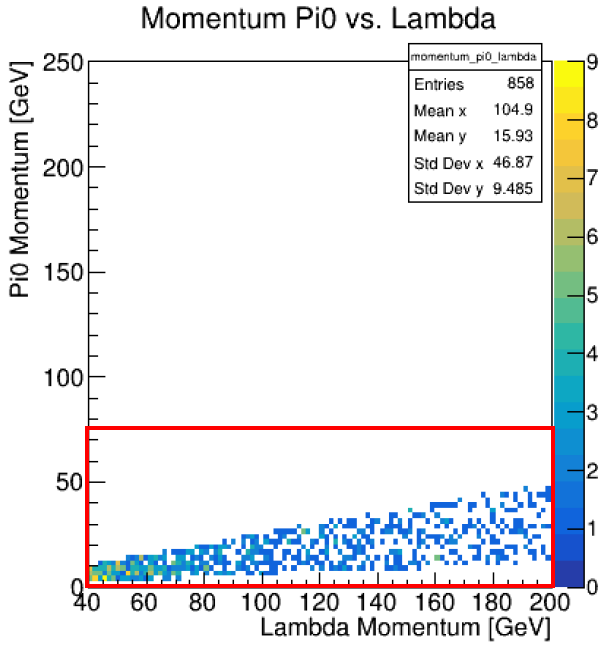
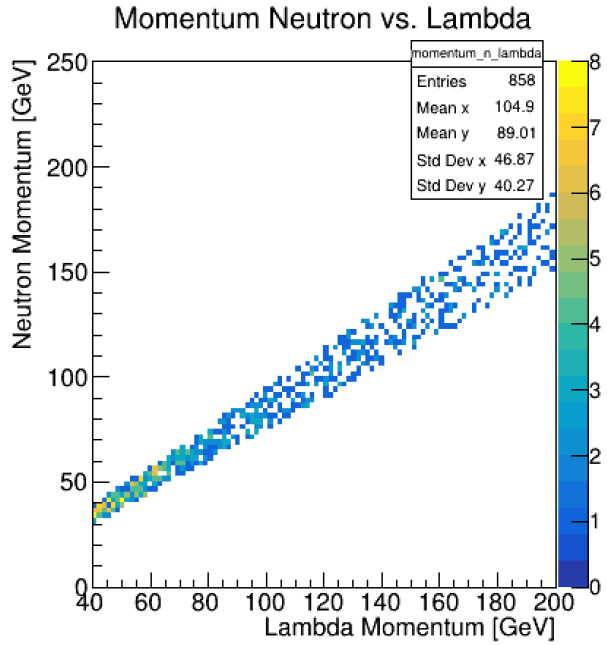
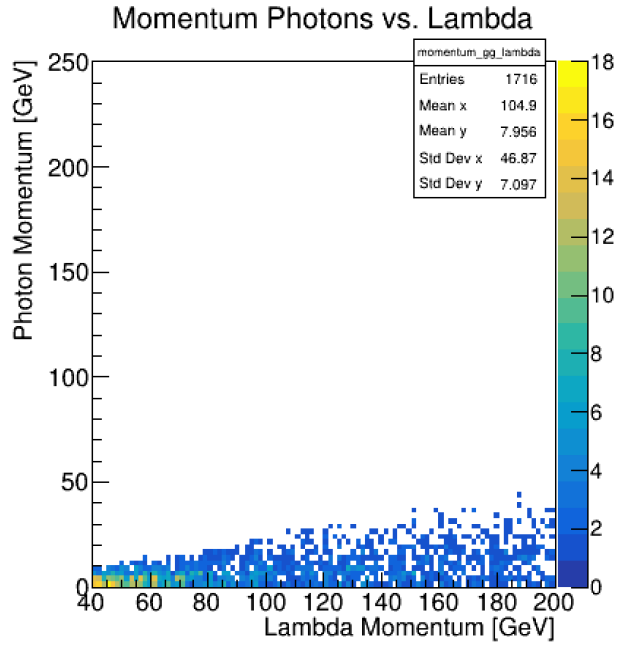
ZDC Simulation: Lambda Study

- Started simulating Lambda data to study the resolution of double photon + neutron decay







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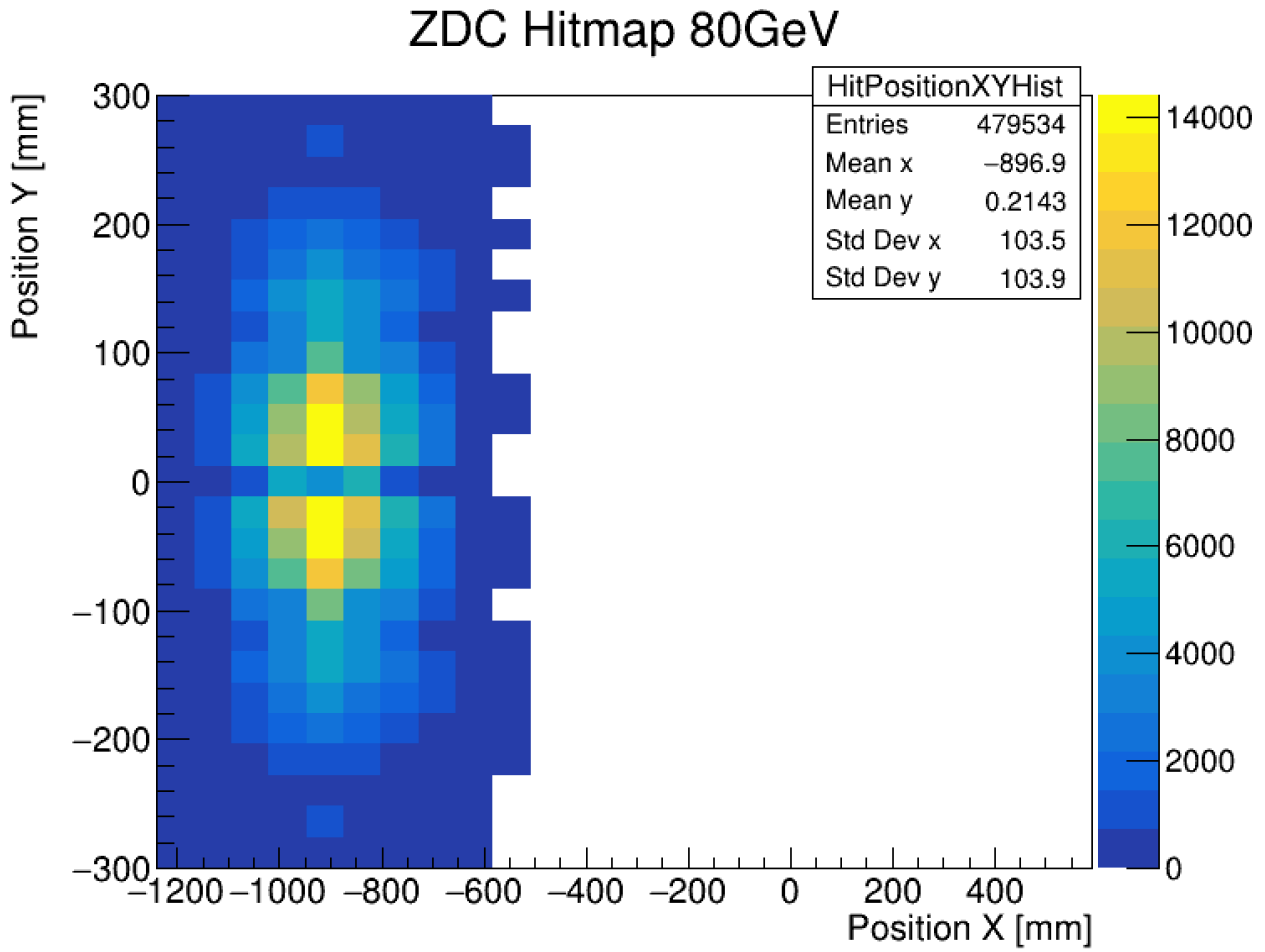
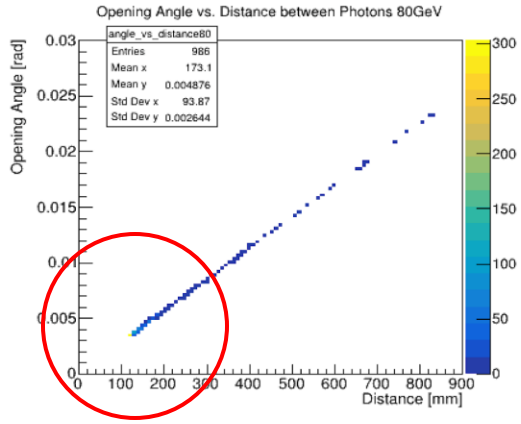
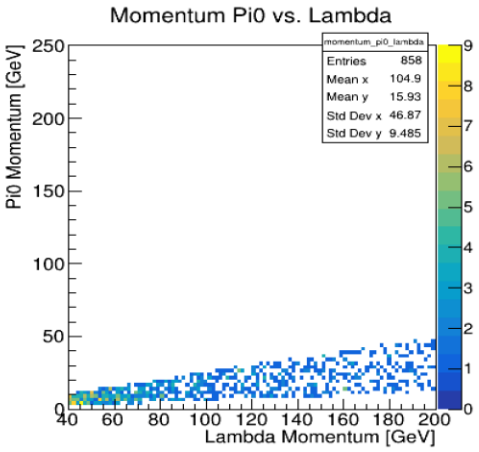
ZDC Simulation: Lambda Study







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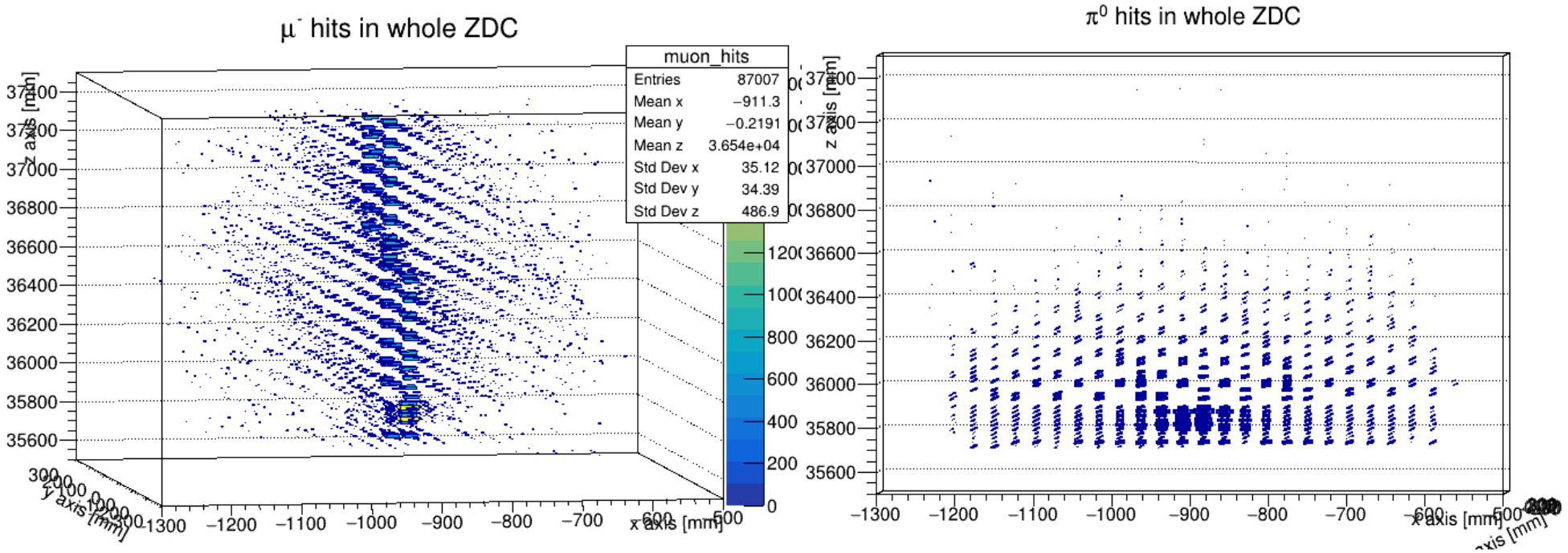
ZDC Simulation: WSi Geometry

- Design has not changed, implementing the WSi layers exactly as it was in original ZDC
- Space was made by removing 5 layers from the front of the Hcal
- Simulation readout works, hits positions are provided
- Plots for various particles and their hits in ZDC

WSi Geometry Plots 1



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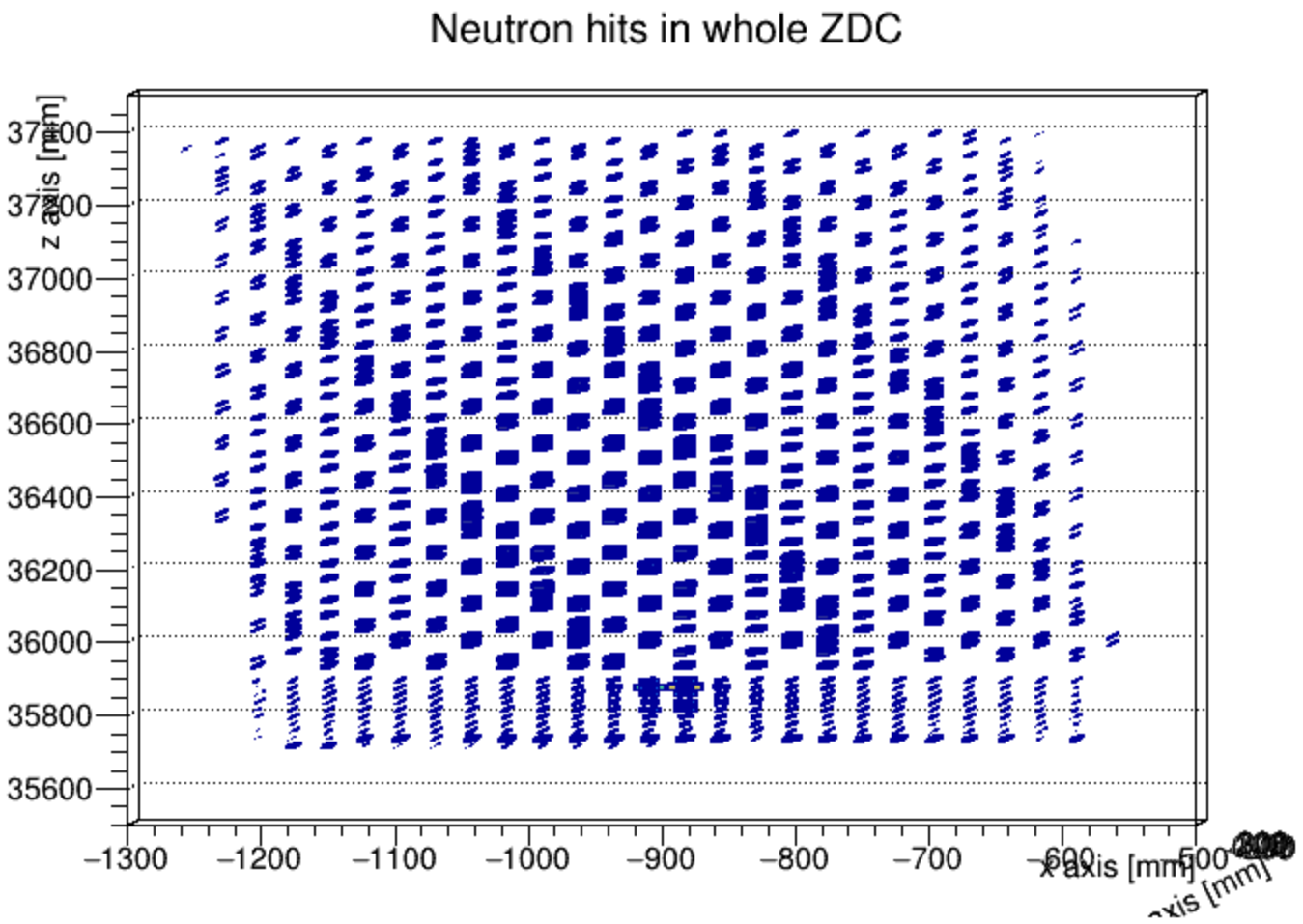
WSi Geometry Plots 2



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Hardware: Plots for Coincidence Study

- We took 5 sets of data
- Varied height and angle
- Active ch2, 3 and 4
- Ch1 was too noisy

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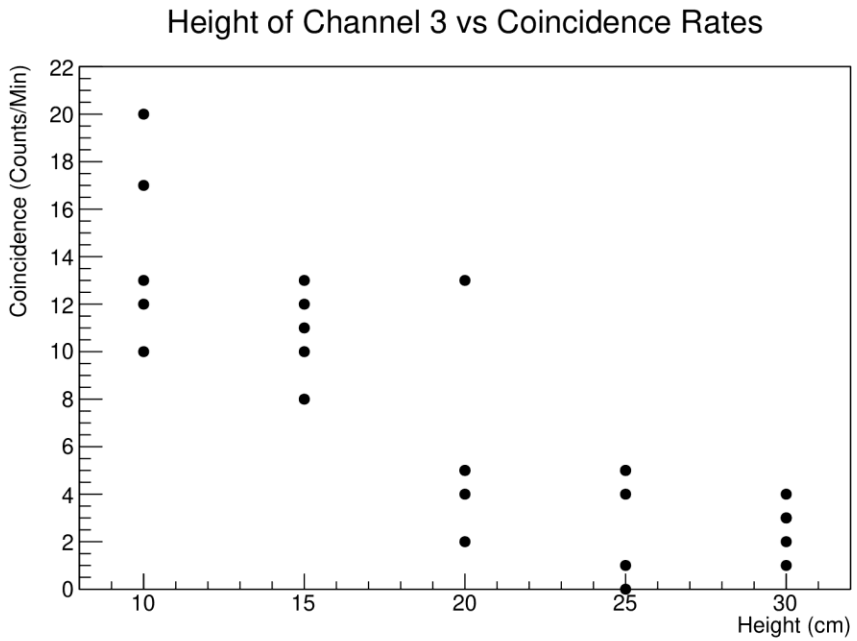
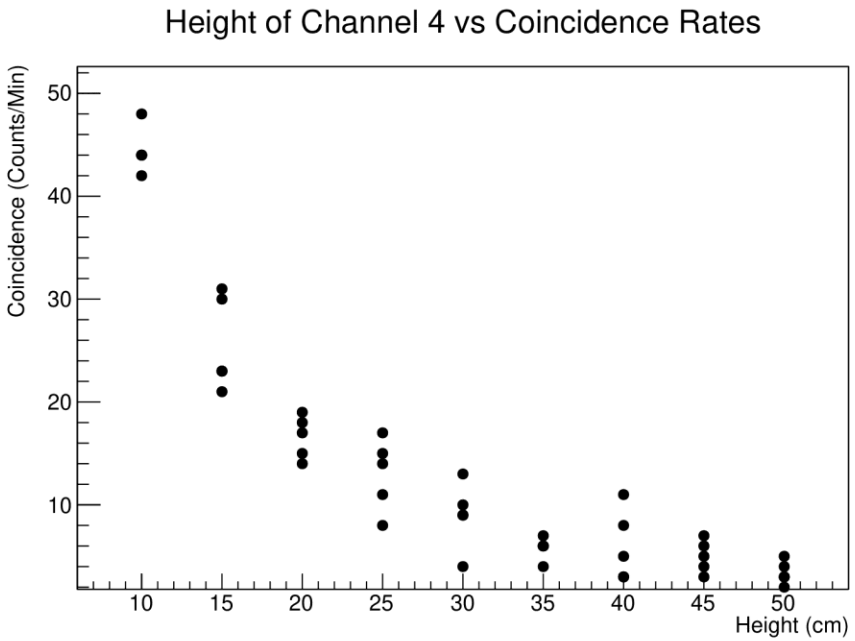
Coincidence Study Plots 1





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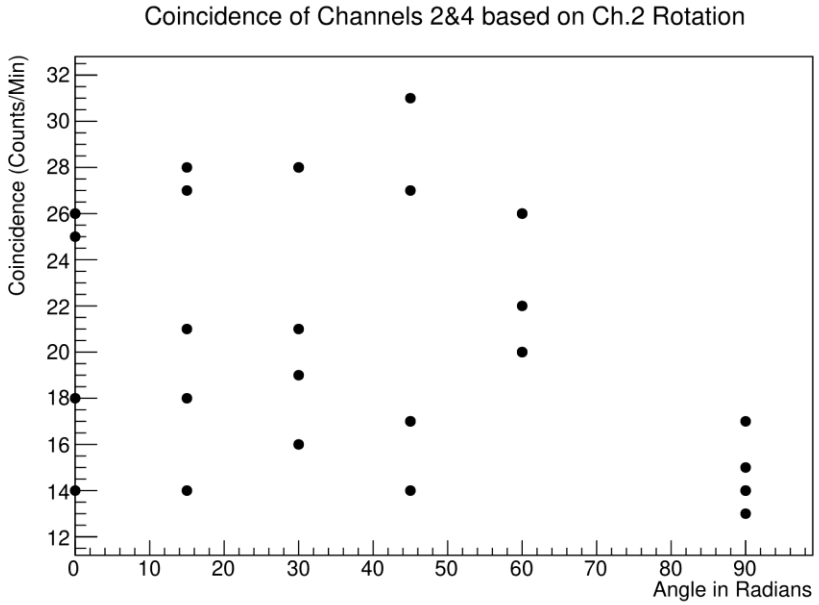
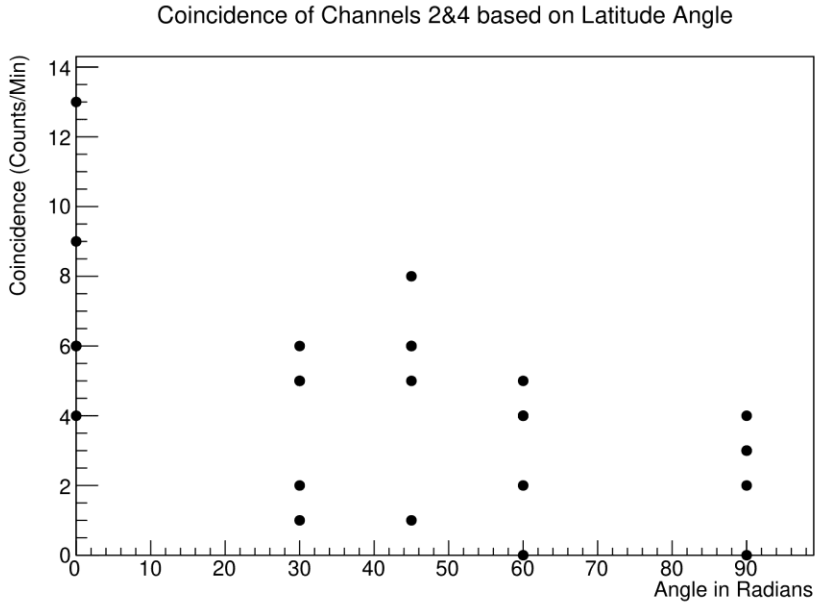
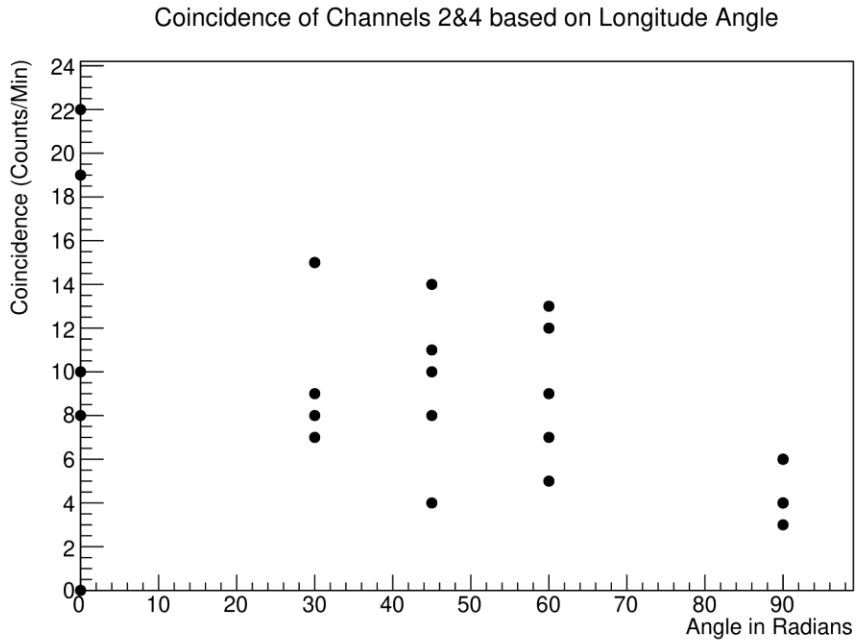
Coincidence Study Plots 2







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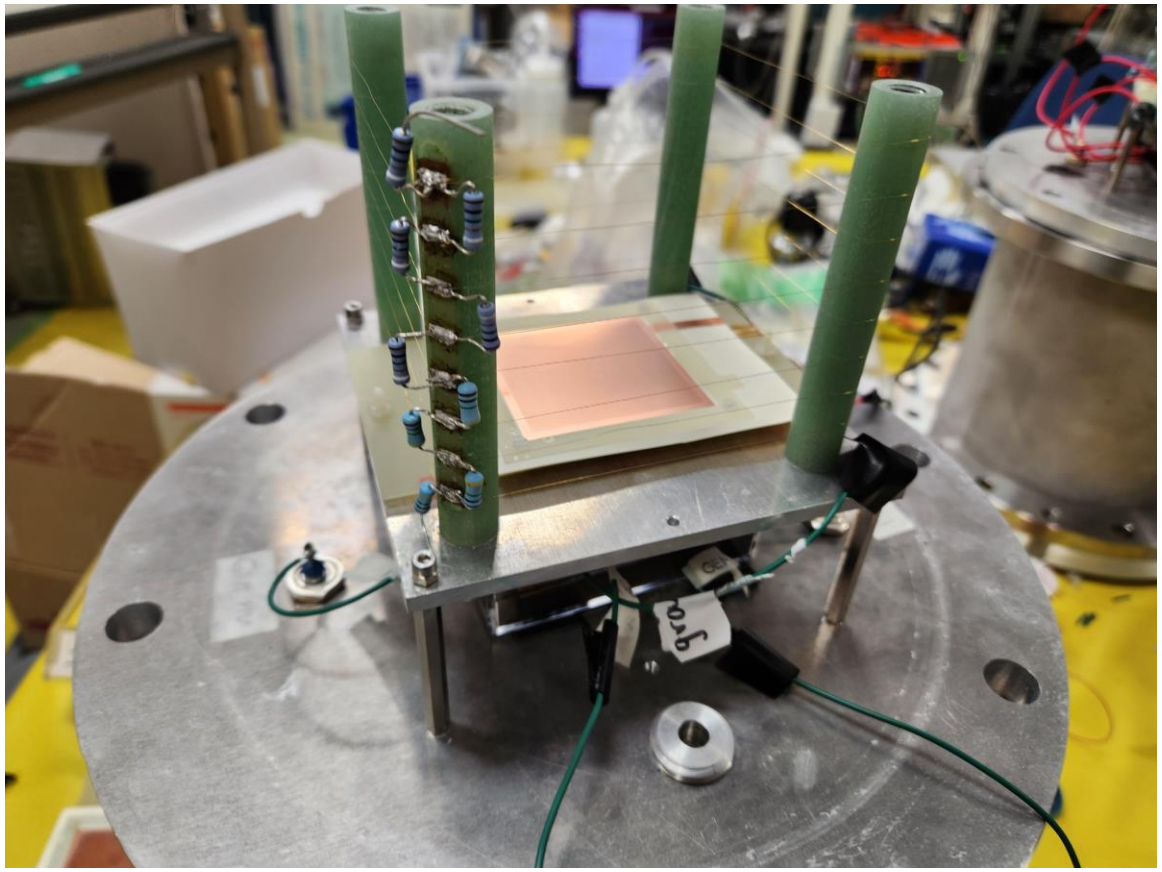
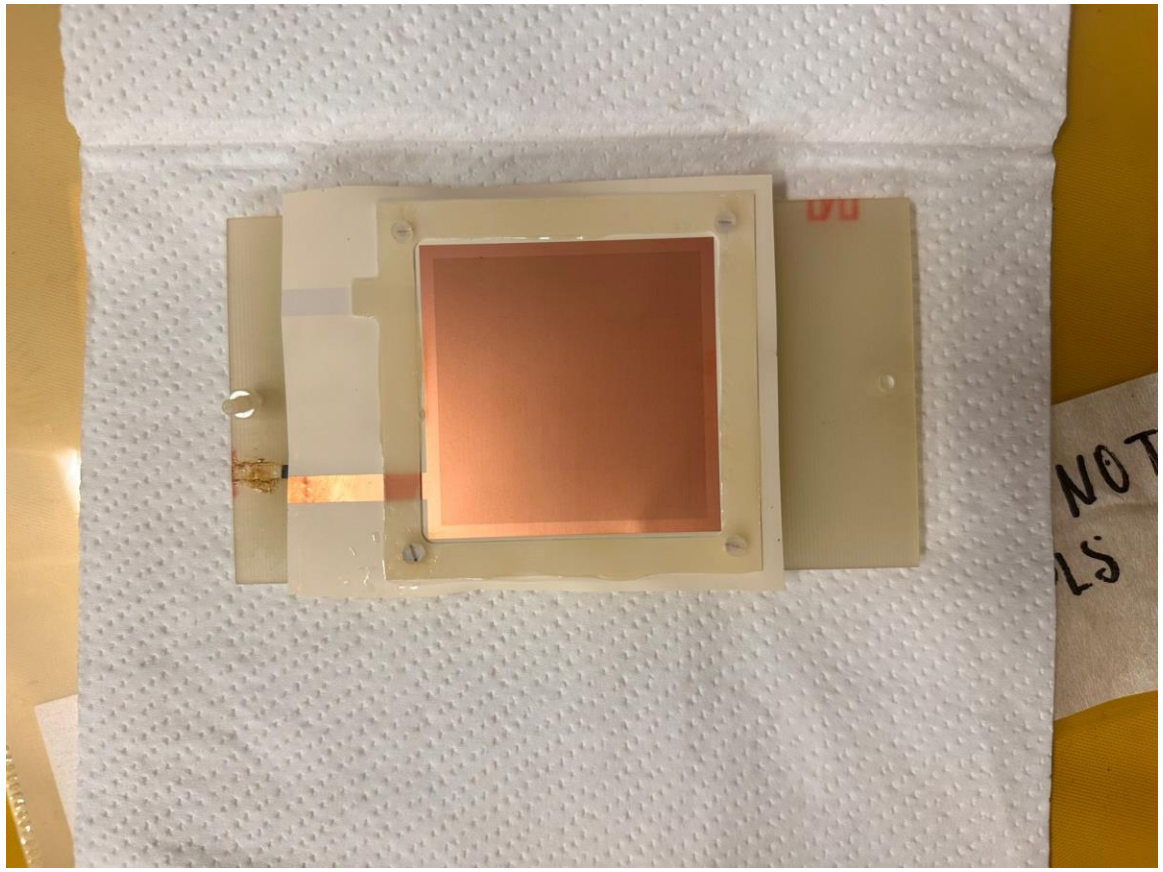
TPC Construction: General Assembly

- We disassembled several TPCs and reconstructed one
- Resoldered the wires and resistors on the cage
- Soldered the circuit together
- Assembled GEM and placed it in cage
- Currently waiting for Prof. Taku's next free day to installed alpha source, close TPC and start pumping with N2
- Next steps are set up the DAQ and start collecting data

TPC Construction: Photos





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Goals for this week

- Note: G will be back in America until July 2nd
- Determine abstracts for APS-DNP, deadline is 8th July (2 weeks)
- ZDC Simulation:
  - Determine for what lambda energies/decay lengths do we see 2gamma + n in ZDC AND can we distinguish them
- TPC Hardware:
  - Finish constructing
  - Prepare DAQ
  - Start taking data