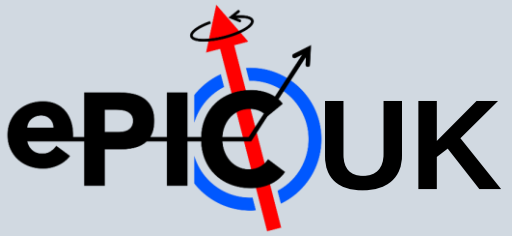
Update on Tracking Simulations with OB Geometry from CAD Files

- Code to create DD4HEP geometry from CAD files with automatic script implemented
- Looks like there are still bugs
- No significant impact on track momentum and DCA resolution

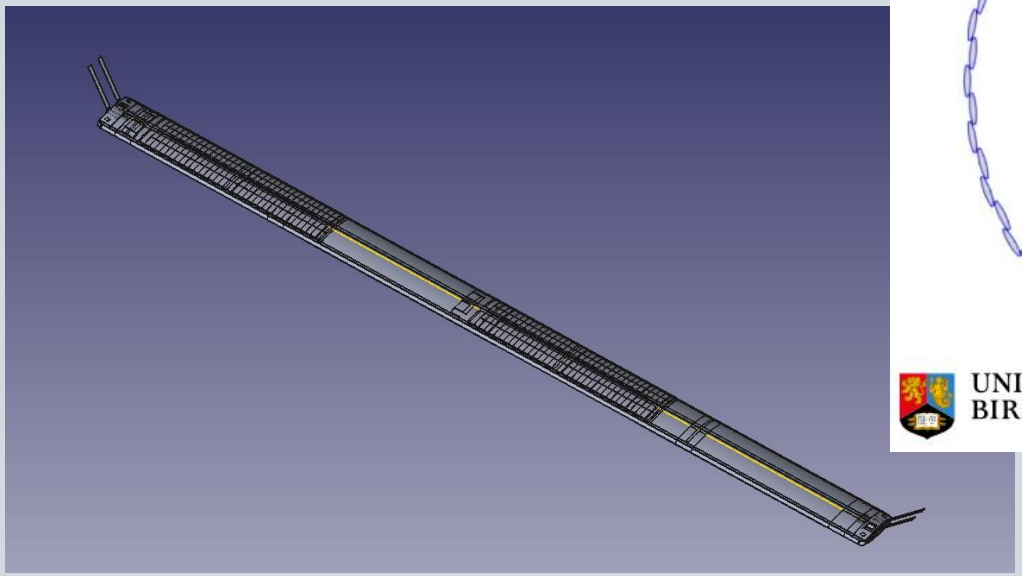
Sam Henry, University of Oxford

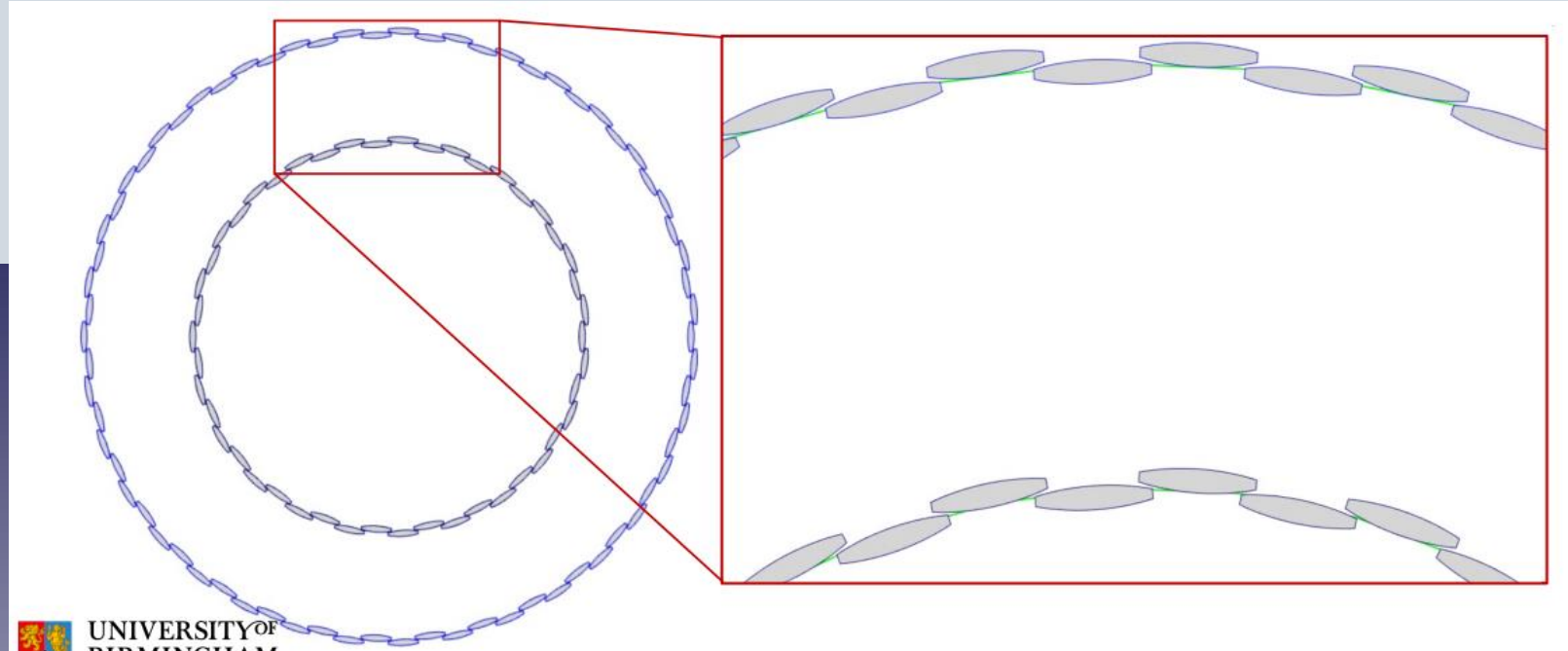
Reporting work by Tuna Tasali

Thanks to Todd Huffman, Georg Viehhauser, Long Li



OB Stave Design





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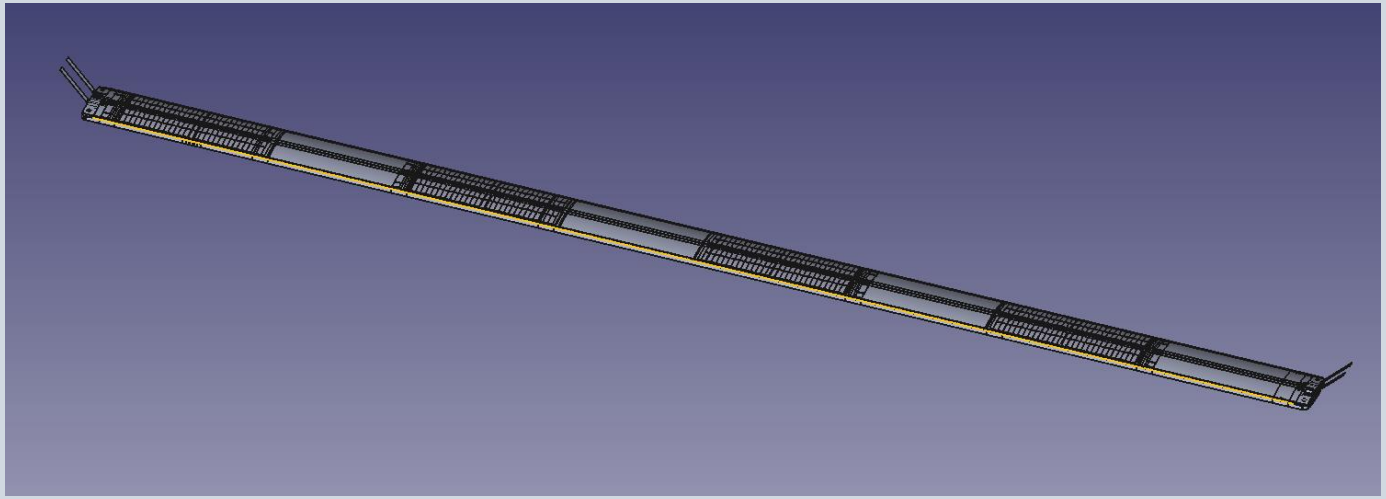
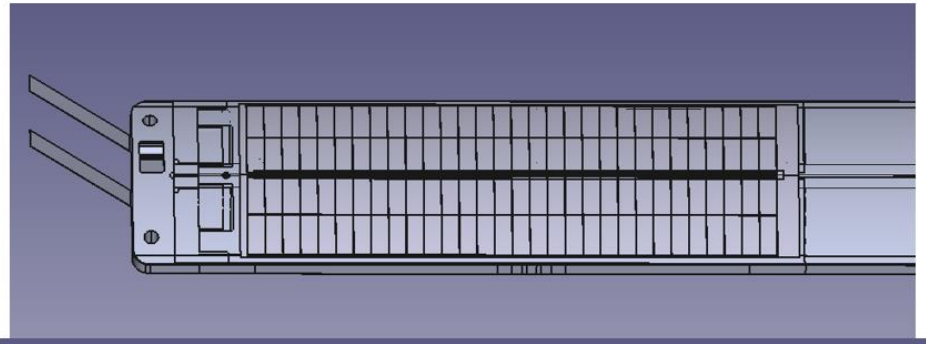
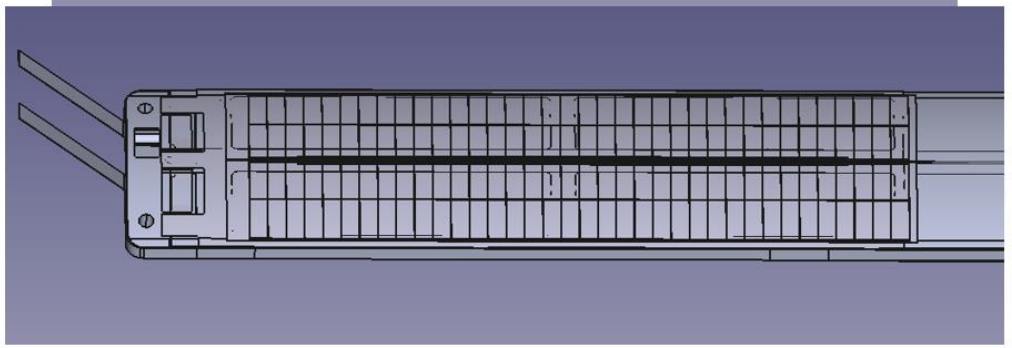
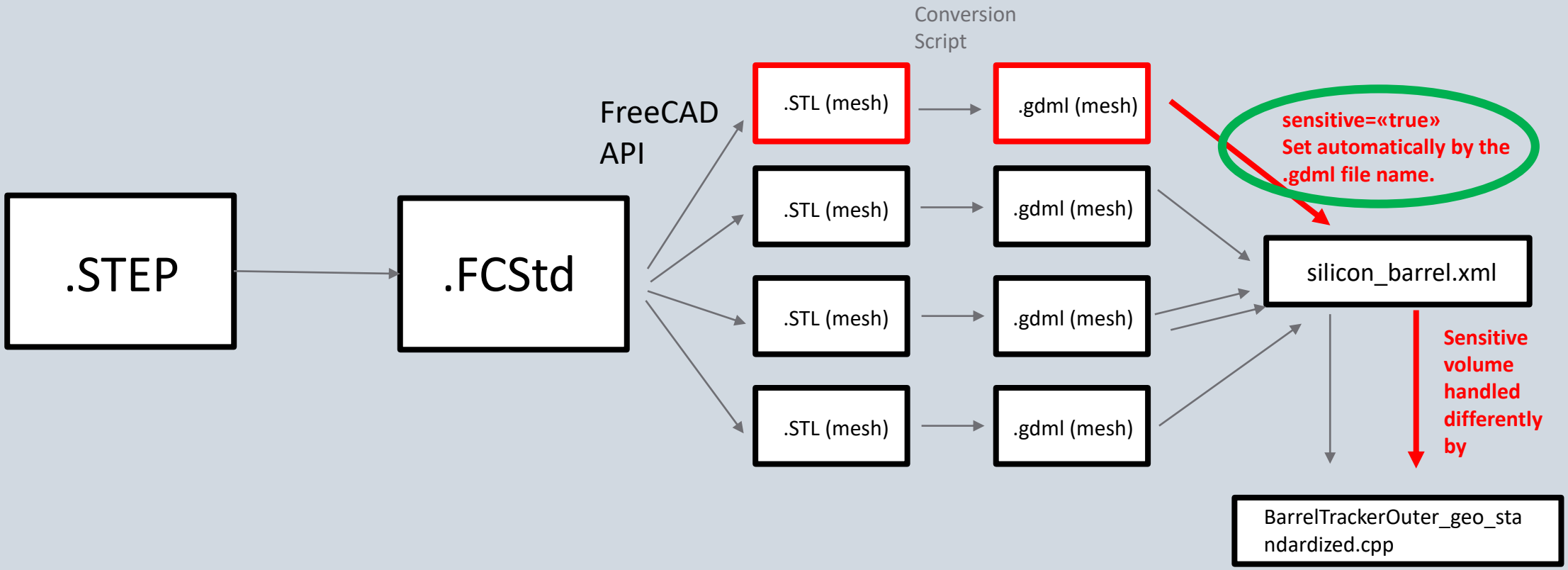






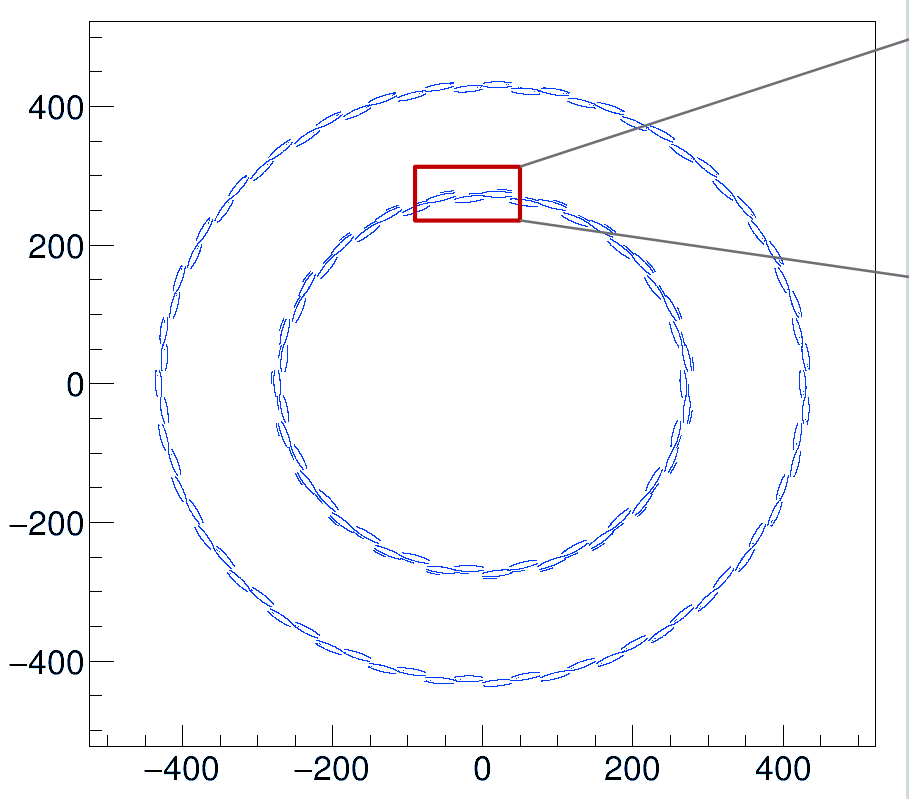
Importing CAD design

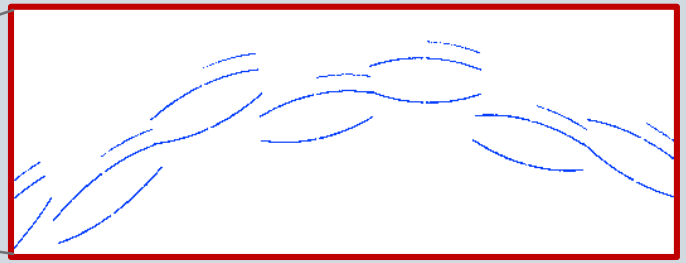


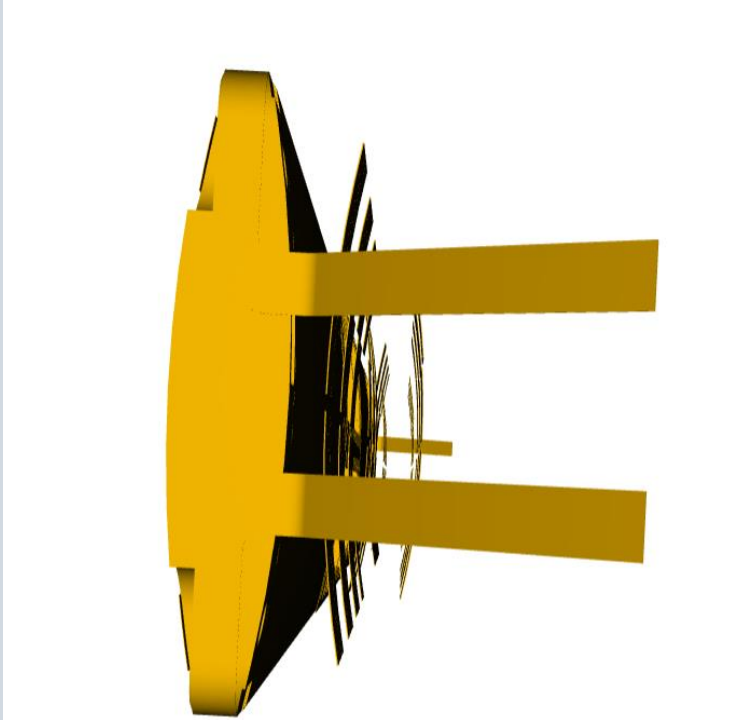
https://github.com/Tunat66/epicUK/tree/UK_Contribution

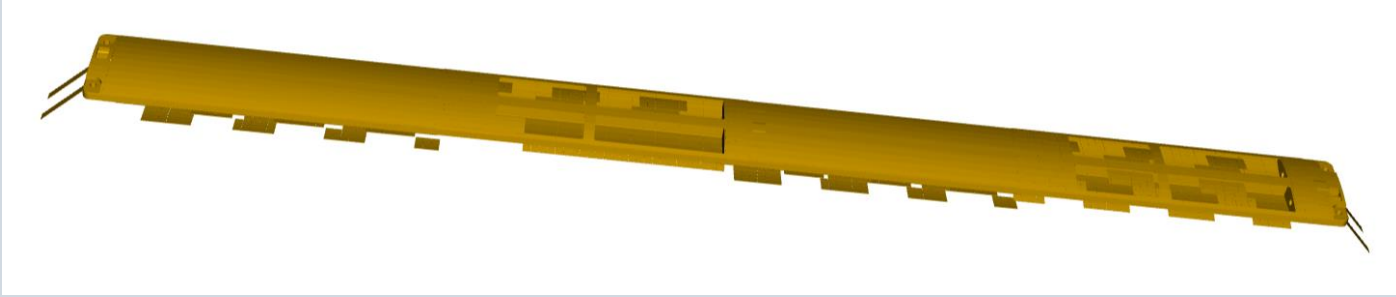
Importing CAD design

Geoviewer / hit map reveals something not quite right



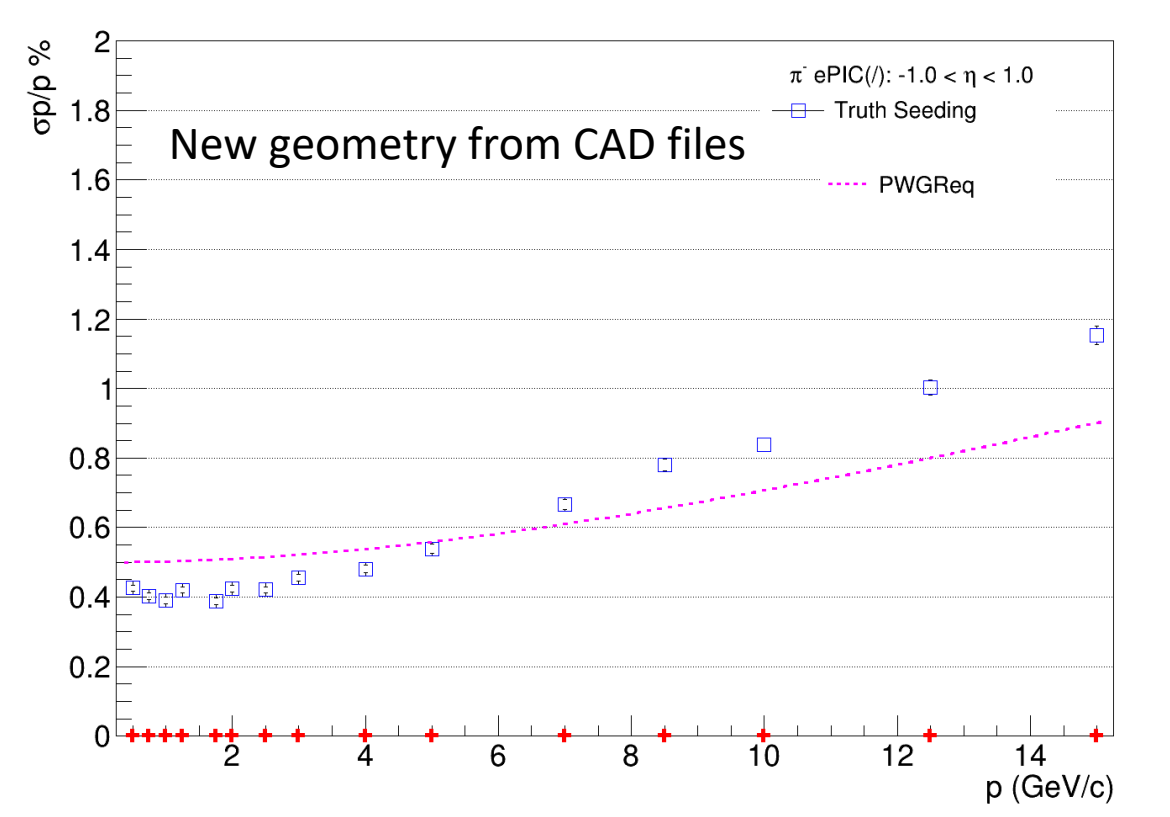


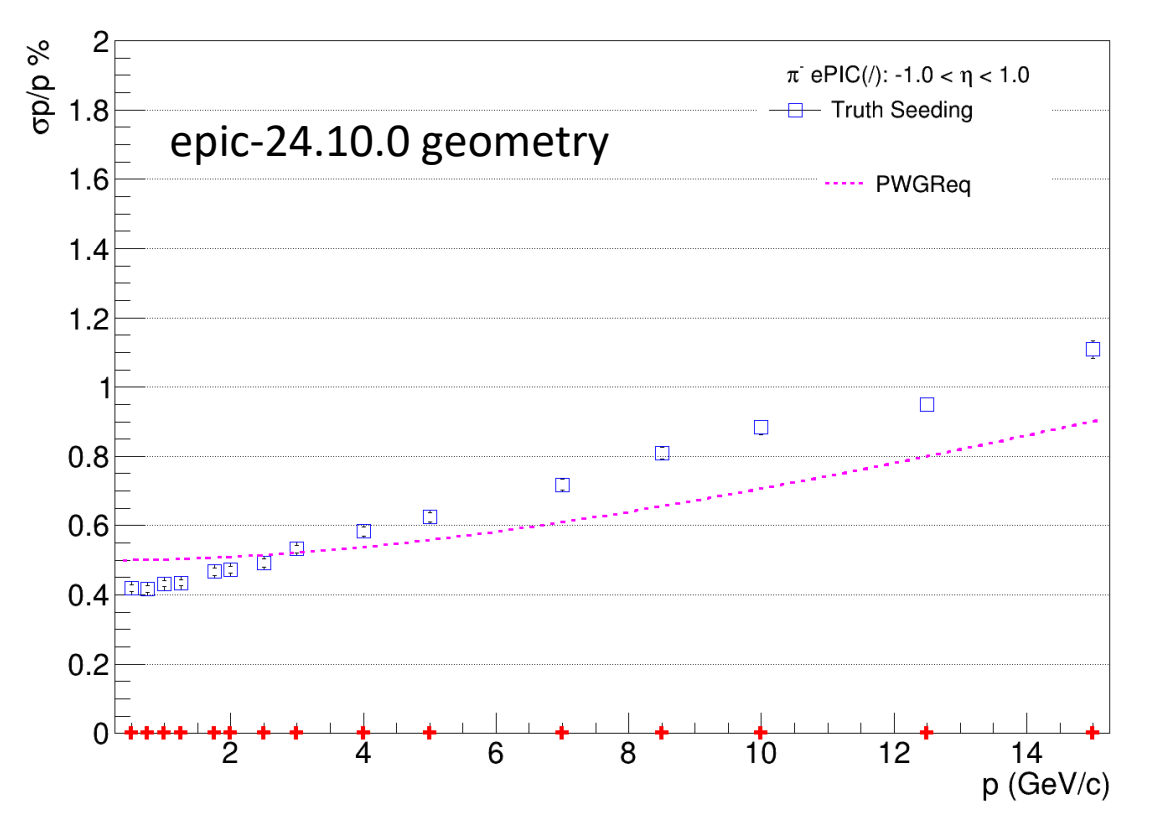




Tracking momentum resolution

Using tracking performance benchmark script by Shyam Kumar, epic_craterlake_tracking_only.xml
https://github.com/eic/detector_benchmarks/tree/master/benchmarks/tracking_performances



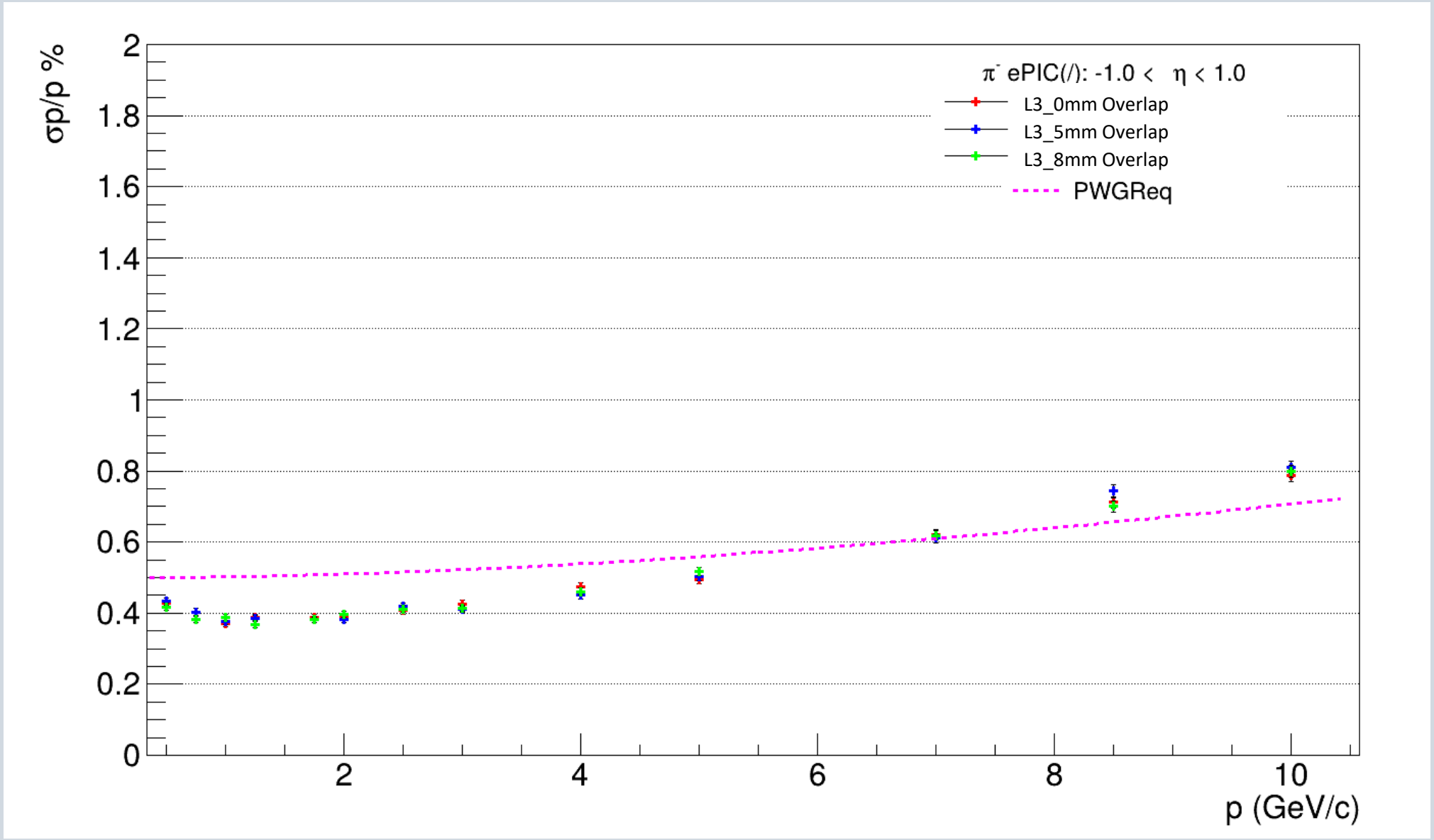


Run time: 92±25 minutes

Run time: 10±3 minutes

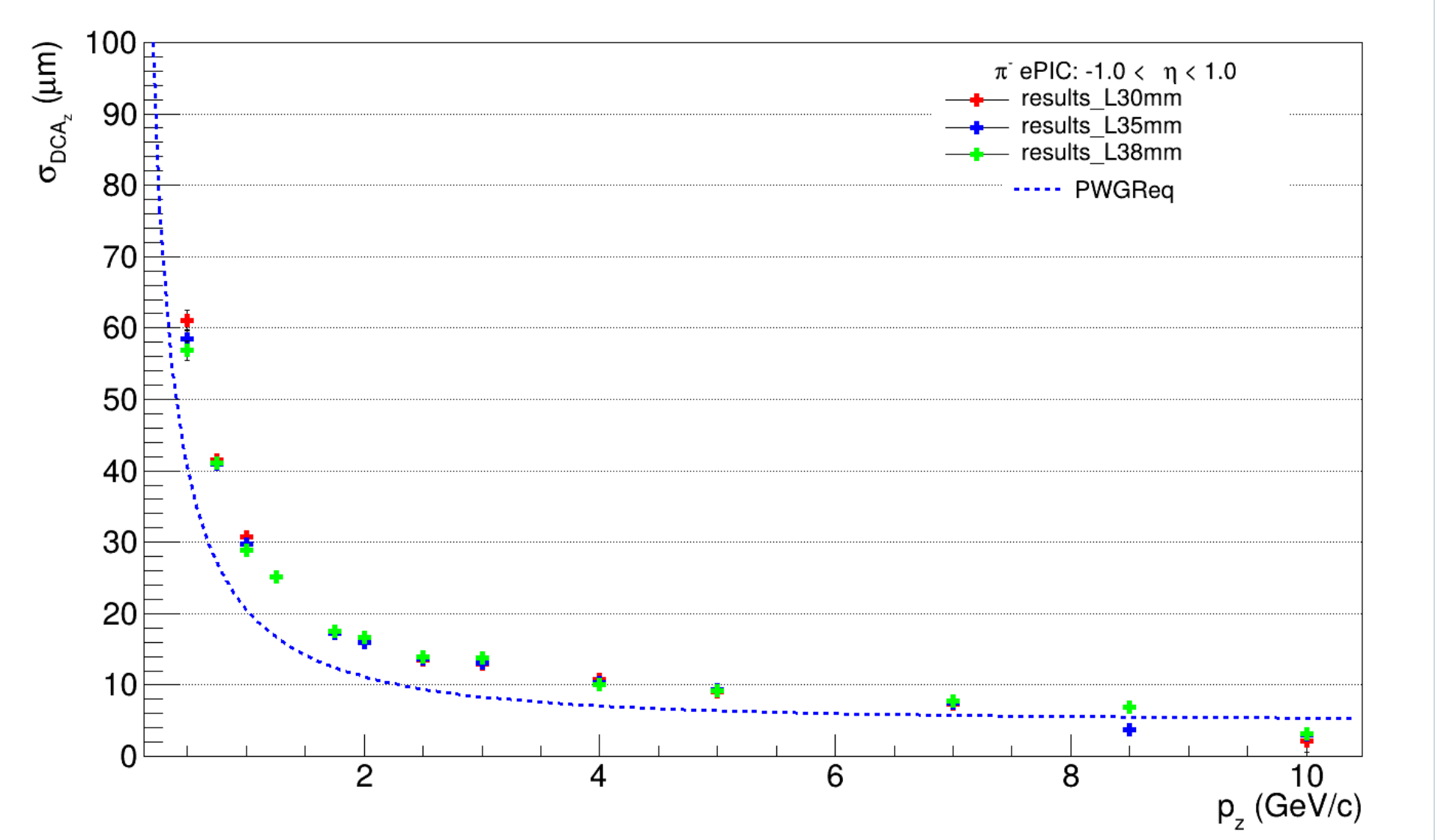
Running ddsim and eicrecon on 10,000 events

Overlap Study (in L3 only): deltap/p

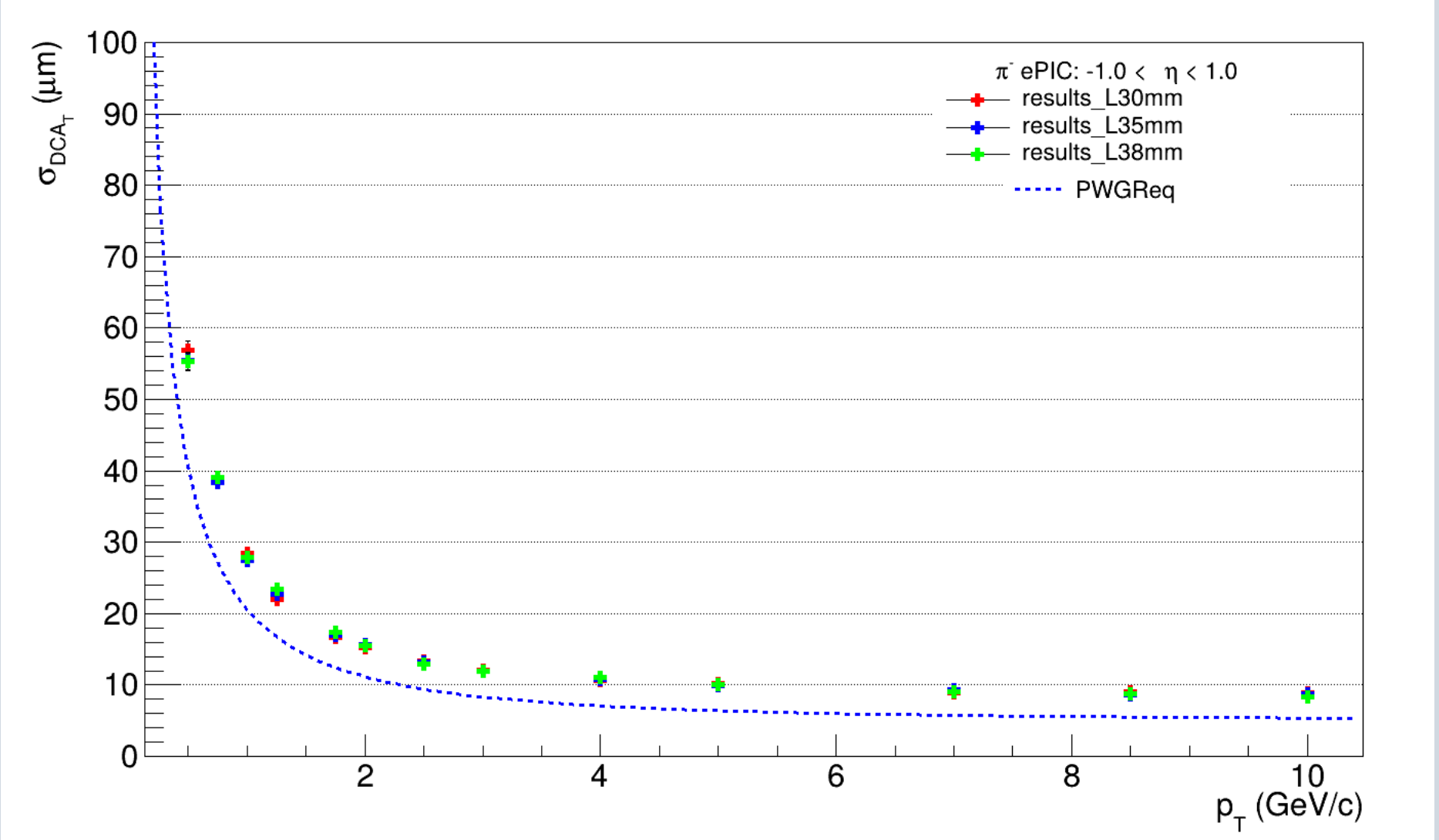


Pion momentum:
0.5-10GeV/c

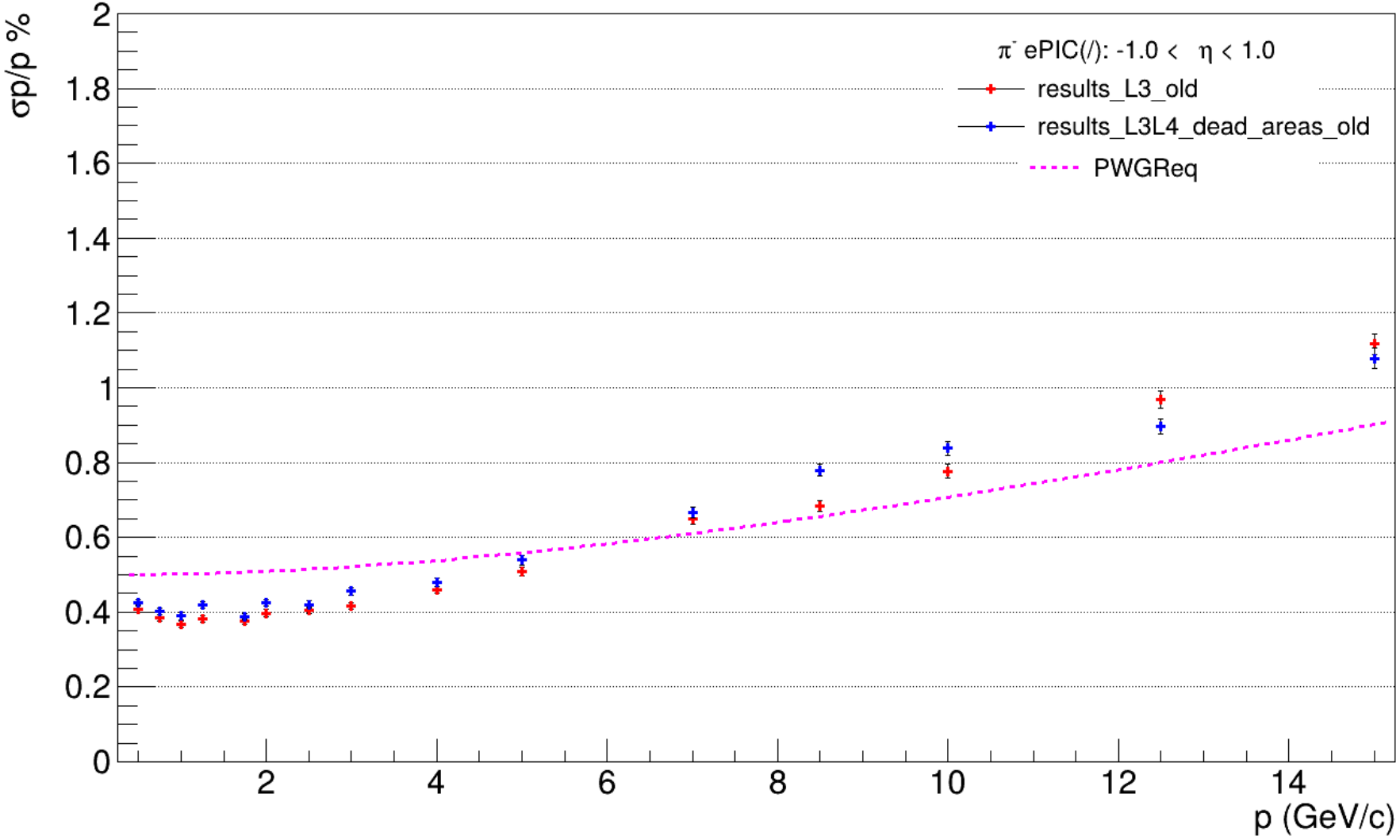
Overlap Study (in L3 only): dca_z



Overlap Study (in L3 only): dca_T



Sensitive Area Study (both layers)



Next steps

- Current status: code to import CAD geometry into epic DD4HEP working but has bugs. No significant change to tracking performance from more detailed geometry
- Debug and further test code
- Create branch on epic repository (what is appropriate for main epic geometry?)
- Further design studies to optimise barrel design
- Full material thickness map
- Further design questions?