CEPC Silicon Drift Chamber Tracker Concept

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Outline

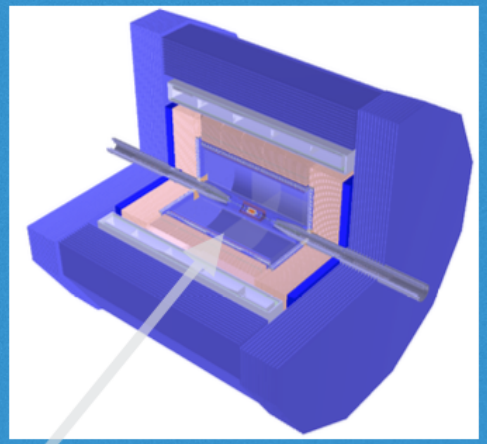
- Introduction
- Current Status
- Plan

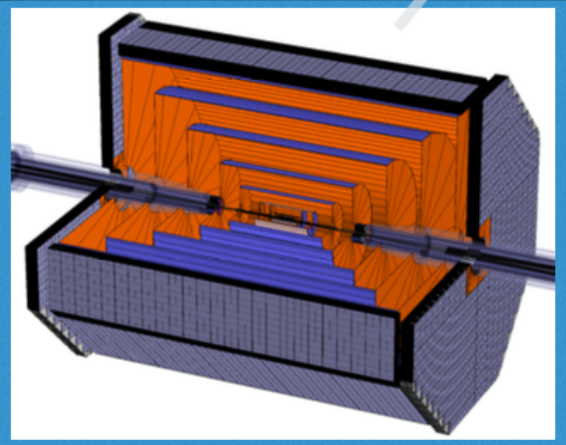
CEPC: 2.5 Detector Concepts

CEPC plans for 2 interaction points

Particle Flow Approach

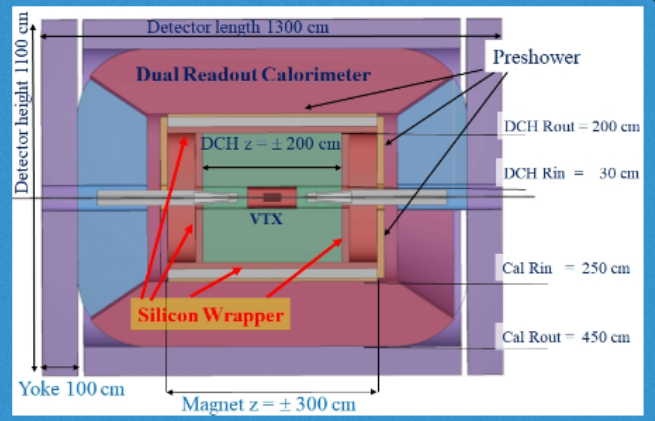
Baseline detector ILD-like (3 Tesla)





Full silicon tracker concept

Low magnetic field concept (2 Tesla)



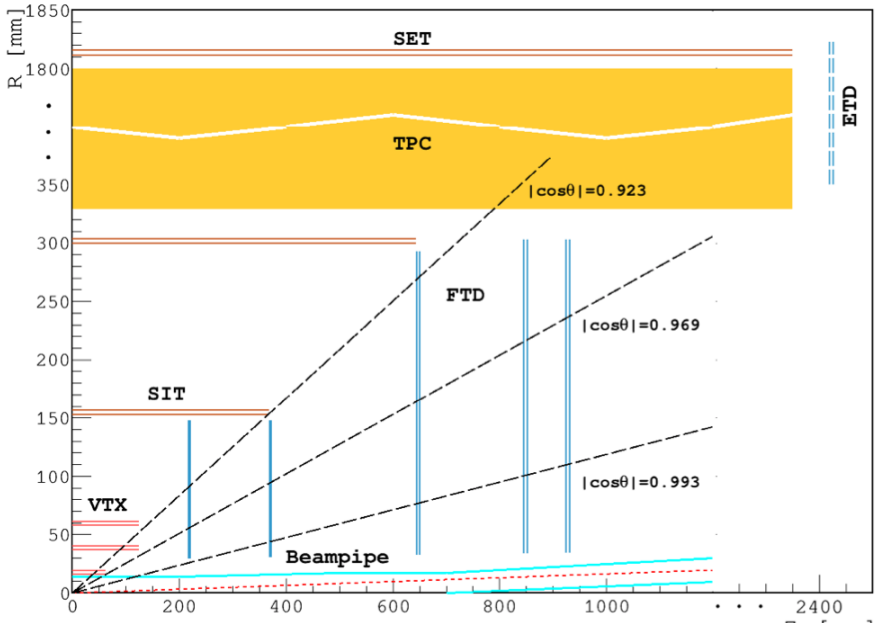
IDEA Concept
also proposed for FCC-ee

Final two detectors likely to be a mix and match of different options

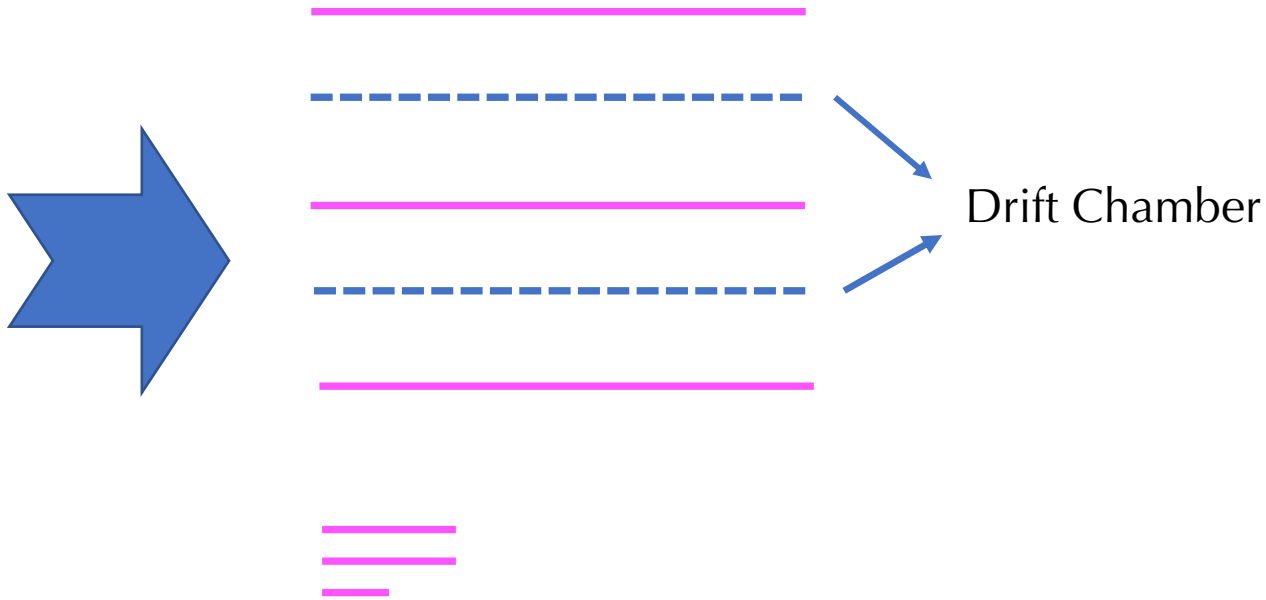
27

CEPC Silicon + Drift Chamber Tracker

- Explore the combination of Silicon and Drift Chamber Tracker (SDT)
- Based on the baseline Silicon + TPC
- Replace TPC layers with drift chamber layers

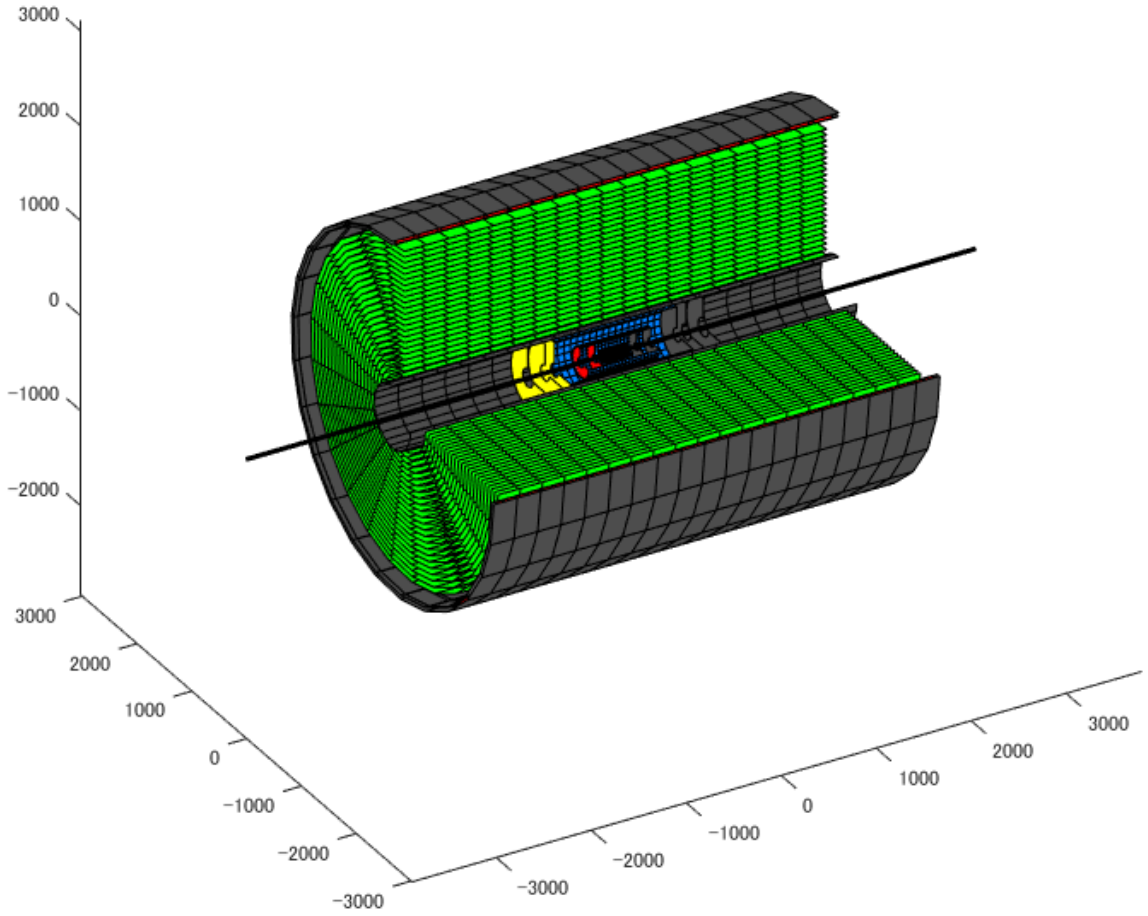


Detector		Radius R [mm]	$\pm z$ [mm]	Material budget [X_0]
SIT	Layer 1	153	371.3	0.65%
	Layer 2	300	664.9	0.65%
SET	Layer 3	1811	2350	0.65%



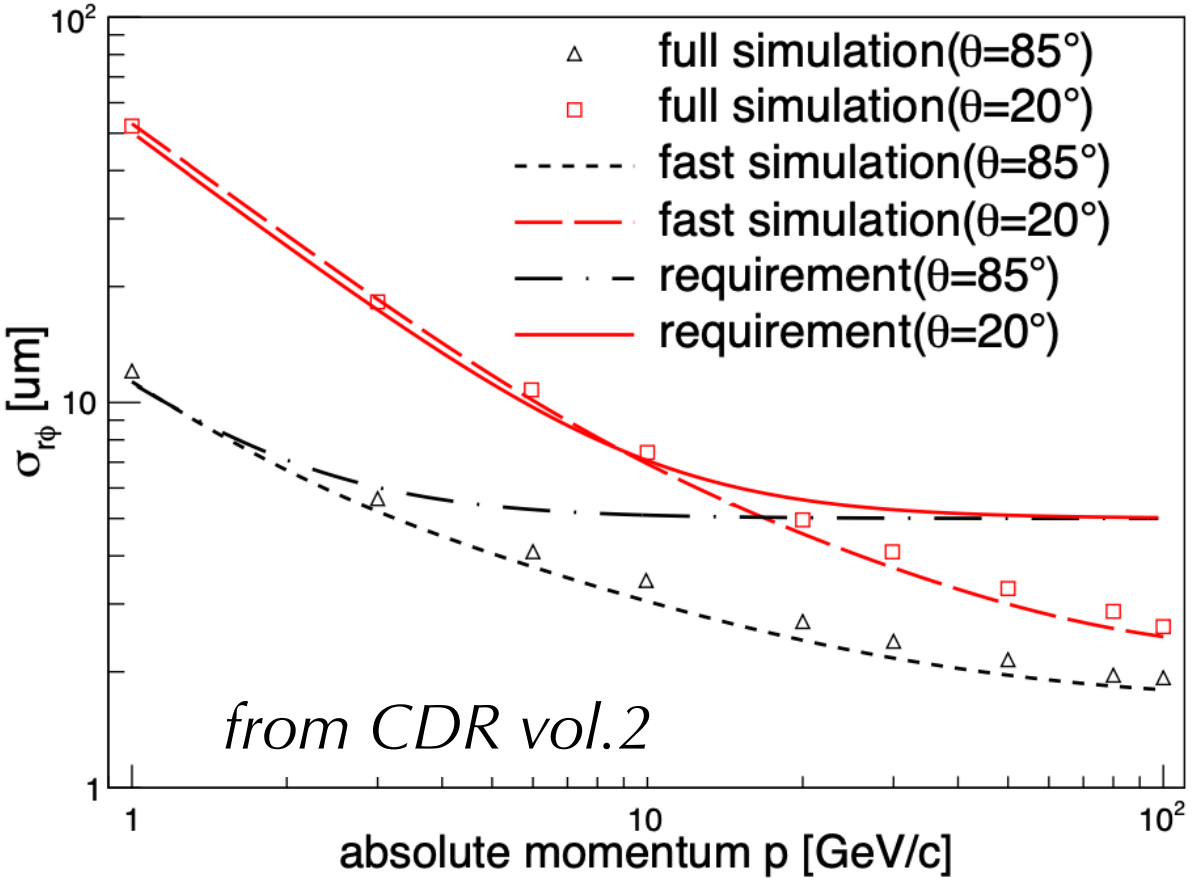
Geometry of the detector layers

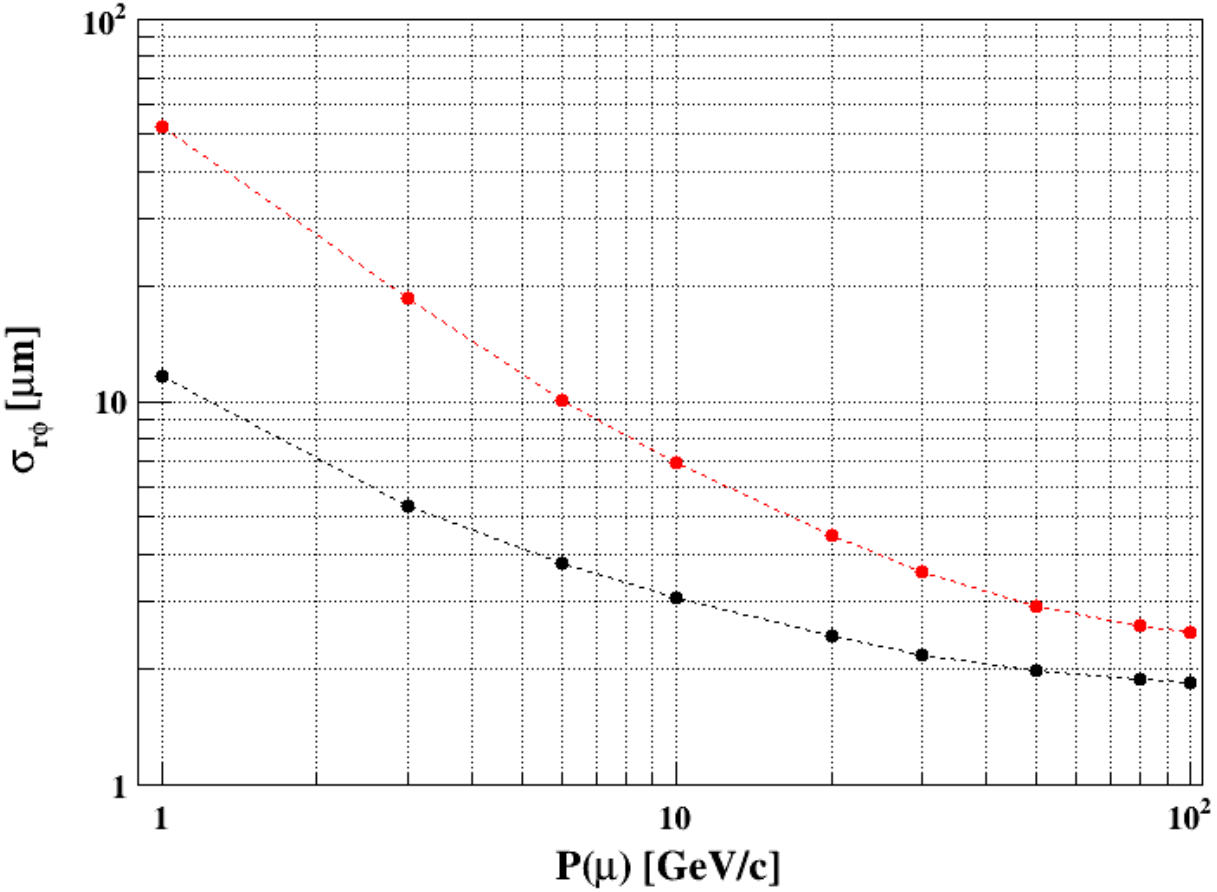
- Fast Simulation Tool LiC Detector Toy 2.0 (LDT) developed for design studies and optimizing the detector configuration
- Reflecting the geometry (of the tracking part) of the baseline concept



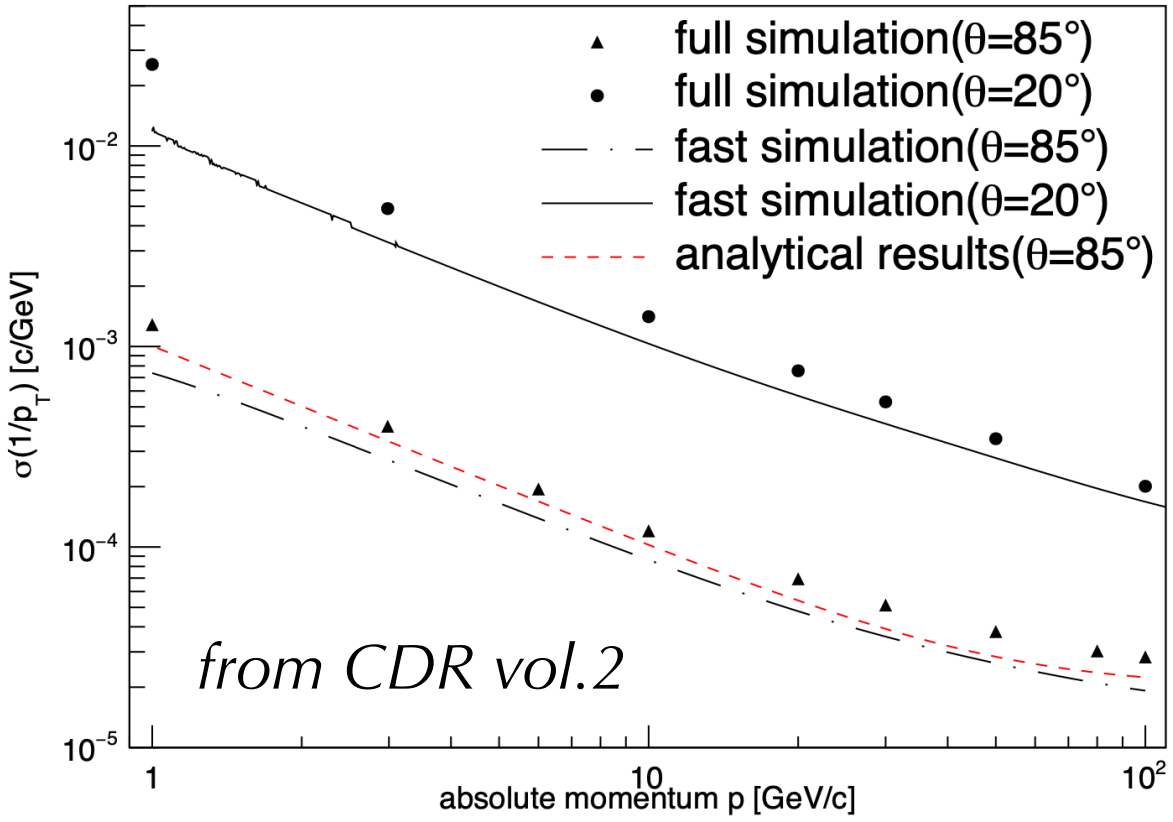
A layout of the tracking system set in the simulation

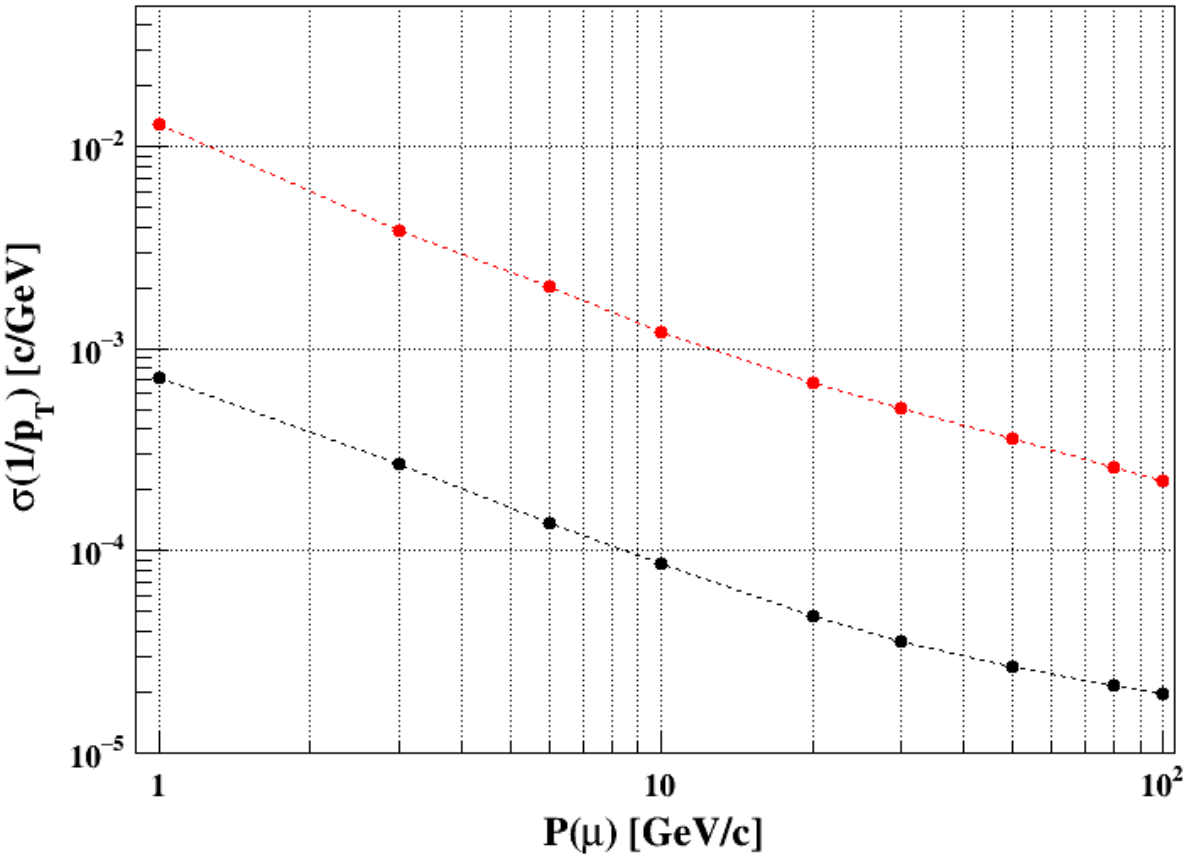
Transverse impact parameter resolution



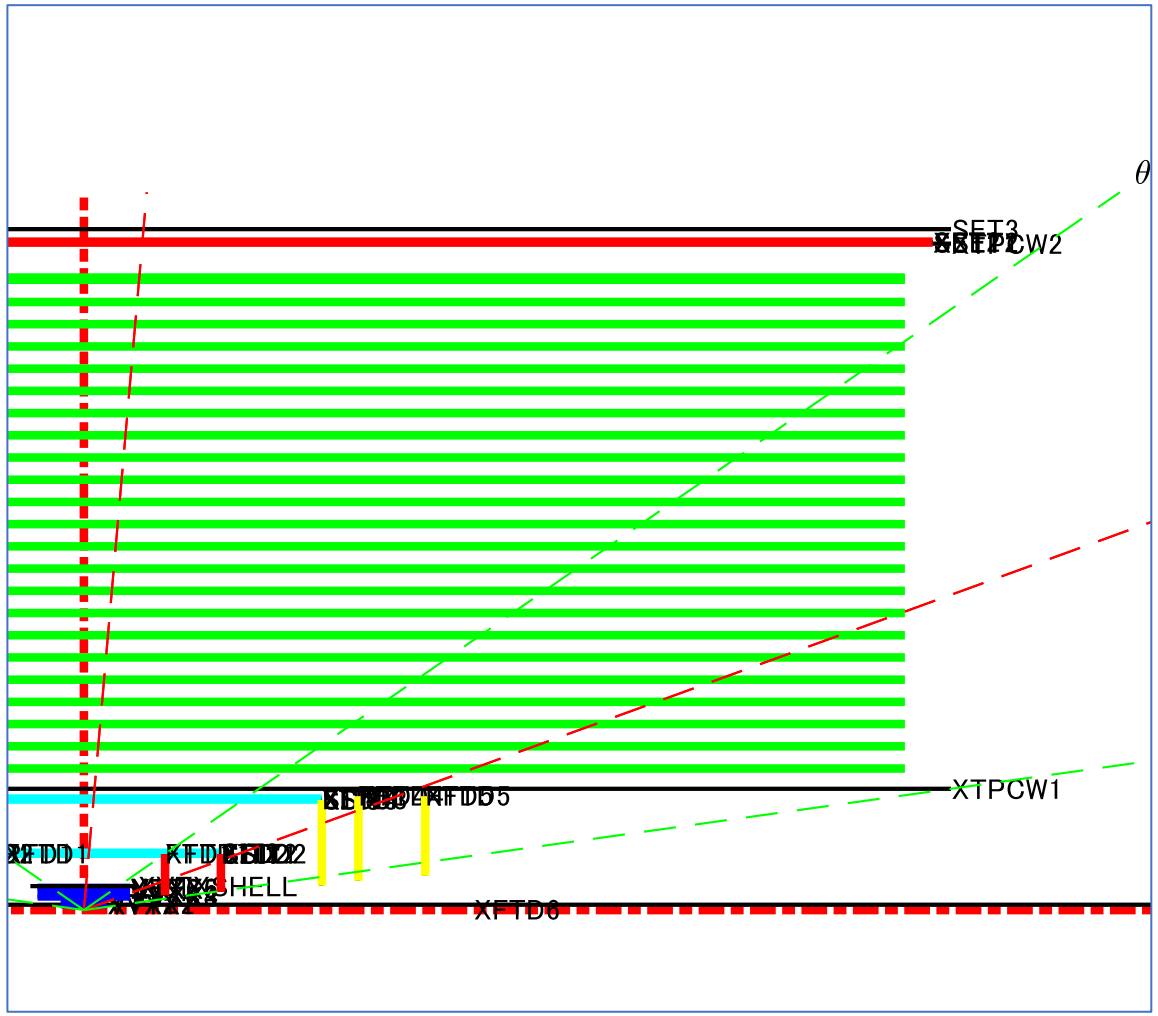


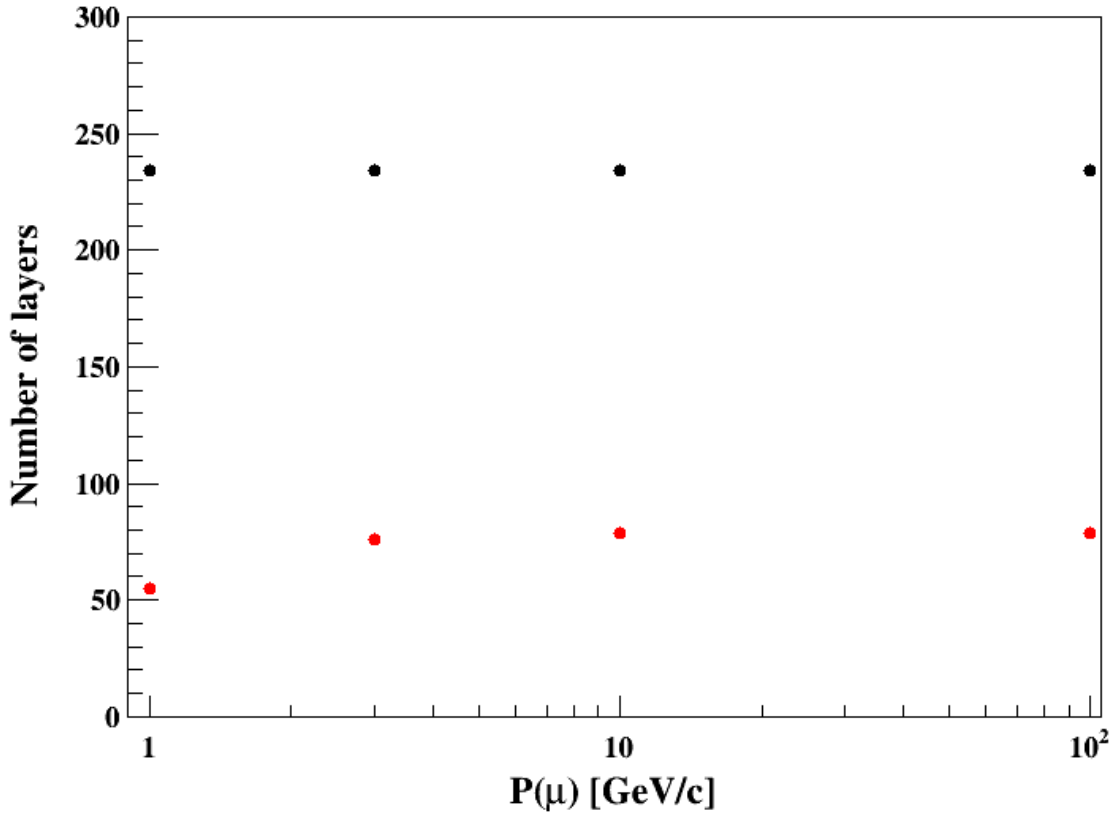
Transverse momentum resolution





Number of hit layers (per track)





Averaged Number of layers which measure the space point

Release Plan for SDT

- v0.2: validate it by comparing with CDR results
- v0.3: Remove TPC, change the position and number of layer of Si-Strip, demonstrate the degrading of performance
- v0.4 : add wire chamber according to suggestion of Mingyi
- ...
- v1.0: SDT simulation and reconstruction complete for barrel region

- Compare tracking performance of SDTv1.0 with FST, FST2, TPC/Silicon
- Optimization points: material, dE/dx, overall volume, S/D layers,...

Any comments or suggestions are always welcome!