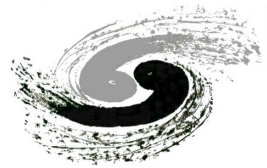


CEPC SDT on CEPCSW Status



中國科學院高能物理研究所
Institute of High Energy Physics
Chinese Academy of Sciences

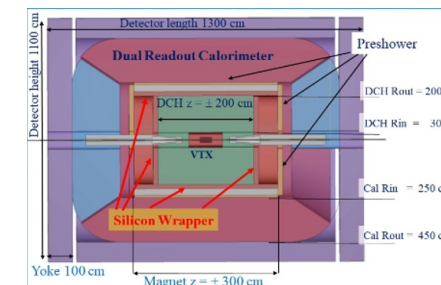
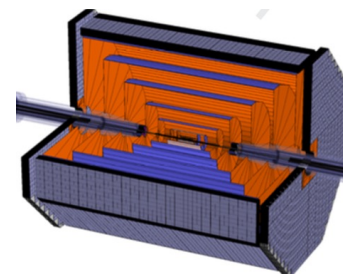
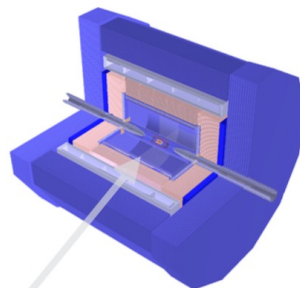
Xin Shi

On behalf of CEPC Tracker Team

Introduction

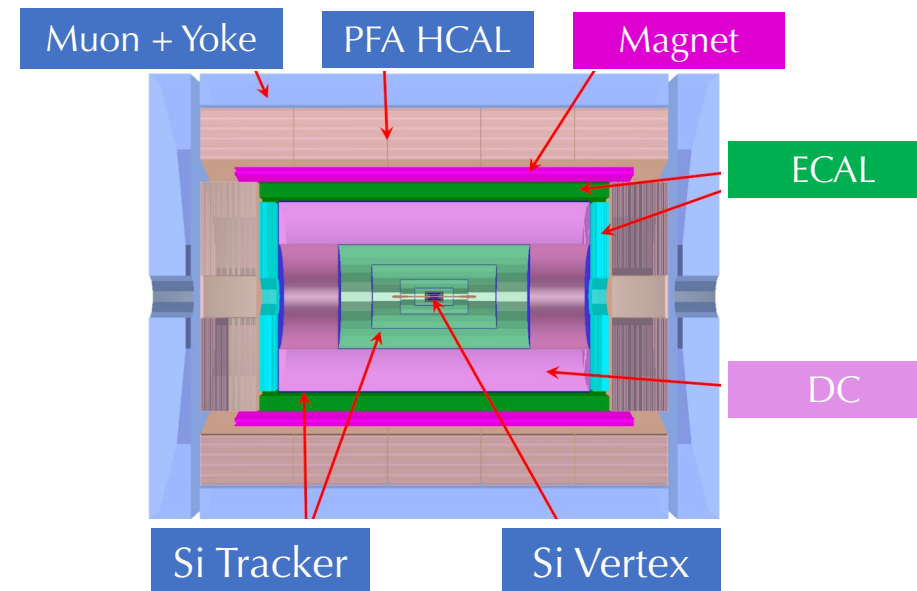
- Three existing detector concept for CDR

- Silicon + TPC
- Full Silicon Tracker
- IDEA Concept



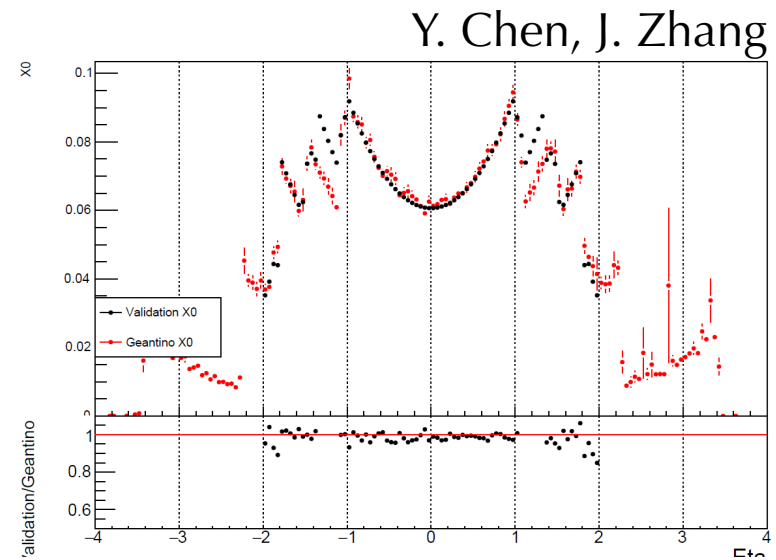
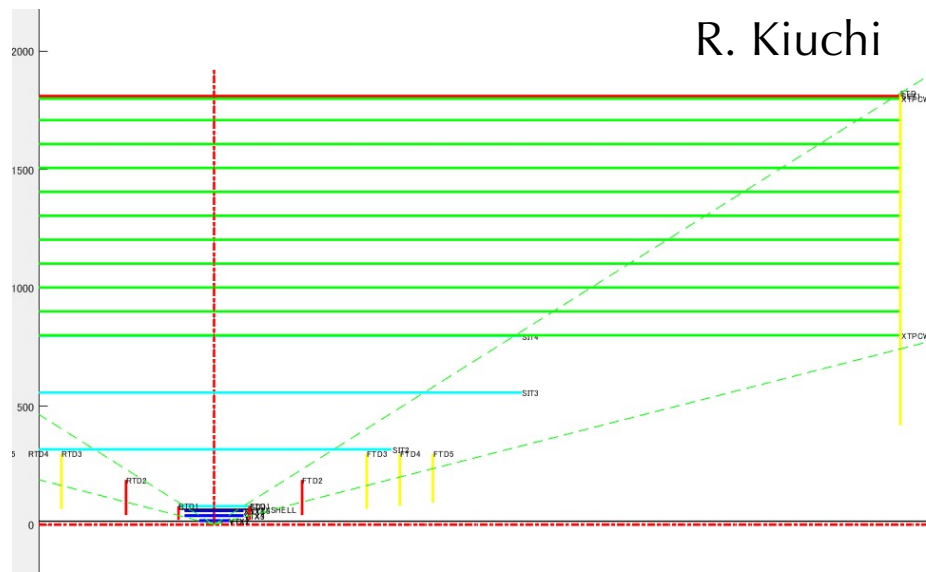
- The 4th detector concept

- Silicon Vertex + Silicon Tracker for momentum measurement
- Drift chamber optimized for PID
- Transverse crystal bar ECAL optimized for π^0/γ reconstruction
- Solenoid magnet between HCAL and ECAL



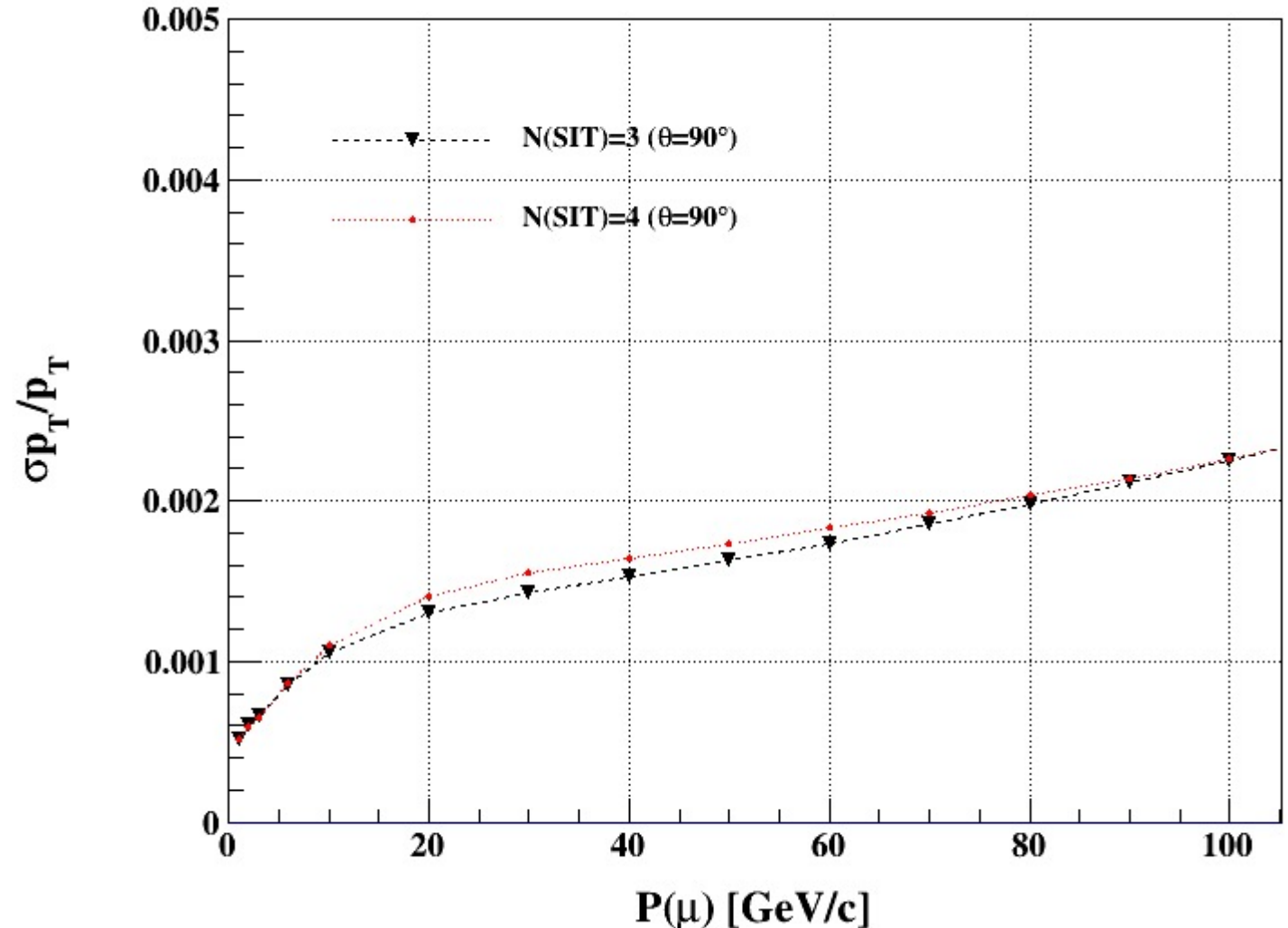
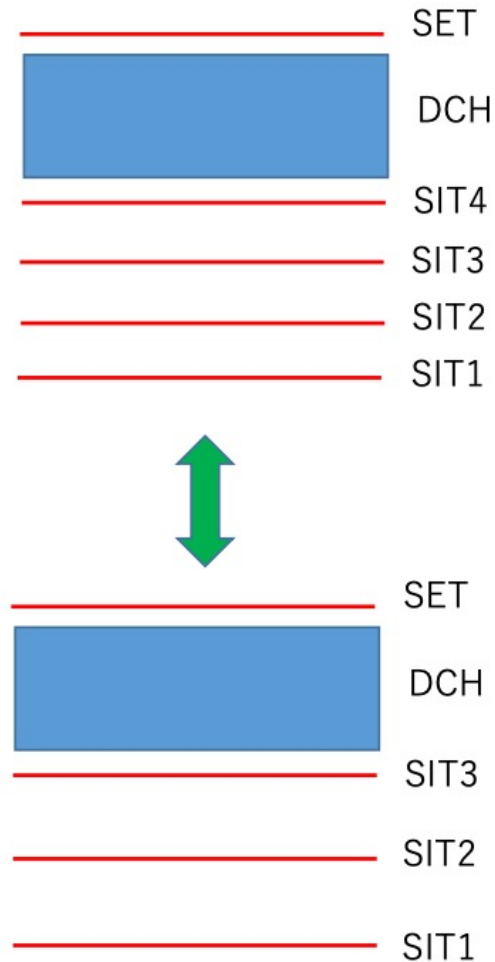
Studies based on LDT software

Configuration for simulation study from Yangzhou meeting (v0)



Sub detector	N layers	Resolution (μm)		Material budget ($\%X_0$)
		r- ϕ	z	
VXD	6	2.8 / 6 / 4 / 4 / 4 / 4	2.8 / 6 / 4 / 4 / 4 / 4	0.15 per layer
SIT	4	7.2	86.6	0.65 per layer
DC (cell 1x1cm ²)	100	100	2000	1.2
SET	1	7.2	86.6	0.65
Total	111	--	--	5.35

New config for Silicon + Drift chamber: 4 layers of silicon (v1)



shows better resolution at this momentum range

Switching to CEPCSW

Configuration

- Tracker geometry

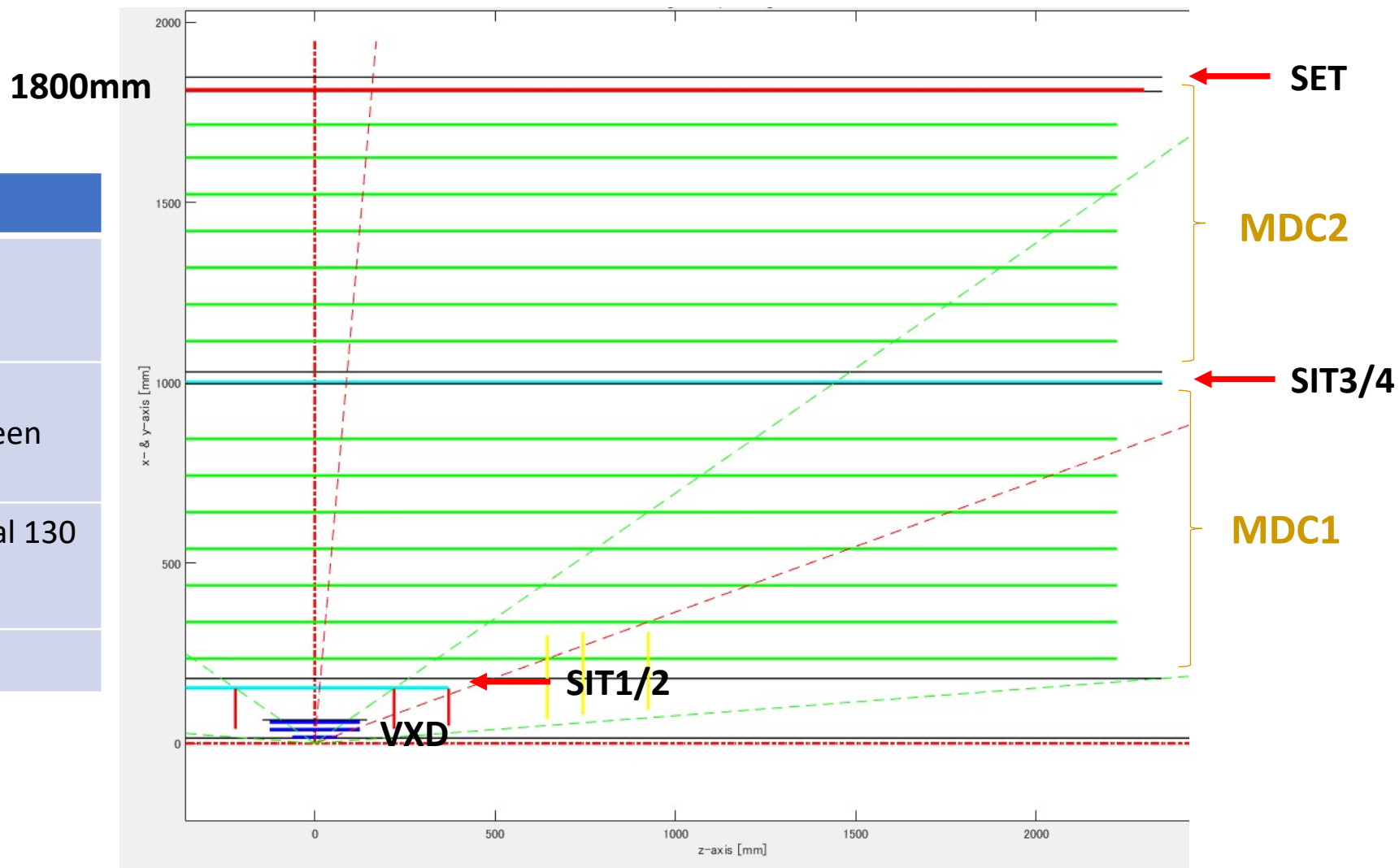
VXD	default config. 6 pixel layers.
SIT	2xstrip sensors as a layer. Second layer locates between 2DCHs. (Res. =7 μ m)
DCH	2 DCHs. 10cm cell size, total 130 layers.
SET	2xstrip sensors

“CRD_o1_v01” configuration

- Particle injection

```
-- muon, 100GeV, 85 degree
```

showing only tracker part of the geometry set in the simulation

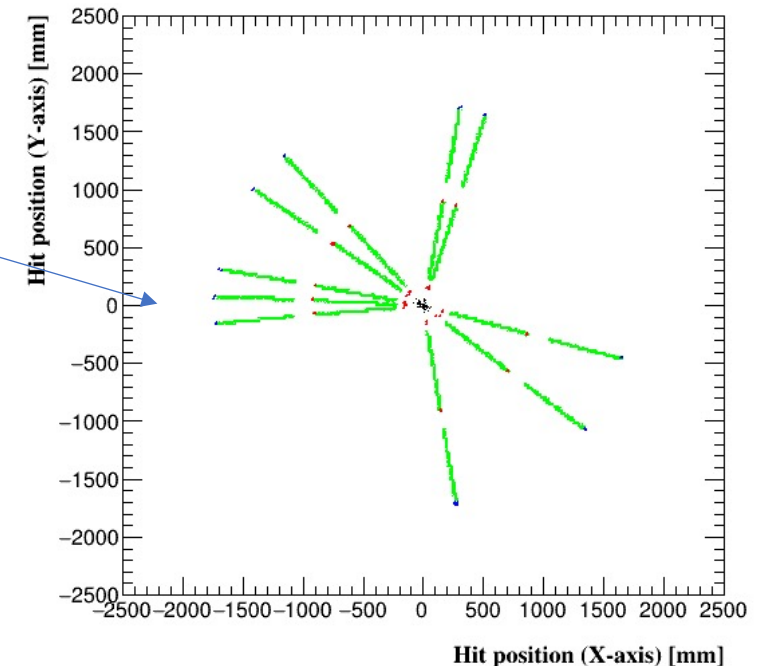


Current status from the CEPCSW (Drift chamber)

- Detector configuration: vertex + silicon + 2*drift chamber
- Fitting programme (Genfit2) with drift chamber + silicon detectors
 - SimHit → digi Hit → Tracking
- Outcome: could produce the momentum resolution

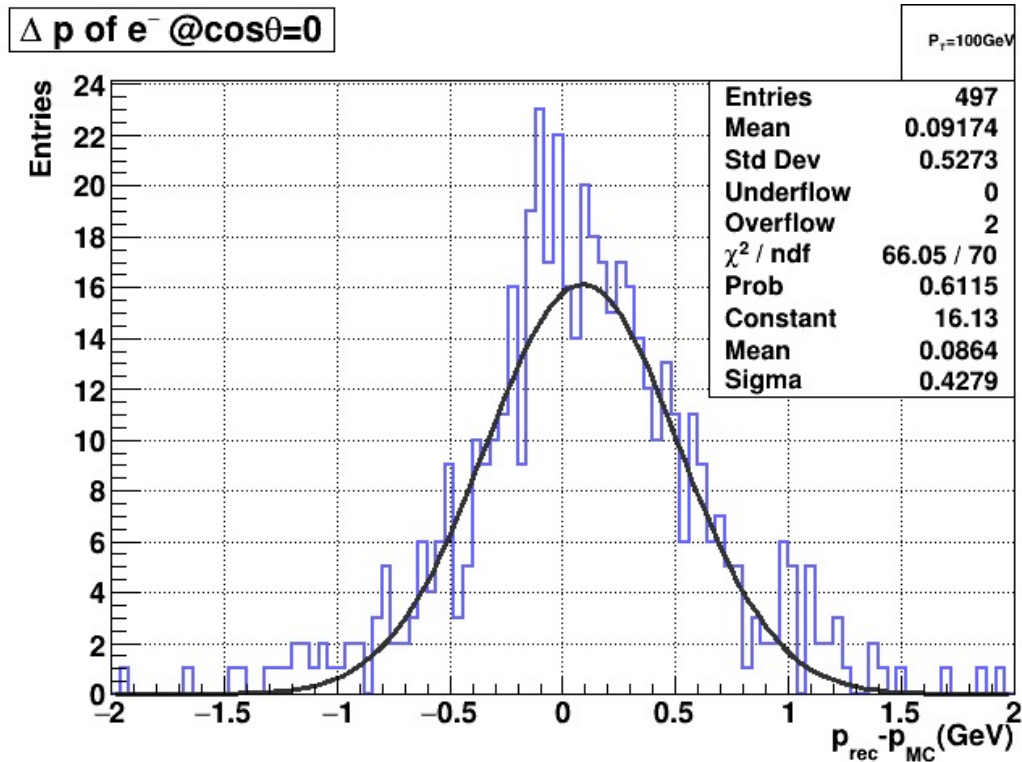
Hits information:

VXD : black
SIT : red
DC : green
SET : blue



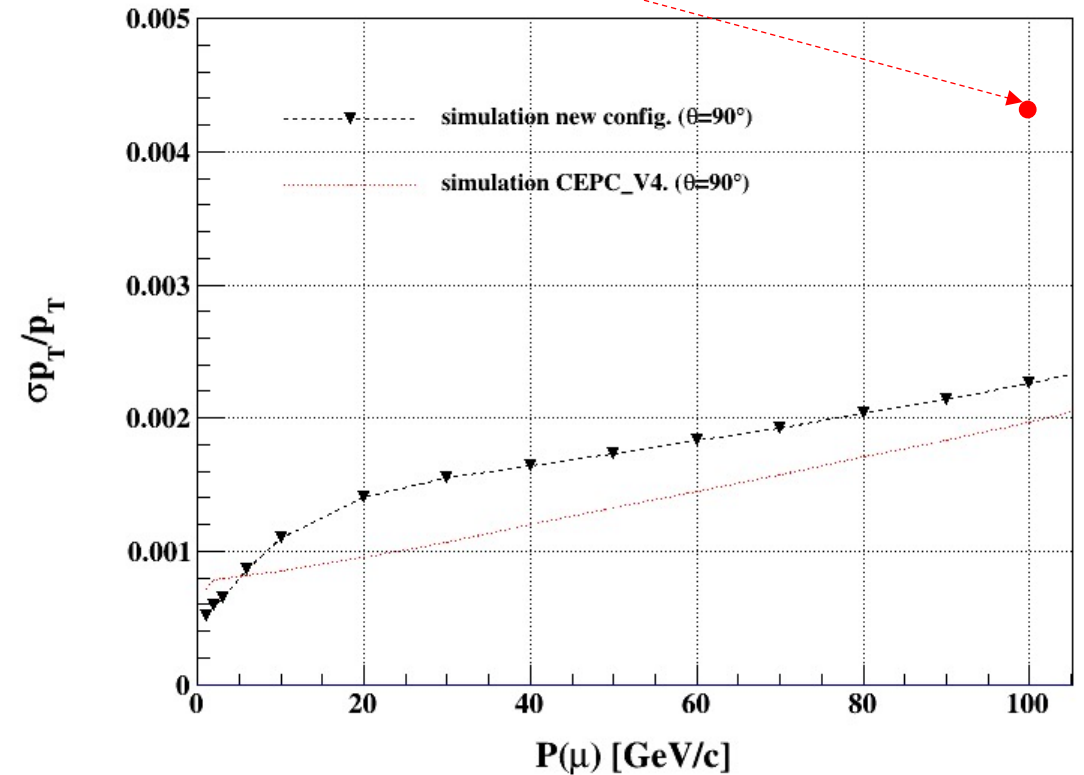
Momentum resolution

$$dp/p = 0.4279/100 = 4.279 \times 10^{-3}$$



500event @ 100GeV

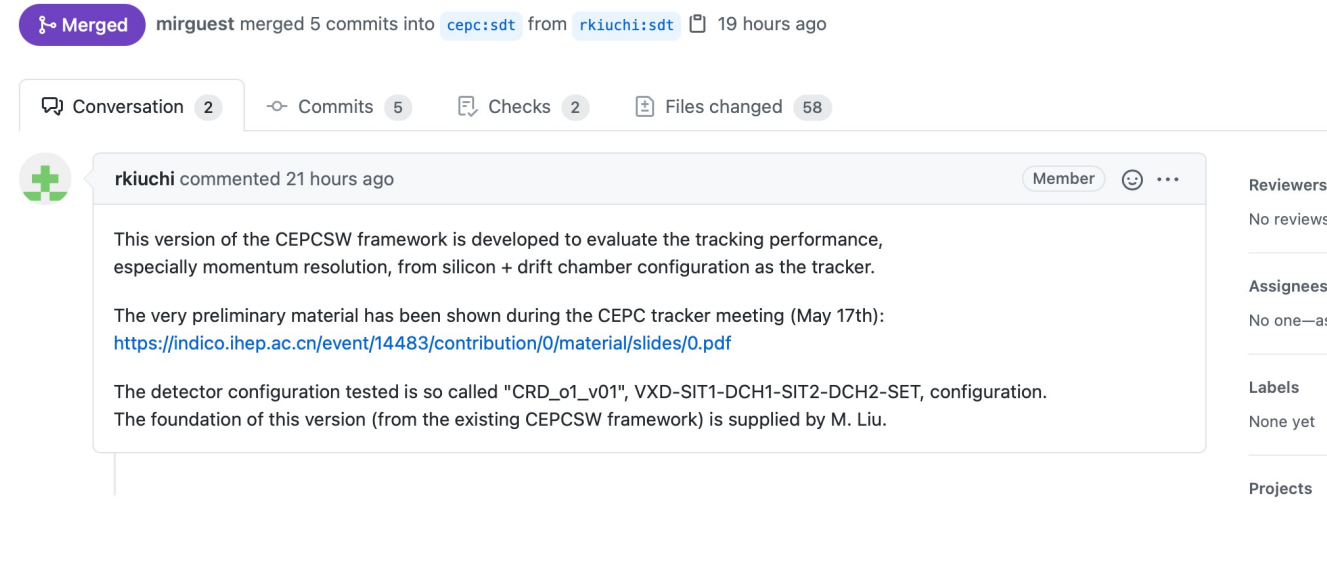
- *different configuration (from the one shown in the Yangzhou meeting)*
- *number of events*
- *further verifications*



Tracking development on github.com

- <https://github.com/cepc/CEPCSW/pull/170>

A version for evaluation of tracking performance of Silicon+Drift chamber tracker #170



Merged mirgquest merged 5 commits into `cepc:sdt` from `rkiuchi:sdt` 19 hours ago

Conversation 2 Commits 5 Checks 2 Files changed 58

rkiuchi commented 21 hours ago

This version of the CEPCSW framework is developed to evaluate the tracking performance, especially momentum resolution, from silicon + drift chamber configuration as the tracker.

The very preliminary material has been shown during the CEPC tracker meeting (May 17th): <https://indico.ihep.ac.cn/event/14483/contribution/0/material/slides/0.pdf>

The detector configuration tested is so called "CRD_o1_v01", VXD-SIT1-DCH1-SIT2-DCH2-SET, configuration. The foundation of this version (from the existing CEPCSW framework) is supplied by M. Liu.

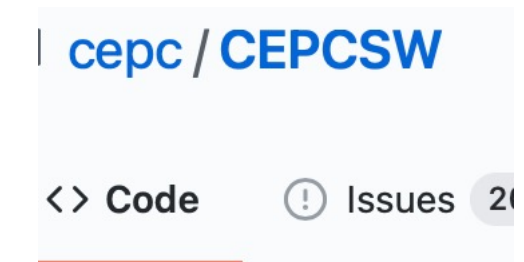
Reviewers: No reviews

Assignees: No one—ass

Labels: None yet

Projects

- SDT team will maintain this branch “sdt”
 - Keep the dialog between the detector and software team



cepc / CEPCSW

<> Code ! Issues 20



sdt

Plan for SDT on CEPCSW

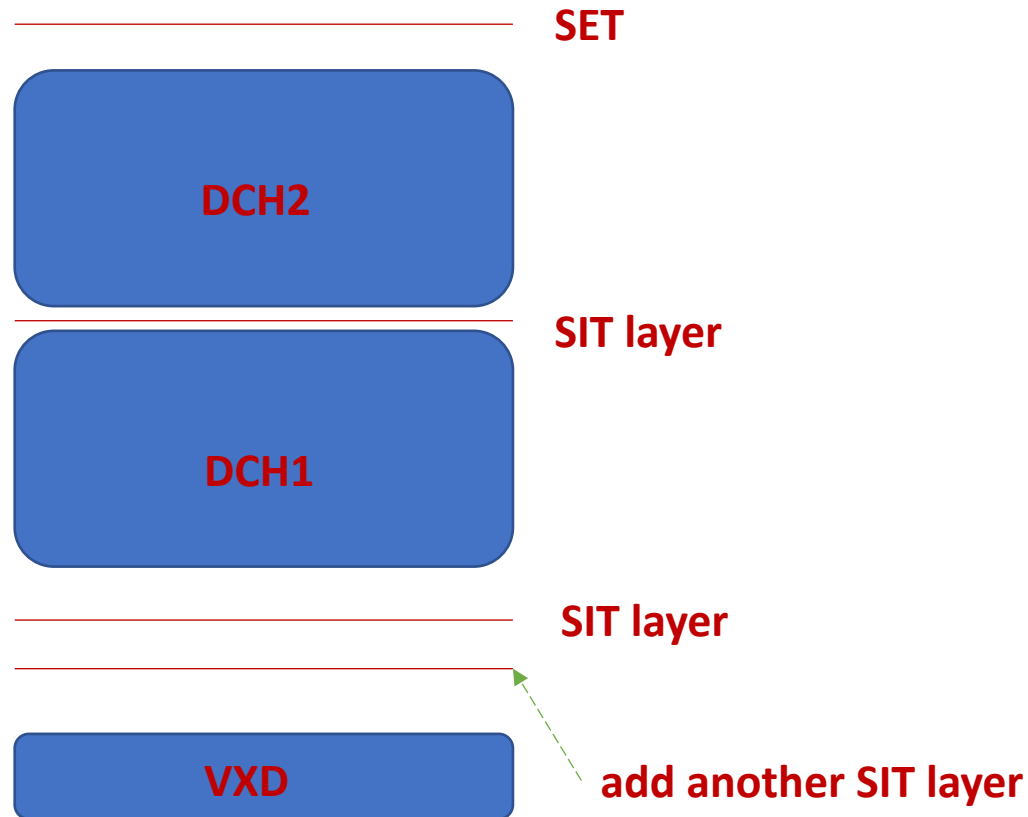
- Prepare the detector config file for v1 (i.e. 4 layers of Si + 1 DCH)
- Use “issues” on github to keep track the development
- Obtain the momentum resolution figure (with the help from CEPCSW developers)
- Focus on the barrel region
 - Material buget dependent from DCH (which side)
 - Momentum reso. w/ and w/o DCH
 - Parameters of DCH (thickness, cell size, gas)
 - Other angles in barrel
 - PID performance

Thanks a lot from software team !

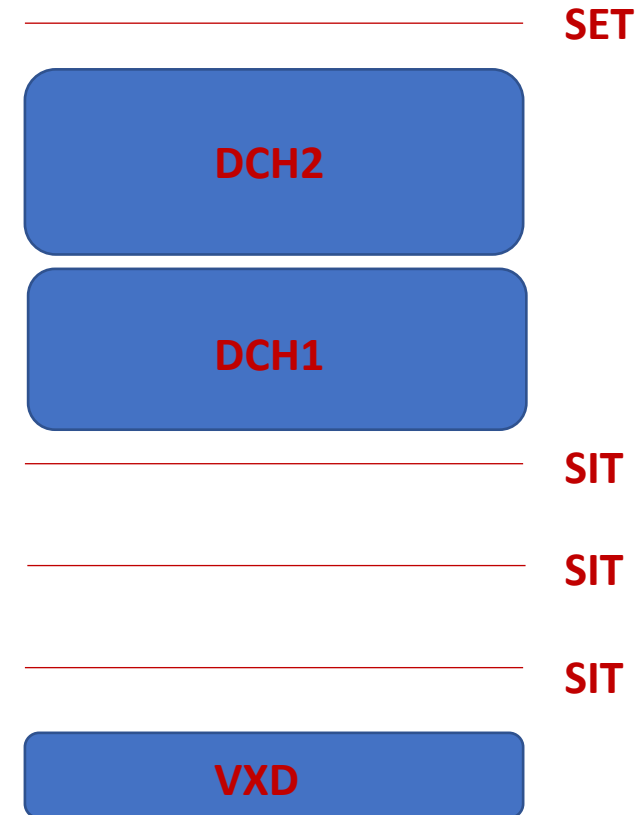
Backup

Customize the configuration

Example 1 :
insert another SIT layer



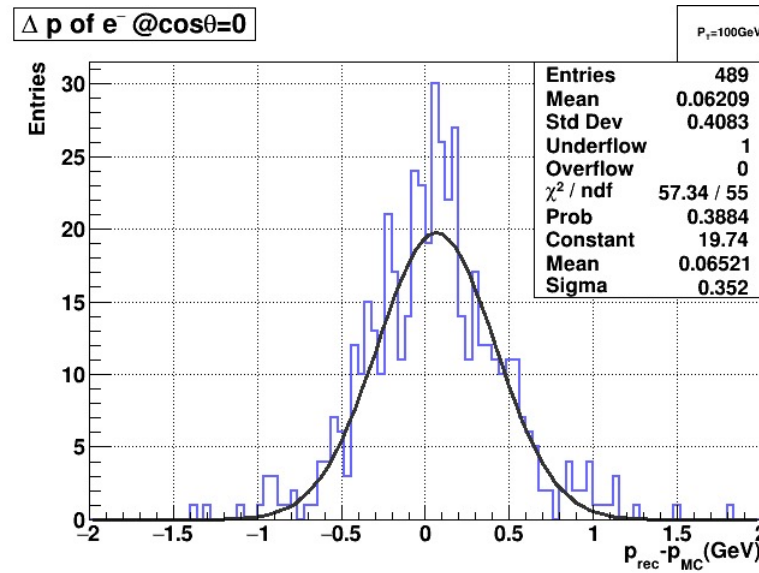
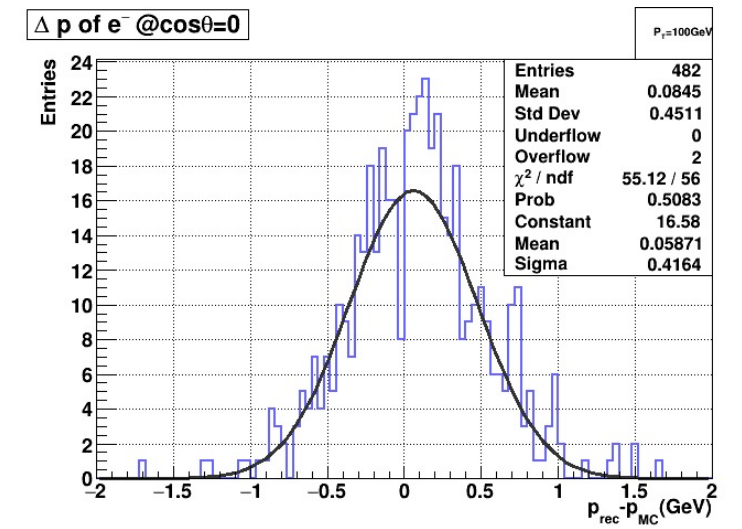
Example 2 : Shrink the DCHs (800-1800) and
set 3 SIT layers correspondingly



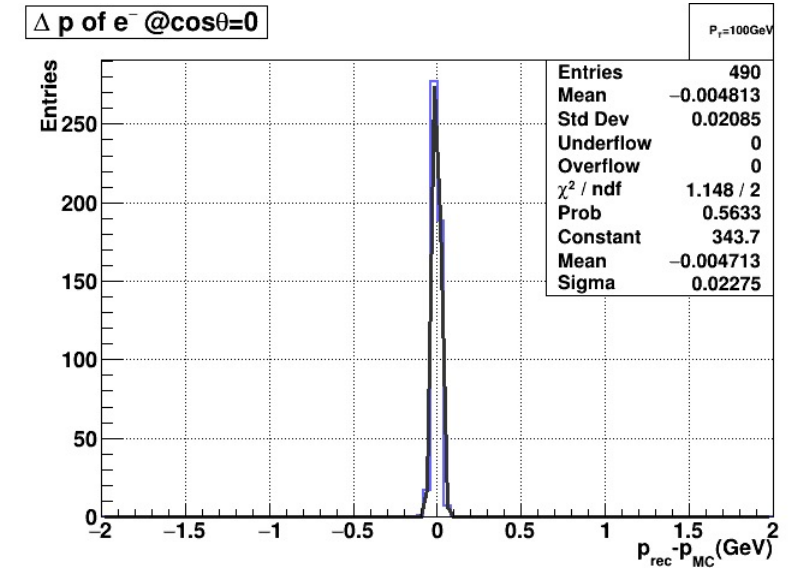
Users can modify and update the geometry

preliminary numbers. Need further confirmation of geometry settings.

Example1, P=100GeV,
dp/p $\sim 4.2 \times 10^{-3}$



Example2, P=100GeV, dp/p $\sim 3.5 \times 10^{-3}$



Example2, P=10GeV
dp/p $\sim 2.3 \times 10^{-3}$