#### CEPC Tracking System Optimization Update



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### Introduction

- Three existing detector concept for CDR
  - Silicon + TPC
  - Full Silicon Tracker
  - IDEA Concept







- The 4<sup>th</sup> detector concept
  - Silicon Vertex + Siliconn Tracker for momentum measurement
  - Drift chamber optimized for PID
  - Transverse crystal bar ECAL optimized for  $\pi^0\!/\gamma$  reconstruction
  - Solenoid magnet between HCAL and ECAL



# Configuration for simulation study





Sub detector	N layers	Resolustion (µm)		Material budget (%X <sub>0</sub> )
		r-ф	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 <sup>2</sup> )	100	100	2000	1.2
SET	1	7.2	86.6	0.65
Total	111			5.35

### Momentum resolution : $N_{SIT}$ =4 vs 3



shows better resolution at this momentum range

# Change the DCH position



- DCH size = 1000mm, Nlayers=100layers , are unchanged now.
- position of "SIT3" is shifted when the DCH is set at the center

#### Momentum resolution : DCH position center



• At higher momentum, resolution for DHC-center config. became worse

#### Momentum resolution : smaller DC



• This option is not promising

### Momentum resolution : with/without DCH



• SITs are the original position. dpt/pt became worse at low momentum

# Momentum resolution : comparison configs w/o



• SITs position affect the momentum resolution (higher momentum side is mainly decided by this)

# Momentum resolution : comparison by changing DCH size



• SIT position is unchanged. These configuration show resolution of very same level.

# Summary and Plan

- Comparison of momentum resolution (in [0,100]GeV) by changing followings:
  - NSIT = 4 vs 3
  - Position of DCH at the center of tracker vs top (default)
  - Position of DCH at the "bottom" of tracker vs default
  - DCH size : 1000mm (default) vs 800mm

Plan

- Other angles study
- Parameters of DC (thickness, cell size, Gas)
- Lenght of barrel region (limit, resolution scan)