



# Fast Simulation for CEPC Tracker Optimization

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# Baseline Design



There are 6 VXD, 4 SIT, 1 DC and 1 SET, their parameters are as follows.

Detector	Layer	Radius(mm)	Material budget[X0]
VXD	1	16	0.15%
	2	18	0.15%
	3	37	0.15%
	4	39	0.15%
	5	58	0.15%
	6	60	0.15%
SIT	1	80	0.65%
	2	320	0.65%
	3	560	0.65%
	4	800	0.65%
DC	100	800~1800	0.34%
SET	1	1815	0.65%

(From youhui's talk)



# Optimization



Detector	Layer	Radius(mm)	Material budget[x/X0]
shell	1	78	0.0015
SIT	1	80	0.0065
	2	320	0.0065
	3	560	0.0065
	4	800	0.0065
Inner wall	1	800	0.00104
DC	100	800-1800	0.000116
Outer wall	1	1800	0.01346

- VXDS and SET stay unchanged
- The outer radius of DC stays unchanged

- Change the radius of DC and SITs and the number of DC's layers at the same time



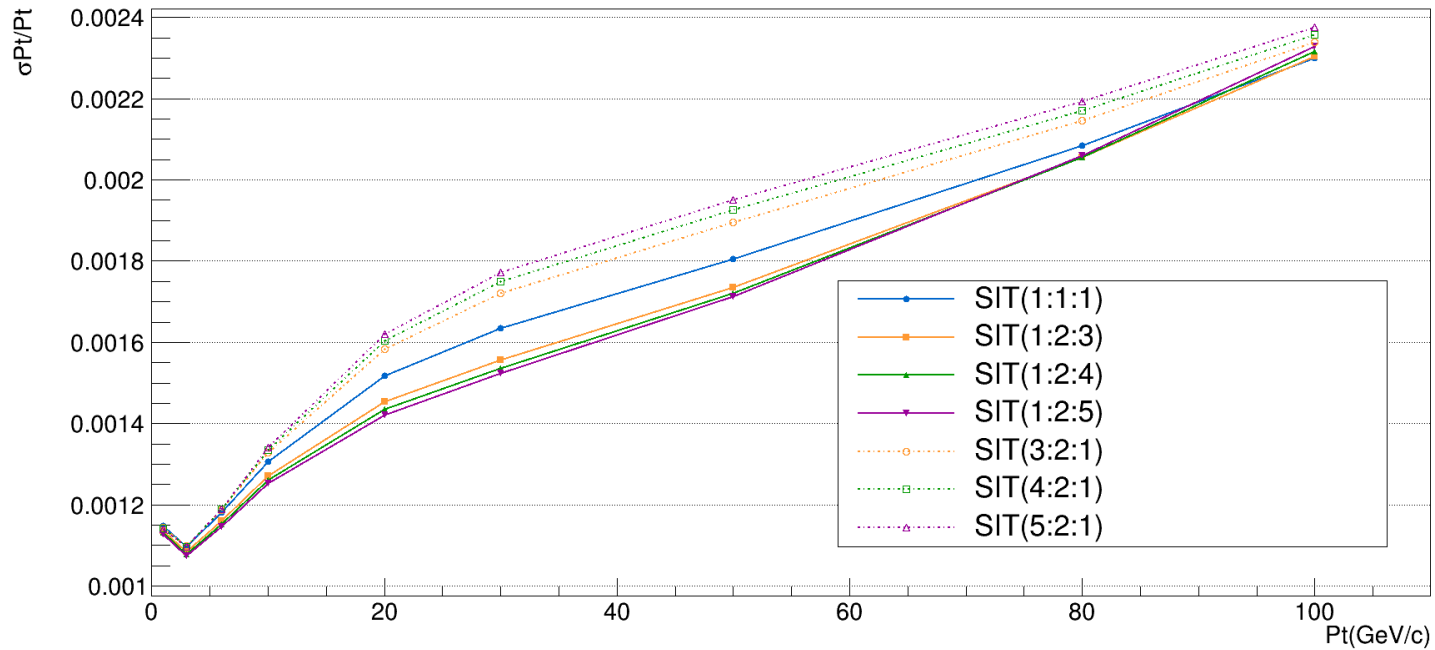
# Optimization of SITs layout

from youhui's talk



- Layers at 80 and 800mm fixed
- Only two layers can move

Graph





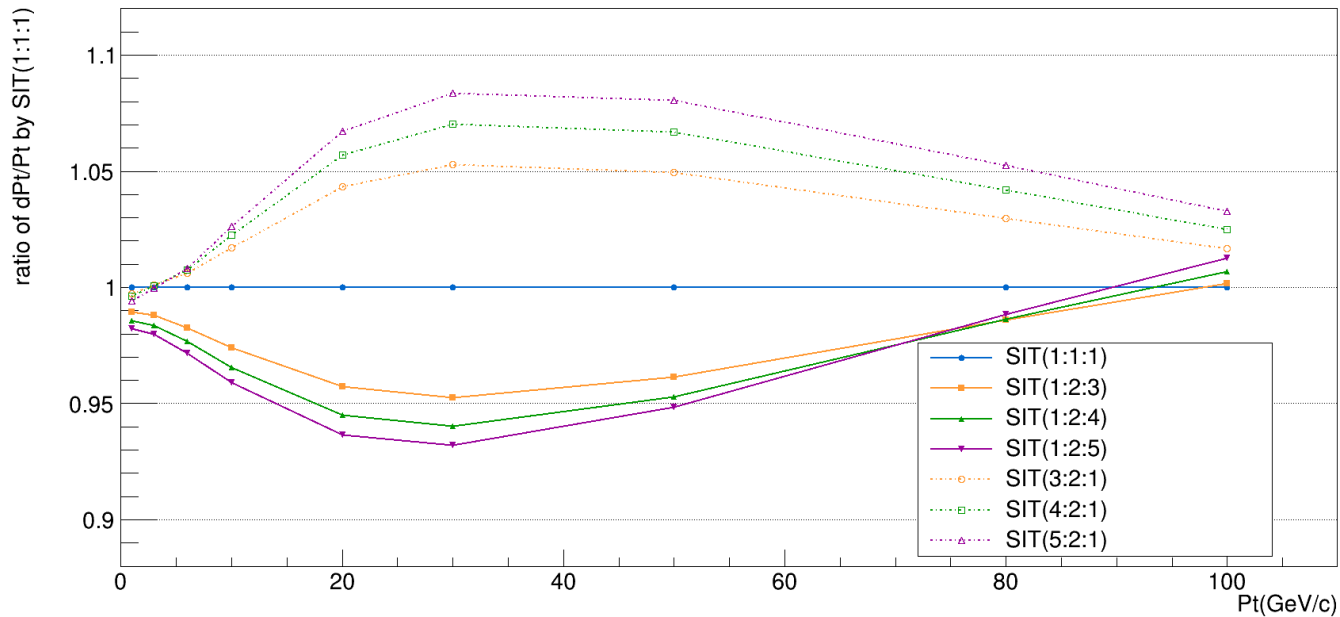
# Optimization of SITs layout

from youhui's talk



- Layers at 80 and 800mm fixed
- Only two layer can move

Graph



Consistent with Hao and Cheng's result



# Optimization of radius and # of layers



- 10x10 cell , material budget 0.000116
- SIT spacing 1:1:1

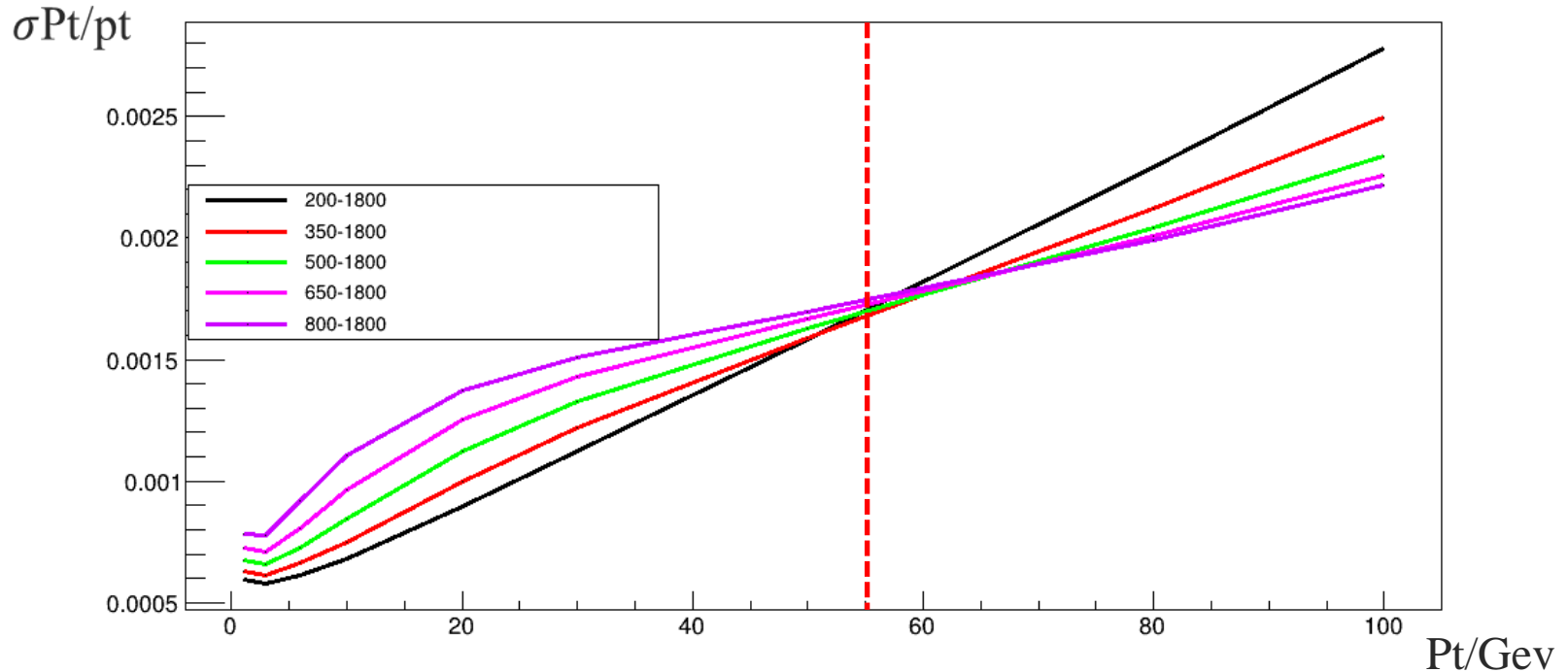
Radius of DC	#of layer	Radius of SITs			
200-1800	160	80	120	160	200
350-1800	145	80	170	260	350
500-1800	130	80	220	360	500
650-1800	115	80	270	460	650
800-1800	100	80	320	560	800



# Optimization of radius and # of layers



sigmaPt MSON



- $Pt$  below  $\sim 55$  GeV , smaller inner radius makes better resolution
- $Pt$  above  $\sim 55$  GeV , on the contrary



# Summary



- SIT layers favor to be near to beamline except the two fixed layers(from Gang's talk)
- At low Pt, smaller inner radius(and more layers) of DC(1:1:1) makes better resolution and at high Pt opposites





THANKS !