Fast Simulation for CEPC Tracker Optimization

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Baseline parameters

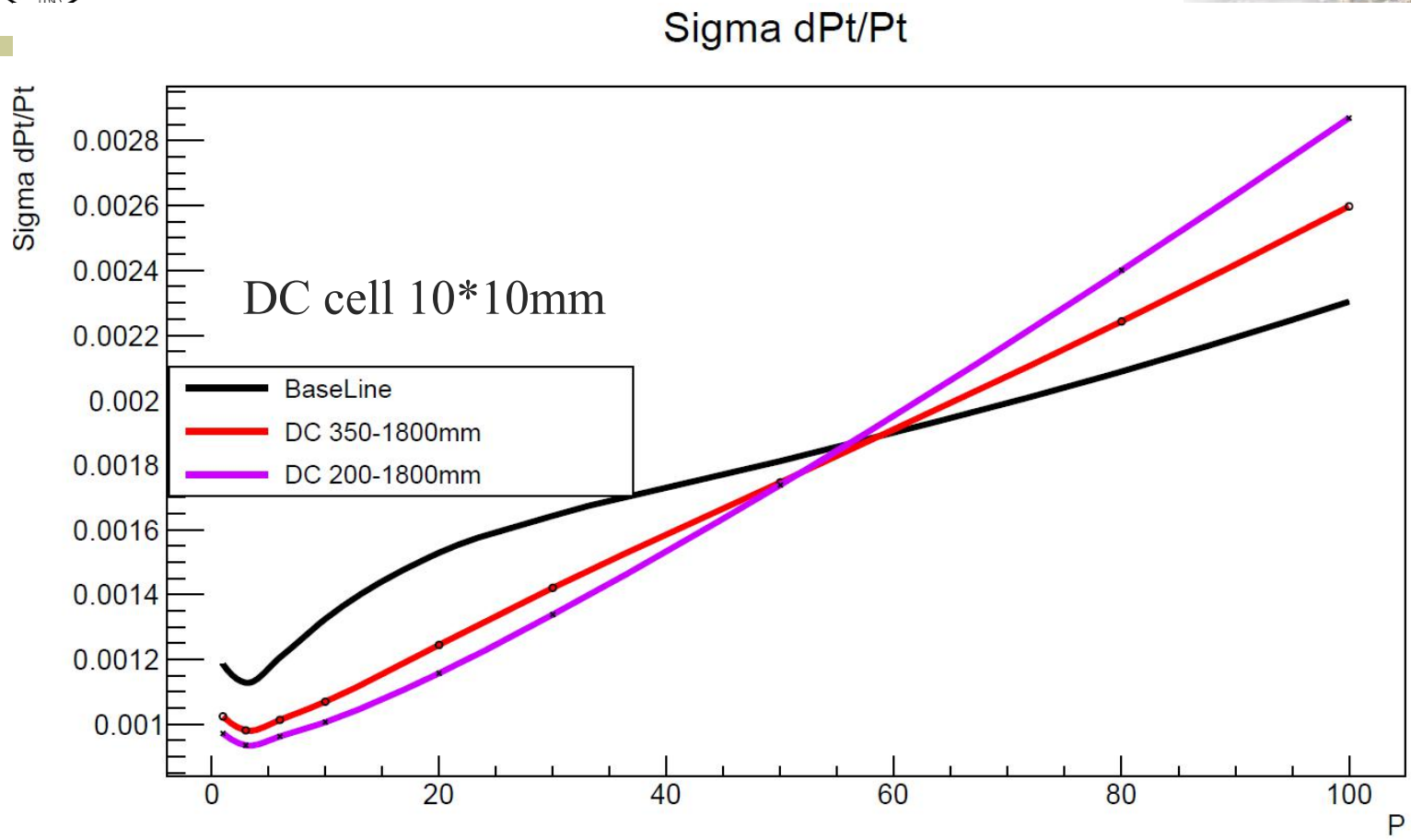
Baseline parameters updated coincide with Zepeng's talk.

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 per layer
Outer wall	1	1800	0.01346

DC Cell parameters

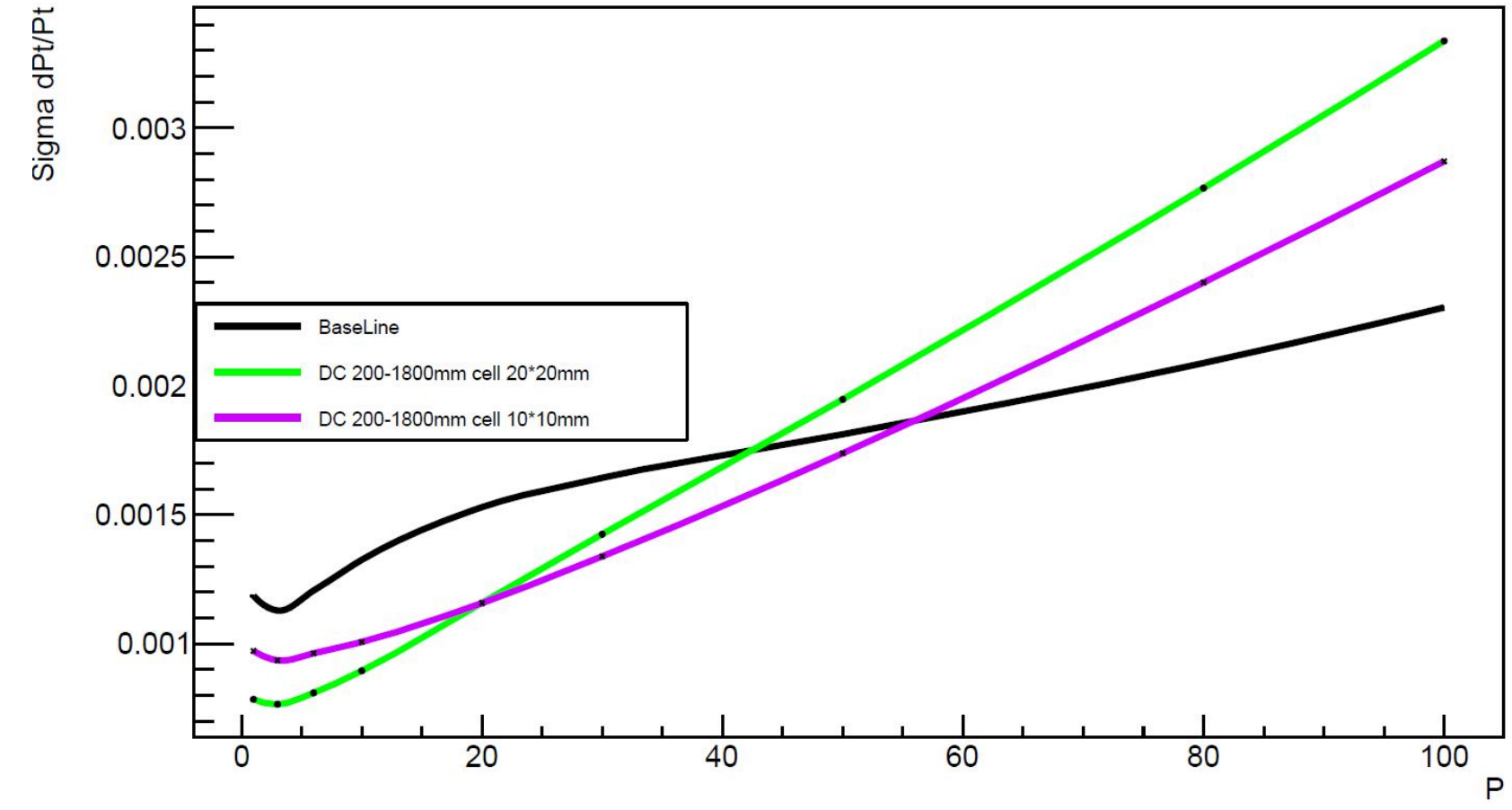
Cell size/ mm	Layer	x/X0 per layer	DC radius/ mm
10*10 (base line)	100	0.000116	800-1800
15*15	97	0.000123	345-1800
20*20	80	0.000139	200-1800

DC cell fixed

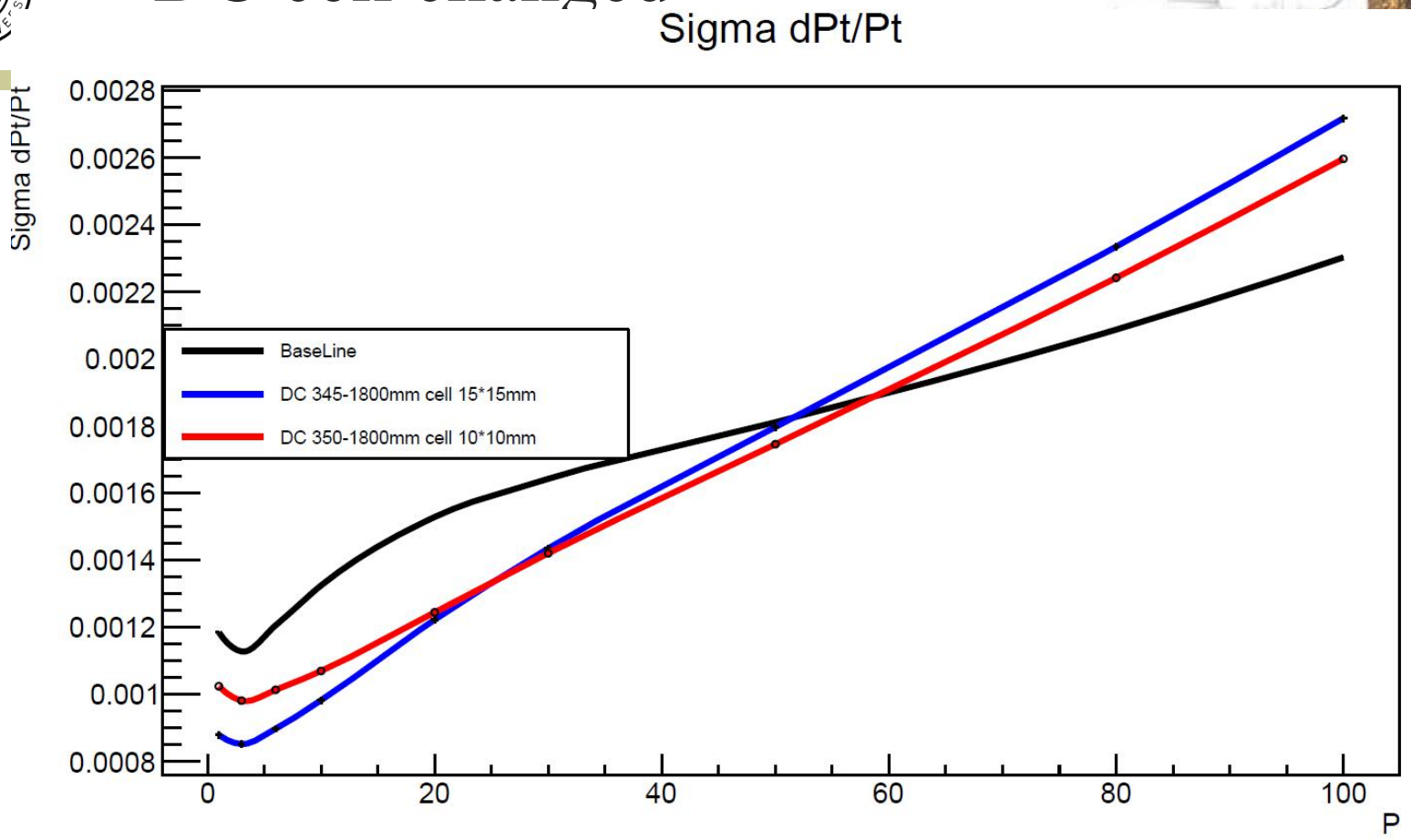


At low Pt, smaller inner radius of DC makes better resolution and at high Pt opposites, the transition point is 55GeV (Zepeng's conclusion).

DC cell changed



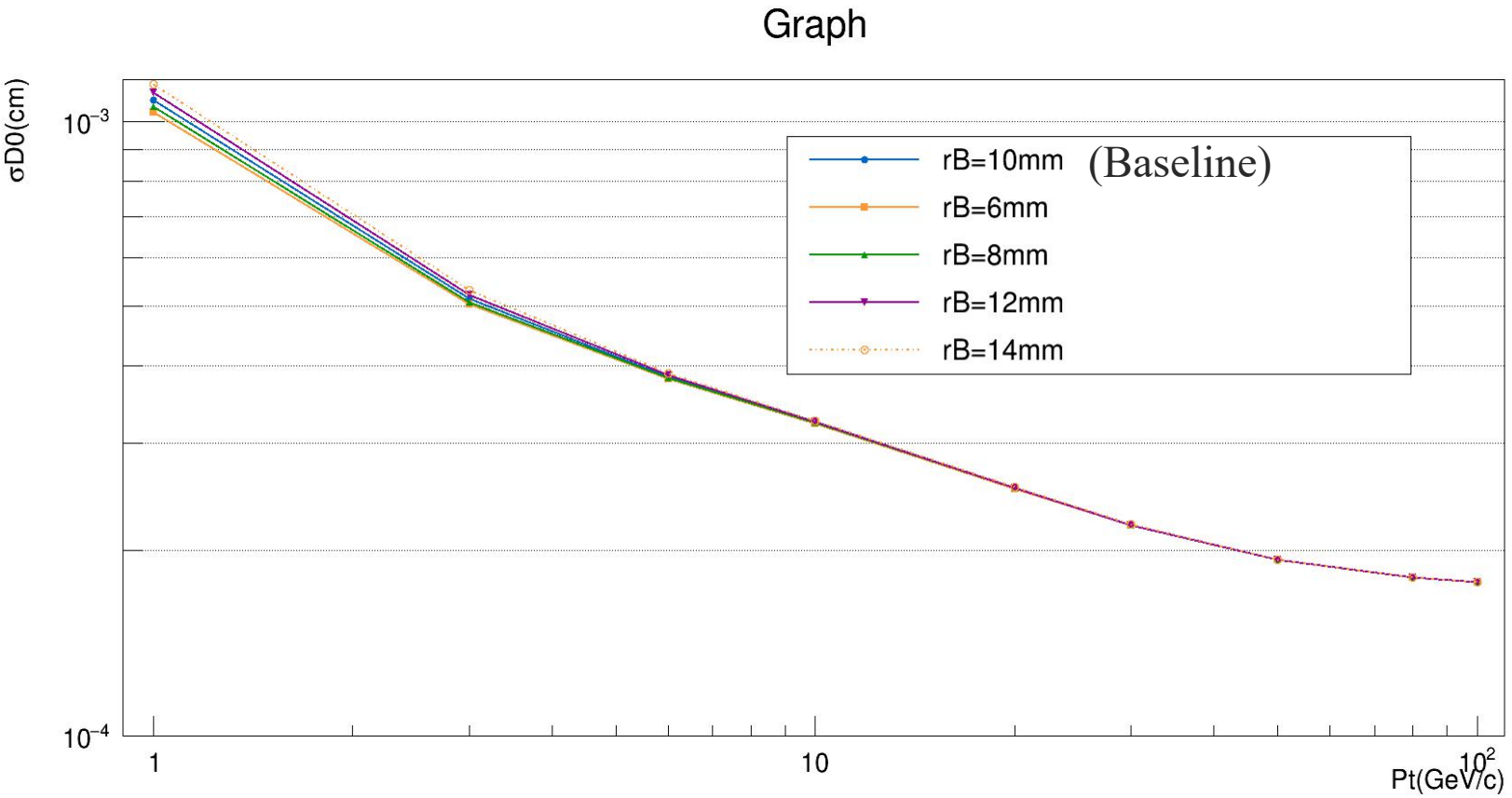
DC cell changed



At low Pt range, increasing cell size(i.e. reducing the number of layers), could help to improve Pt resolution.

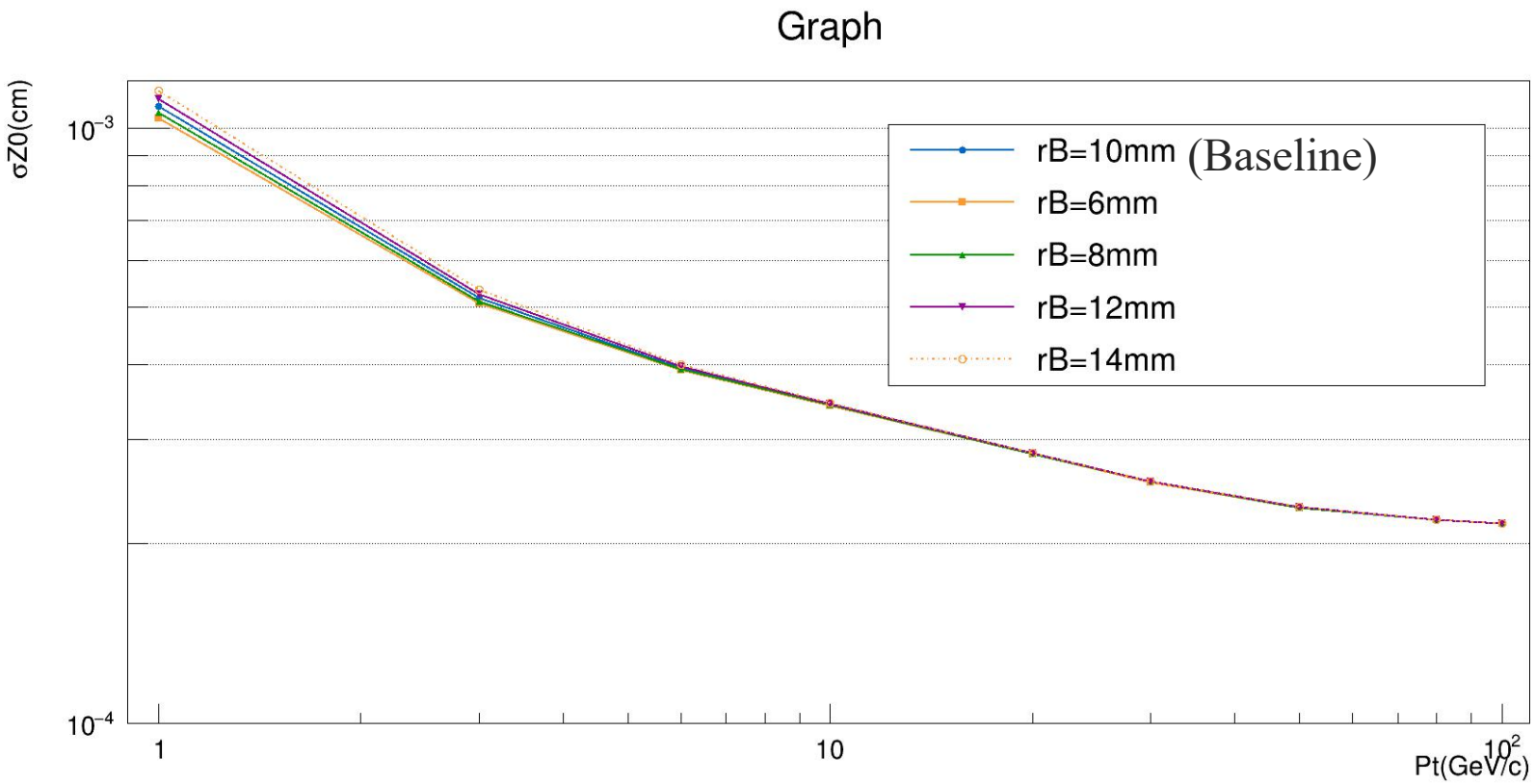
At high Pt range, the conclusion is opposite.

Beam radius changed



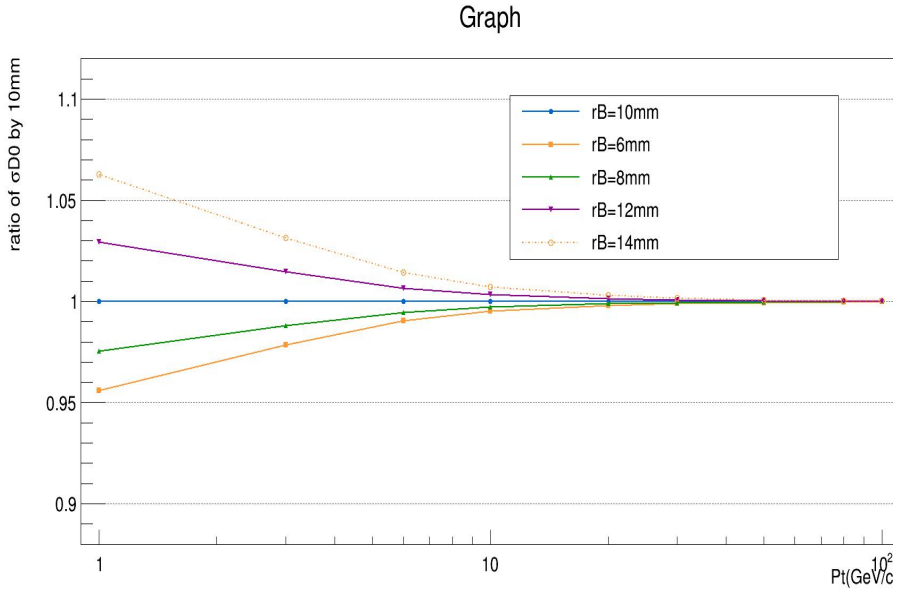
(Youhui's result)

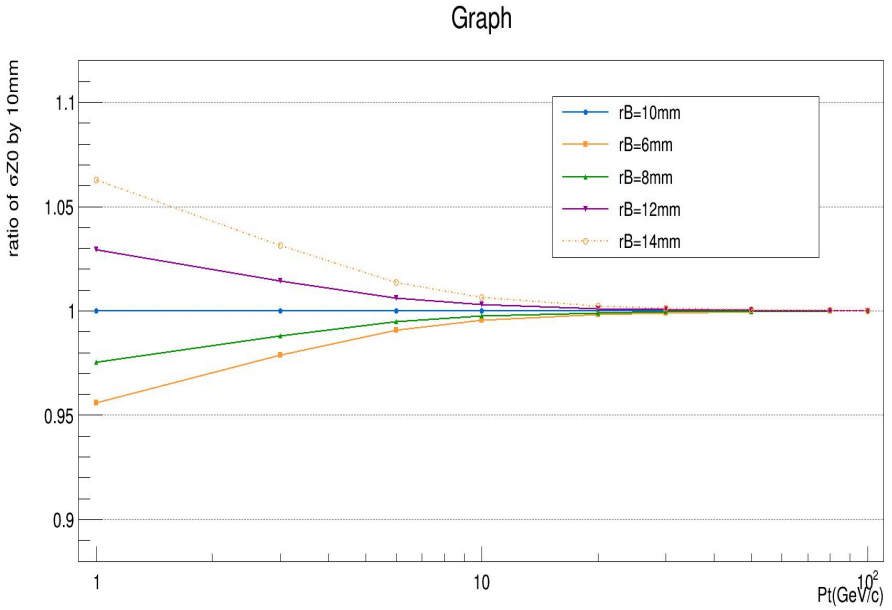
Beam radius changed



(Youhui's result)

Beam radius changed

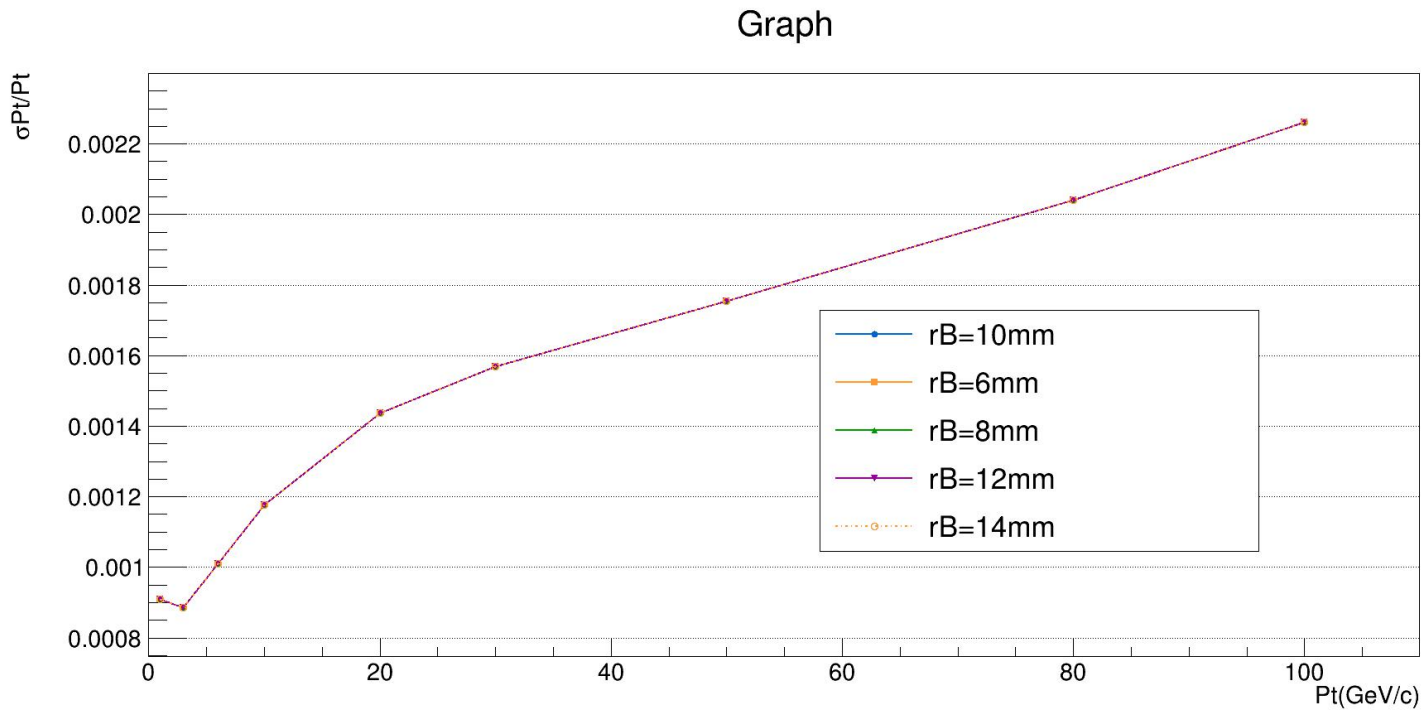




The smaller beam radius gets better d0 and z0 resolution.

(Youhui's result)

Beam radius changed



Pt resolution not changed.

(Youhui's result)

Summary

1.At low Pt range, increasing DC cell size (i.e. reducing number of layers), could help to improve Pt resolution.

At high Pt range, the conclusion is opposite.

2.The smaller beam radius gets better d0 and z0 resolution.

Pt resolution does not changed under different beam radius.

THANKS!