# Tracking Simulations using LDT

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Momentum Resolutions Comparisons from Last Update

All barrel hits

η=0.0

LDT v1
DD4hep, no mat map
DD4hep, w/ mat map
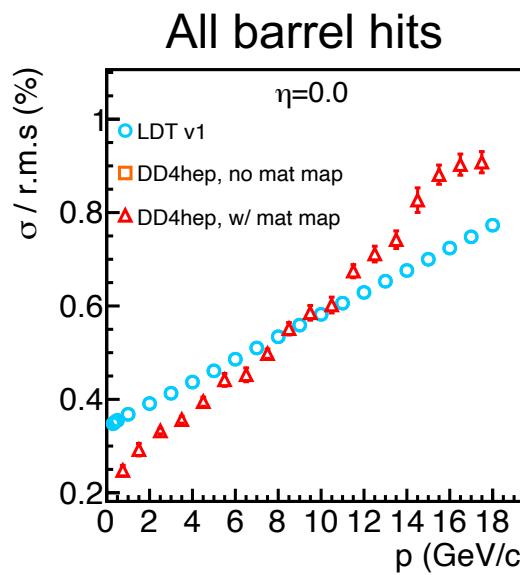
ACTS: X/X_0=0.0131
LDT: X/X_0=0.0128

The gap

η=-0.9
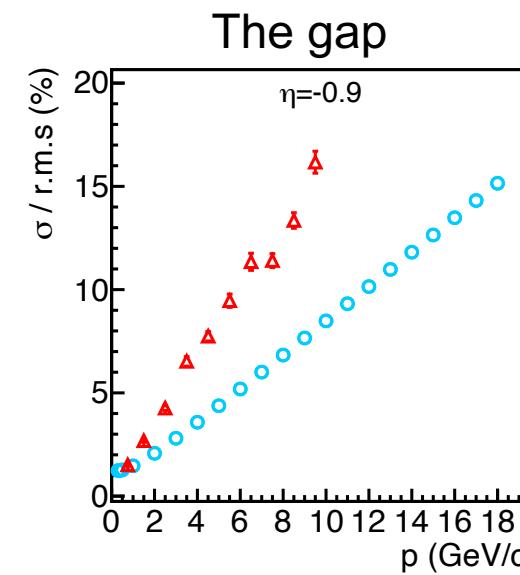
ACTS: X/X_0=0.0095
LDT: X/X_0=0.0068

2 barrel + 3 disk hits

η=-1.4
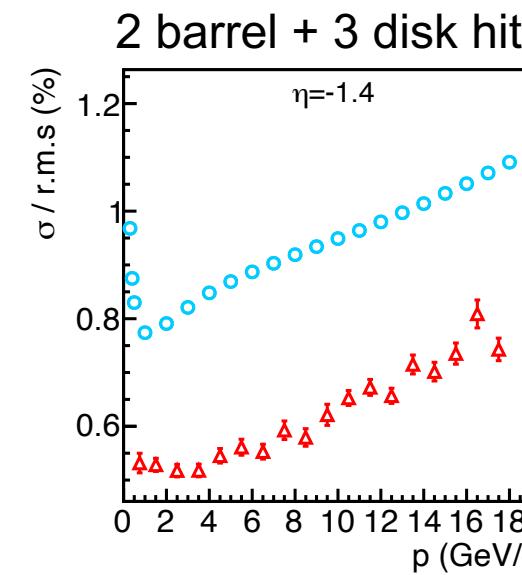
ACTS: X/X_0=0.0181
LDT: X/X_0=0.0180

All disk hits

η=-2.5
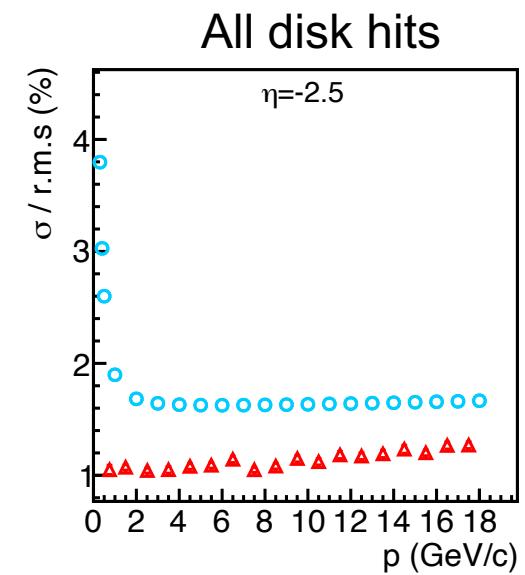
ACTS: X/X_0=0.0347
LDT: X/X_0=0.0352

What Have Changed?

There are changes in LDT only:

- B field: 1.46 T to 1.7 T

- Set beam pipe material thickness=0

- Silicon disk resolutions
  (du,dv) = (5.77,0) um → (20,20) um

- Barrel layer resolutions
  (dRϕ,dz) = (5.77,nan) um → (20,20) um

Suggestions from Ernst

Let's call this v2

Momentum Resolution Comparison

All barrel hits
η=0.0
○ LDT v1
□ LDT v2
△ DD4hep

The gap
η=-0.9

2 barrel + 3 disk hits
η=-1.4

All disk hits
η=-2.5
Slope looks ok
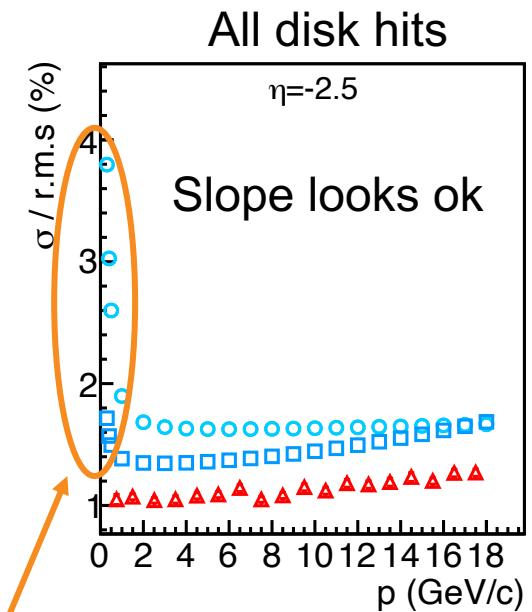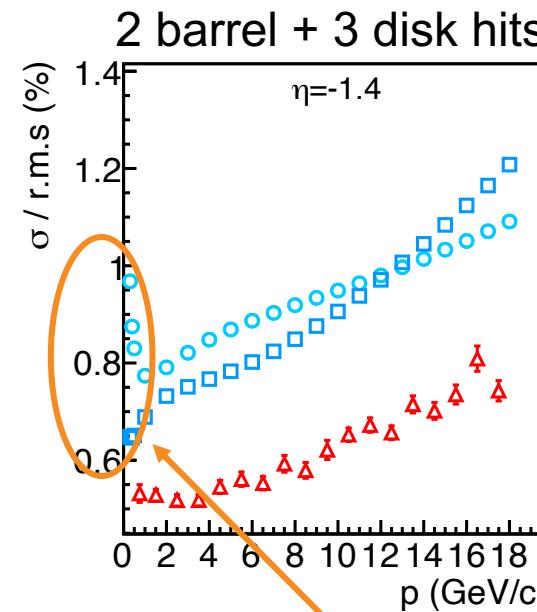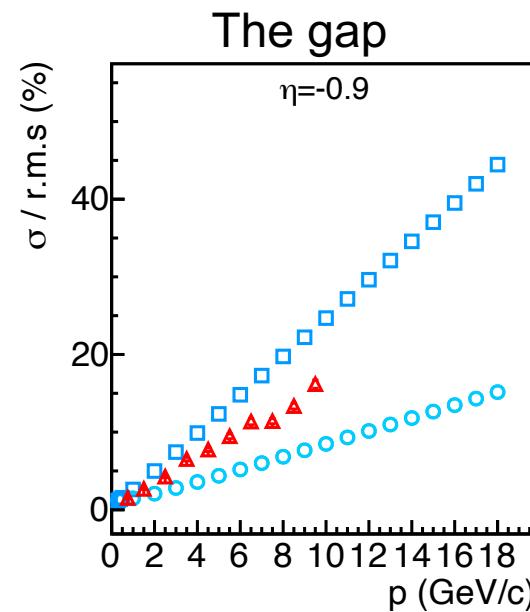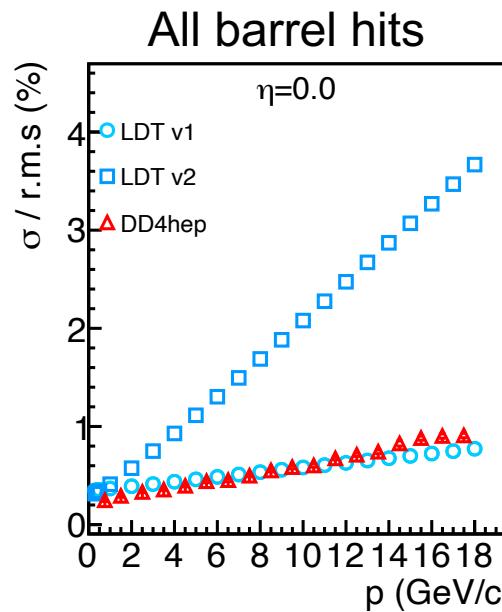
The slope way too steep→ the resolution is definitely off

From the reduction of beam pipe material

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Momentum Resolution with Different Barrel Resolutions

All barrel hits

$\eta=0.0$
- ○ drphi=20um,dz=20um
- □ drphi=10um,dz=10um
- △ drphi=10um,dz=5um
- ◇ drphi=5um,dz=10um
- ✛ DD4hep

The gap

$\eta=-0.9$

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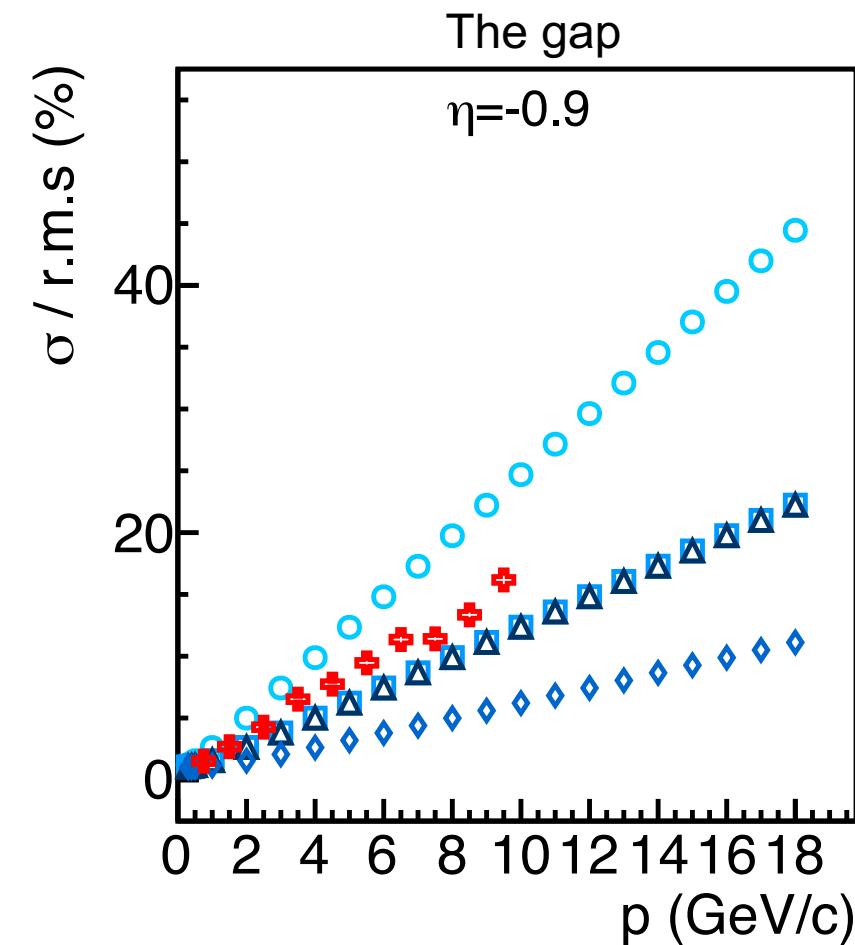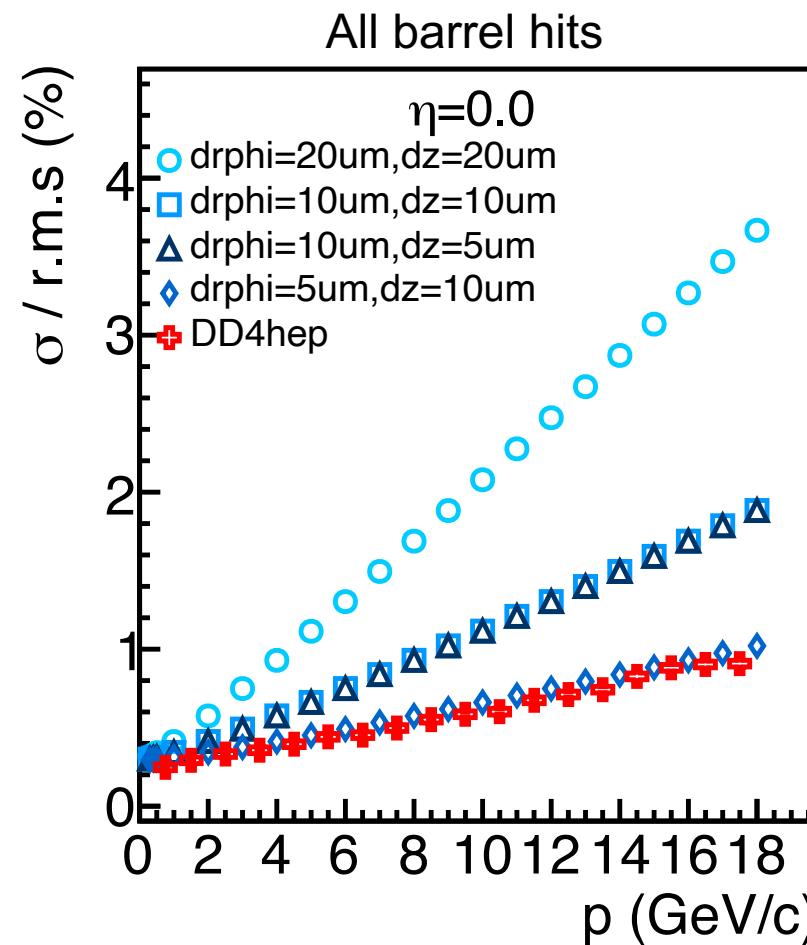
Summary

- There is still a discrepancy between LDT and DD4hep
- Need to better understanding of the definitions of the barrel layer resolution

Back Up

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Material Budget Comparison

η	DD4hep/ACTS	LDT	(LDT-DD4hep)/DD4hep
-2.9	0.0426	0.0434	1.9%
-2.5	0.0347	0.0352	1.4%
-2.4	0.0327	0.0331	1.2%
-2.2	0.0293	0.0296	1.0%
-2	0.0281	0.0282	0.36%
-1.4	0.181	0.0180	-0.55%
-0.9	0.0095	0.0068	-28%
-0.6	0.0153	0.0151	-1.3%
0	0.0131	0.0128	-2.2%
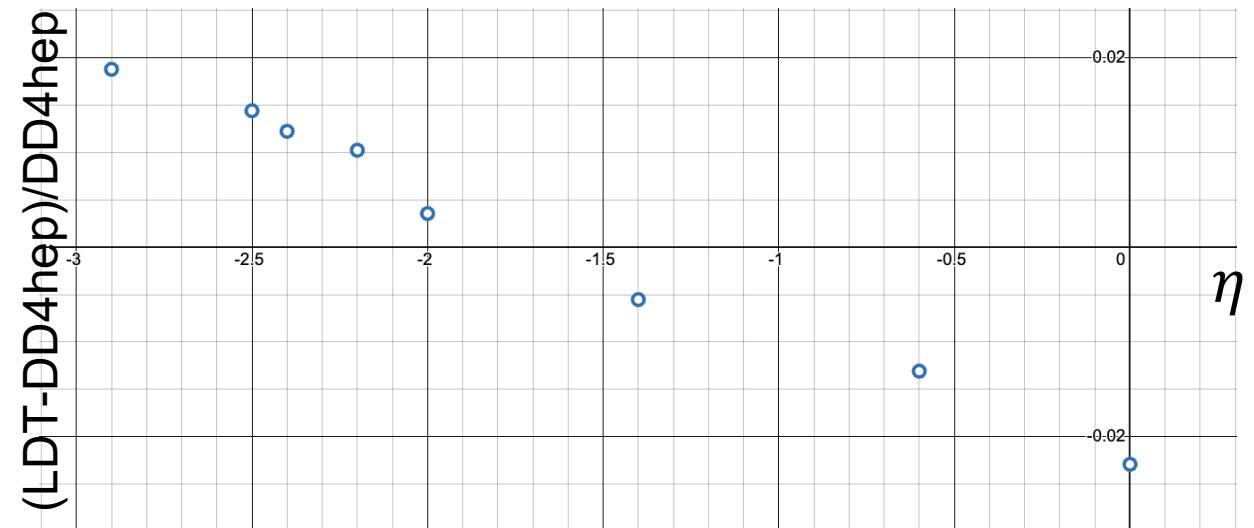
2D Layout of the Tracking Detector in LDT