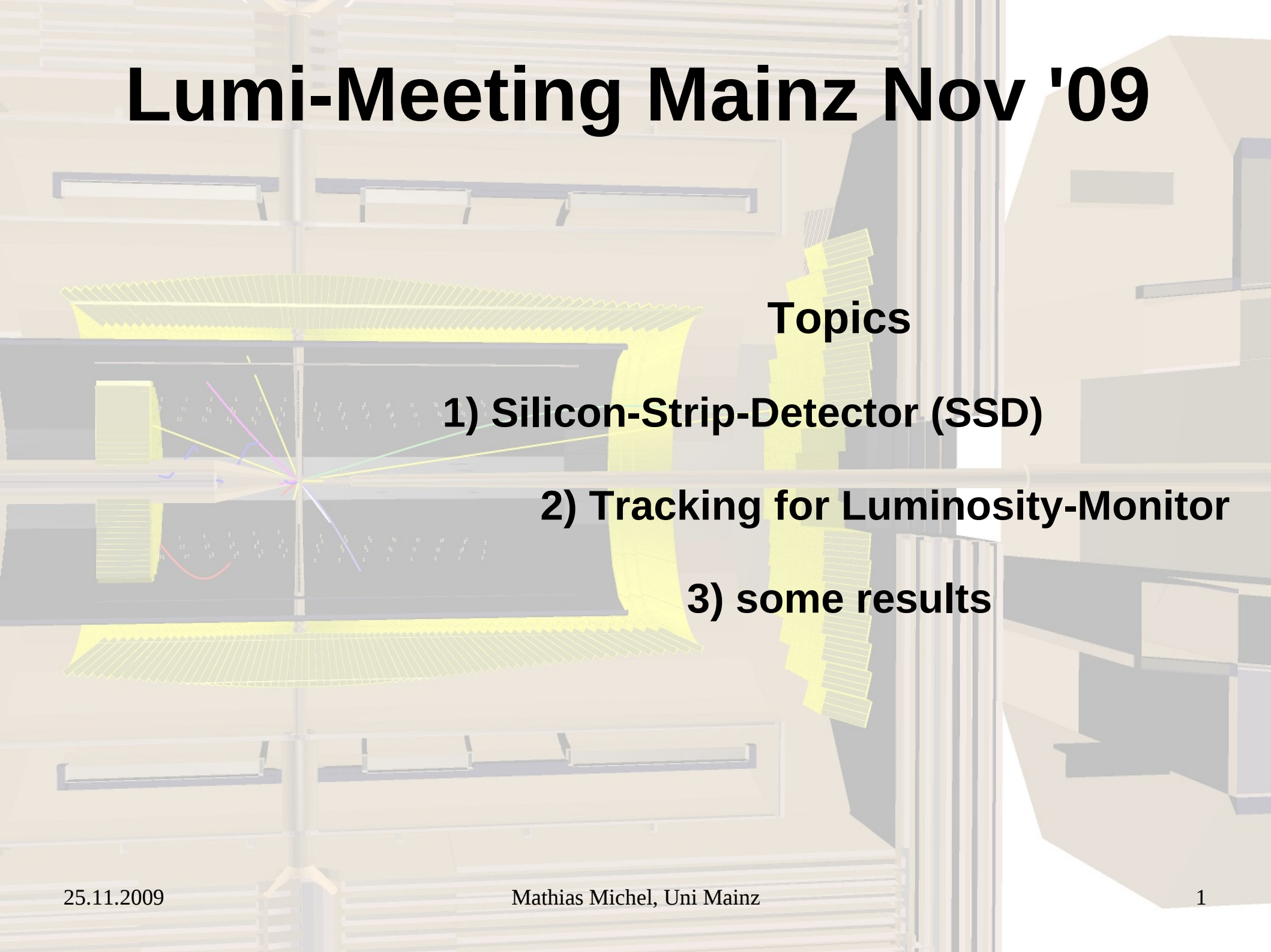
Lumi-Meeting Mainz Nov '09



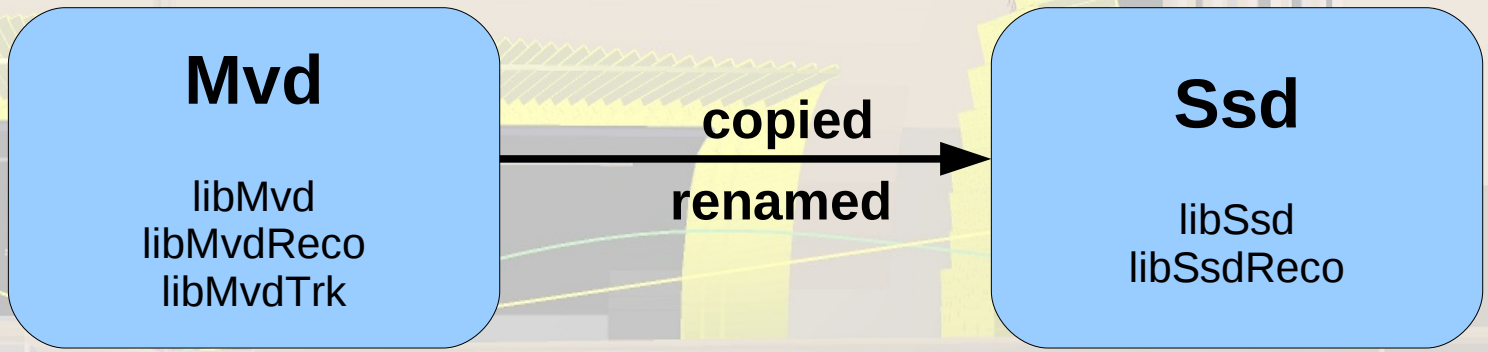
Topics

1) Silicon-Strip-Detector (SSD)

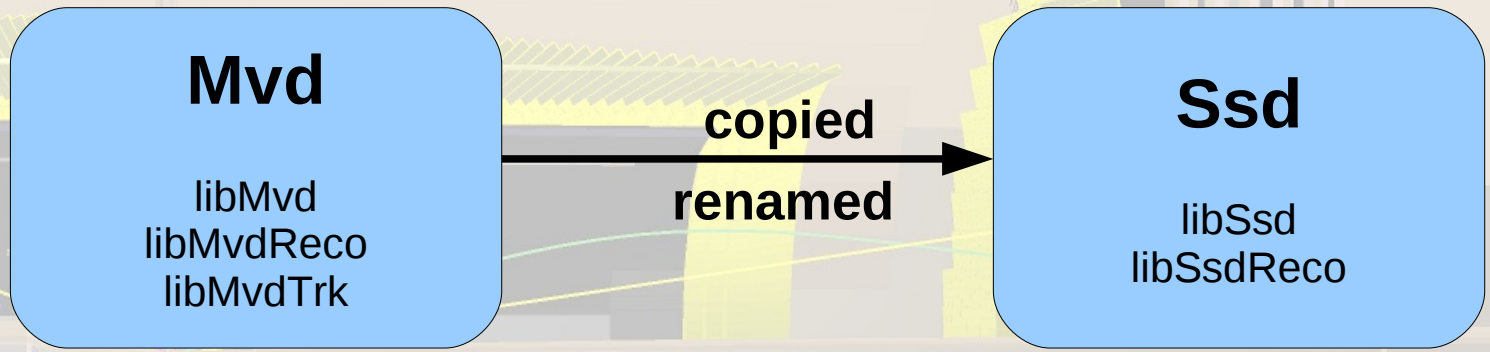
2) Tracking for Luminosity-Monitor

3) some results

Silicon Strip Detector



Silicon Strip Detector



Excluding:
- All Pixel-Tasks
- Some Tools
- Tracking

PndSsdData?
still PndMvdData used: nothing to change, just no use of Pixel classes

Silicon Strip Detector

libSsd Tasks:

PndSsdDetector	PndSsdStripHitProducer	PndSsdNoiseProducer
pure virtual	no inheritance needed, can directly be used TODO: Tsito-Digi	**?**

Silicon Strip Detector

libSsd Tasks:

PndSsdDetector

pure virtual

PndSsdStripHitProducer

no inheritance needed,
can directly be used
TODO: Tsito-Digi

PndSsdNoiseProducer

?

PndMvdDetector

PndLmdDetector

Init() has to be derived:
sets active planes
set branch-names?

in Ssd: Mvd=Dvm, Lmd=Dml

Silicon Strip Detector

libSsdReco Tasks:

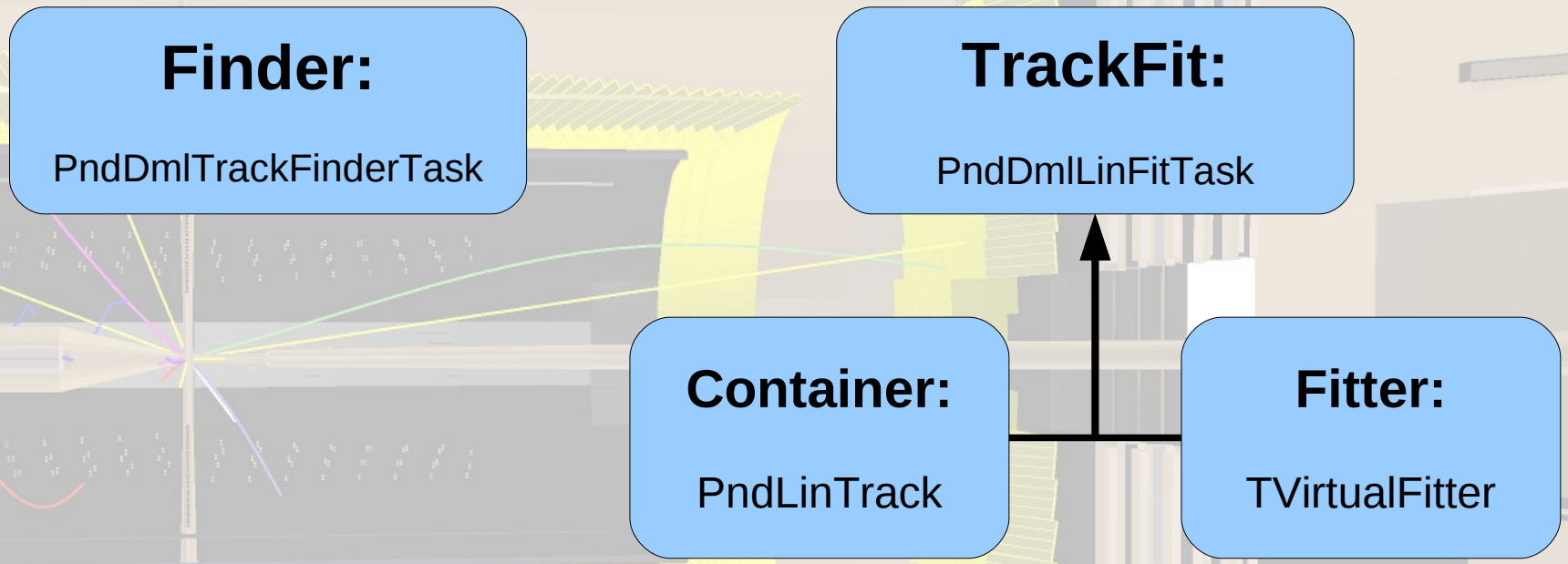
PndSsdStripClusterTask

no inheritance needed?

Next steps:

- What other things needed?
- What to derive? Every Task (Branch names)?
- Merge Lmd and Ssd code (in Ssd)
- Make usage of Ssd in Lmd
- What about Mvd?

Lumi Tracking



In libDmlTrk: /development/michel/ssd
Has to be moved to Lmd !

Lumi Tracking

Input:

SSDHitsStrip
PndMvdHit

SSDStripClusterCand
PndMvdCluster

SSDStripDigis
PndMvdDigiStrip

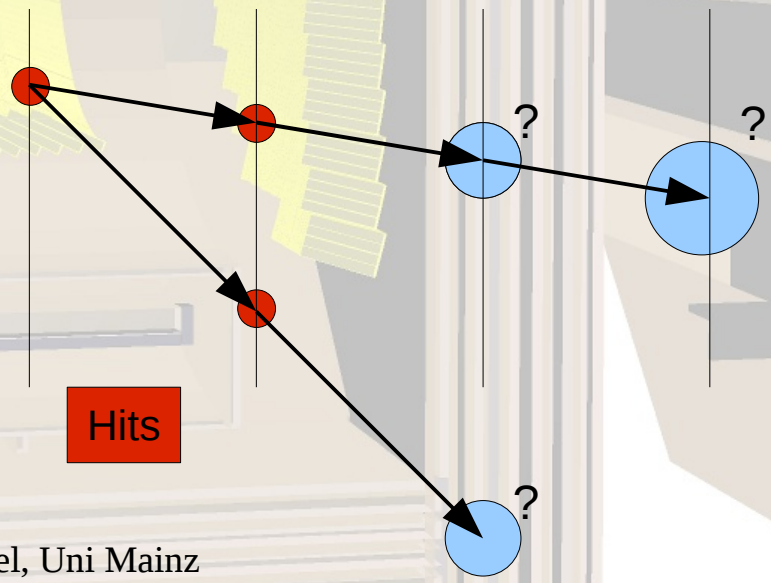
Finder:

PndDmlTrackFinderTask

Build vectors between hits in first and second plane. Look for hits in other plane.

Output:

DMLTrackCand
PndTrackCand



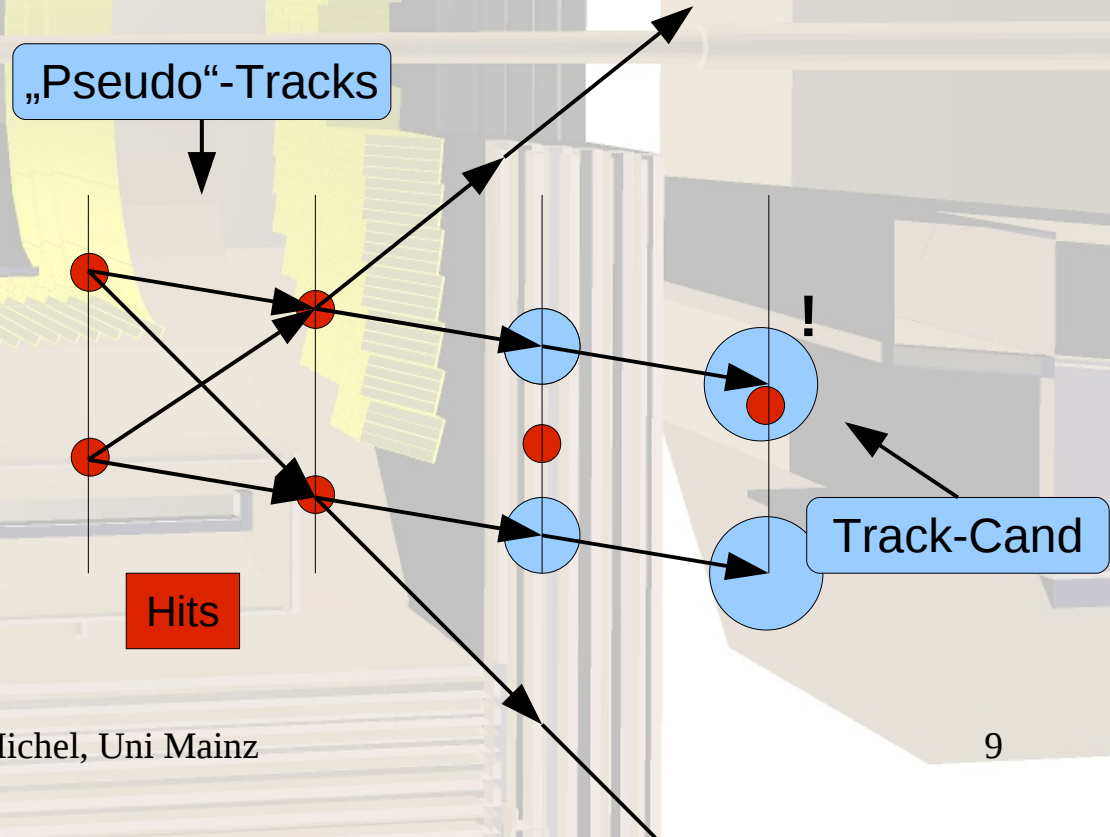
Lumi Tracking

Features:

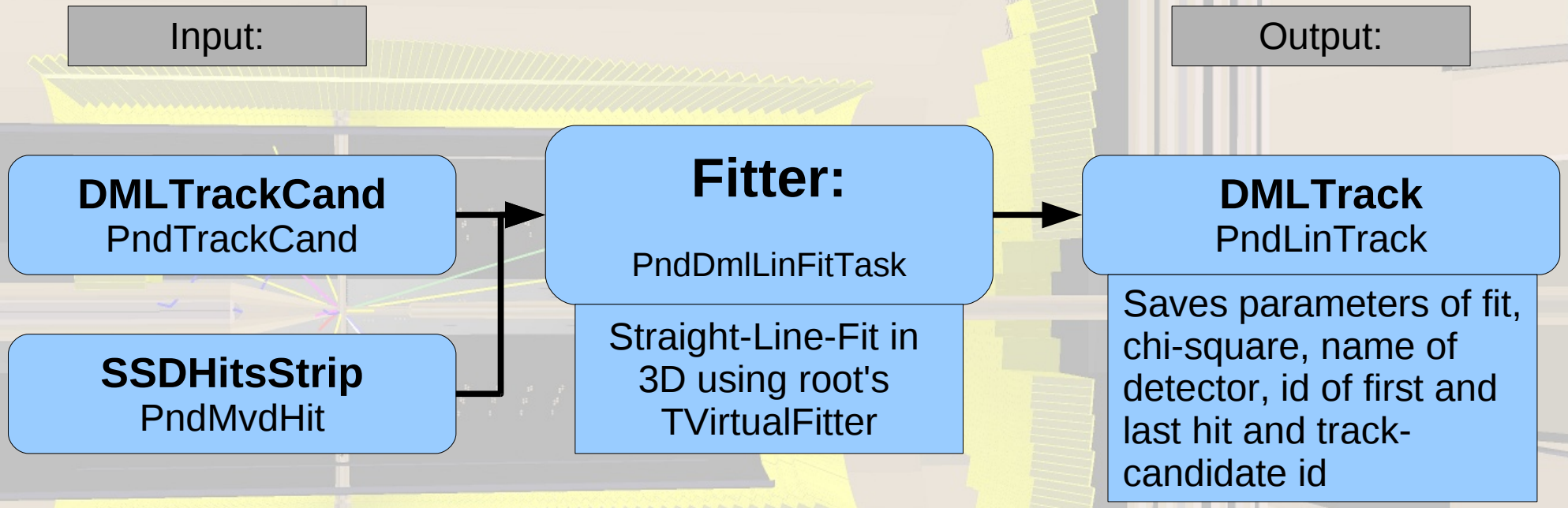
- No TrackCand per event limit
- No number of planes limit
- No need of hits in every plane
- Less noise-hits in Track
- Less secondary particles in tr.
- Possiblity for ignoring „bad“ hits

To fix:

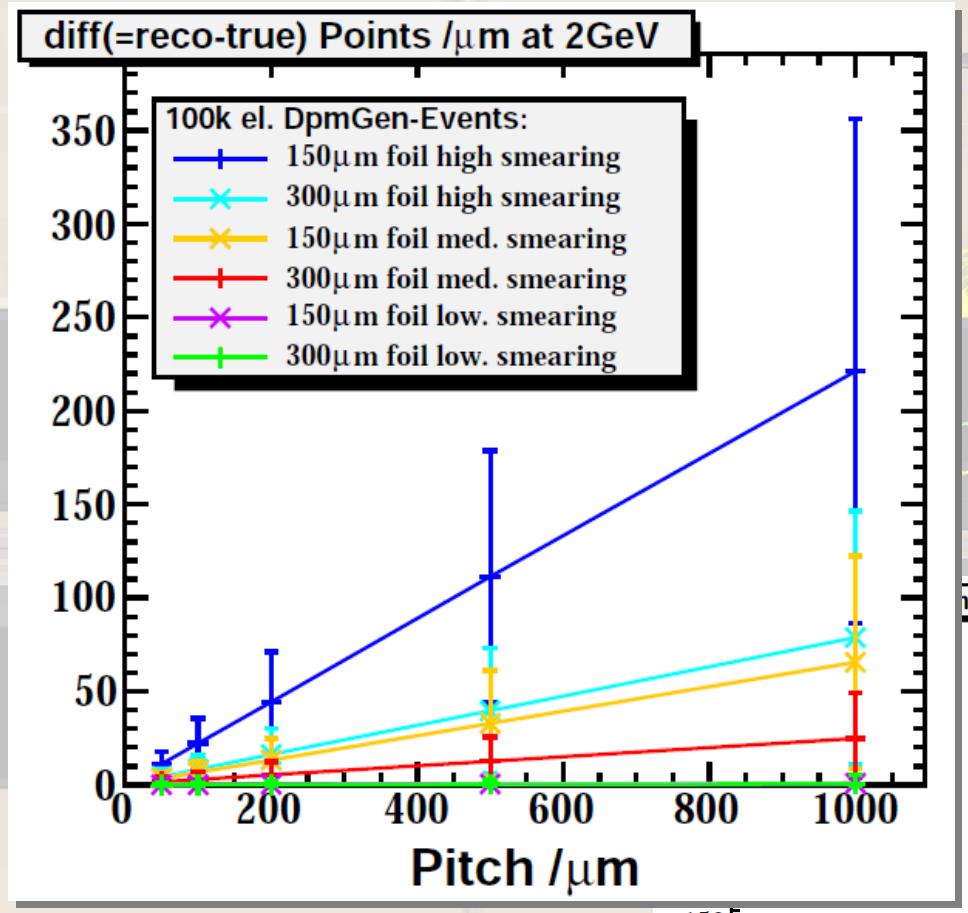
- Sort hits by comparing z
  -> get detector-id?
- Discs have to be parallel to xy
  -> SetTranformation() func?
- Planes have to be equidistant
- Need of hits in first two planes
- Search for other hits too simple?

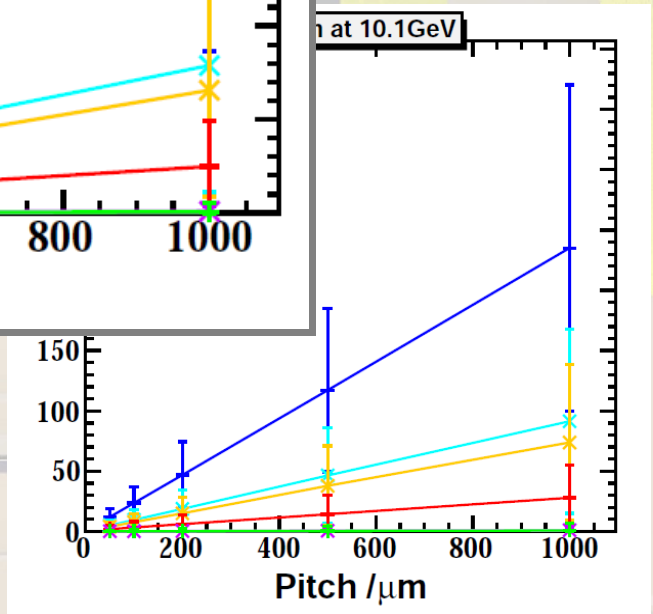


Lumi Tracking



Digitization Effects





Mean difference between reconstr. and Geant-Hits

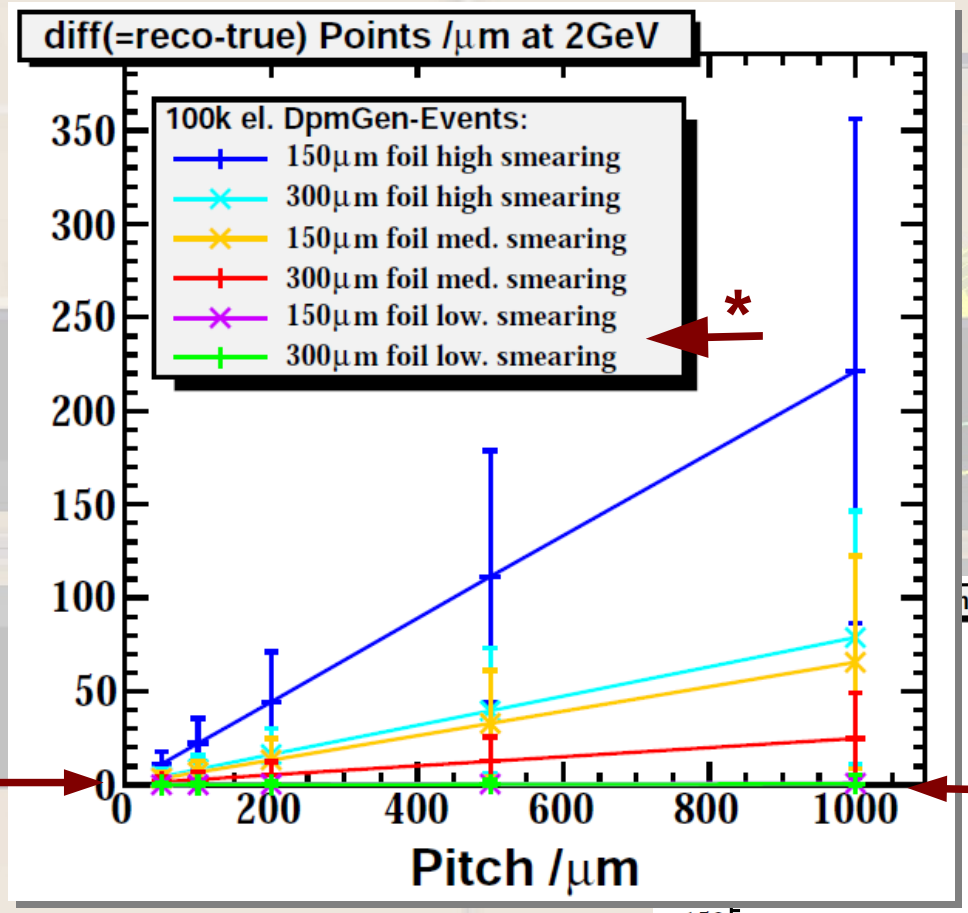
- Linear in pitch-size
- No scattering-effects
- Depends on smearing-value

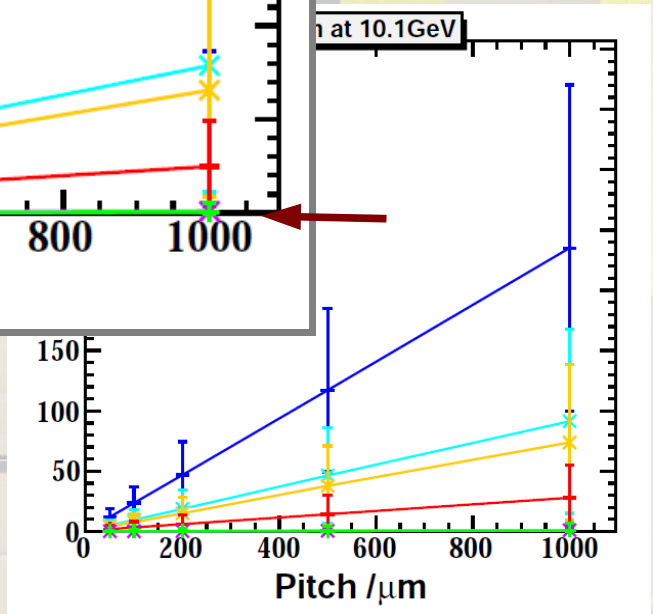
Configuration

- 100 000 events per config.
- DPM pure elastic events
- No magnetic field
- No beampipe, just vacuum
- 4 Si-discs, 3-8mrad, 10.7+0.5m
- Thickness: 150µm or 300µm

	noise /e	threshold /e
• Low:	10 ,	100
• Med:	500 ,	2000
• High:	1000 ,	5000

Digitization Effects





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* Low smearing
Diff ~= 0:
RecoHit ~= GeantHit

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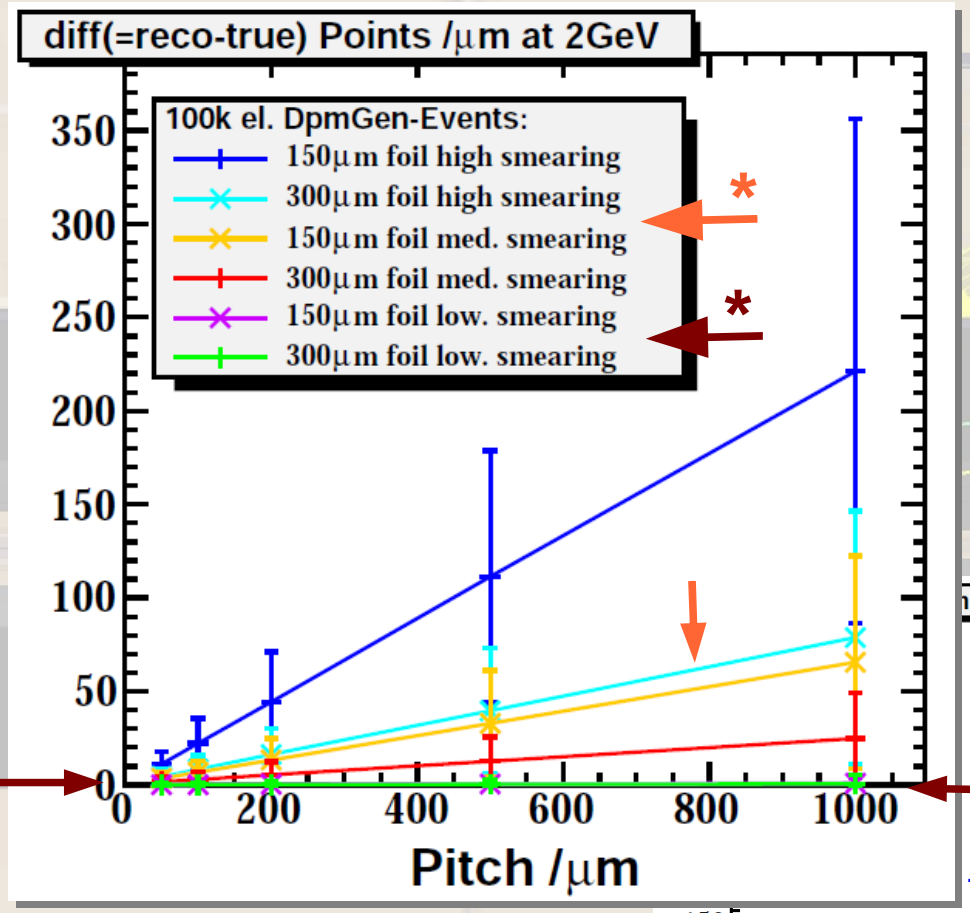

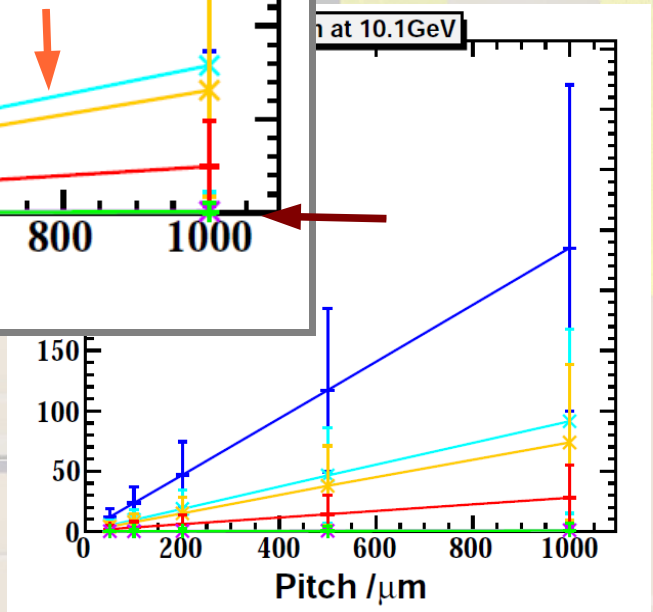

* 300µm high
~= 150µm med.

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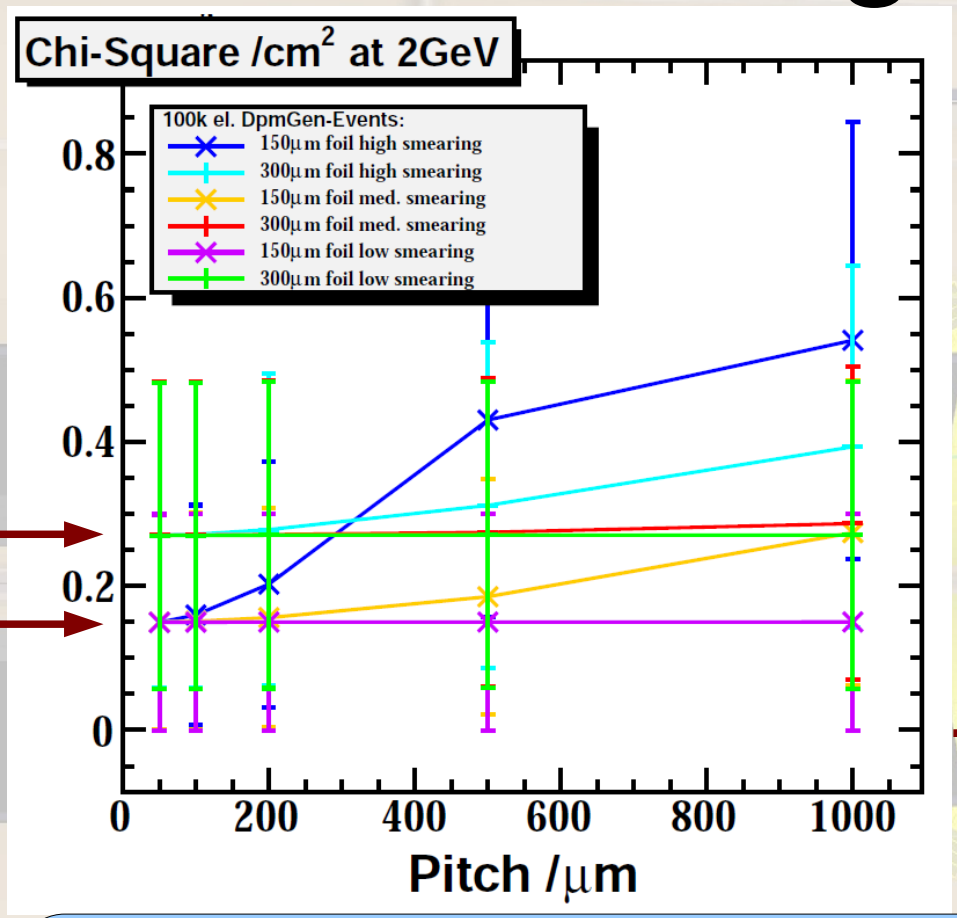
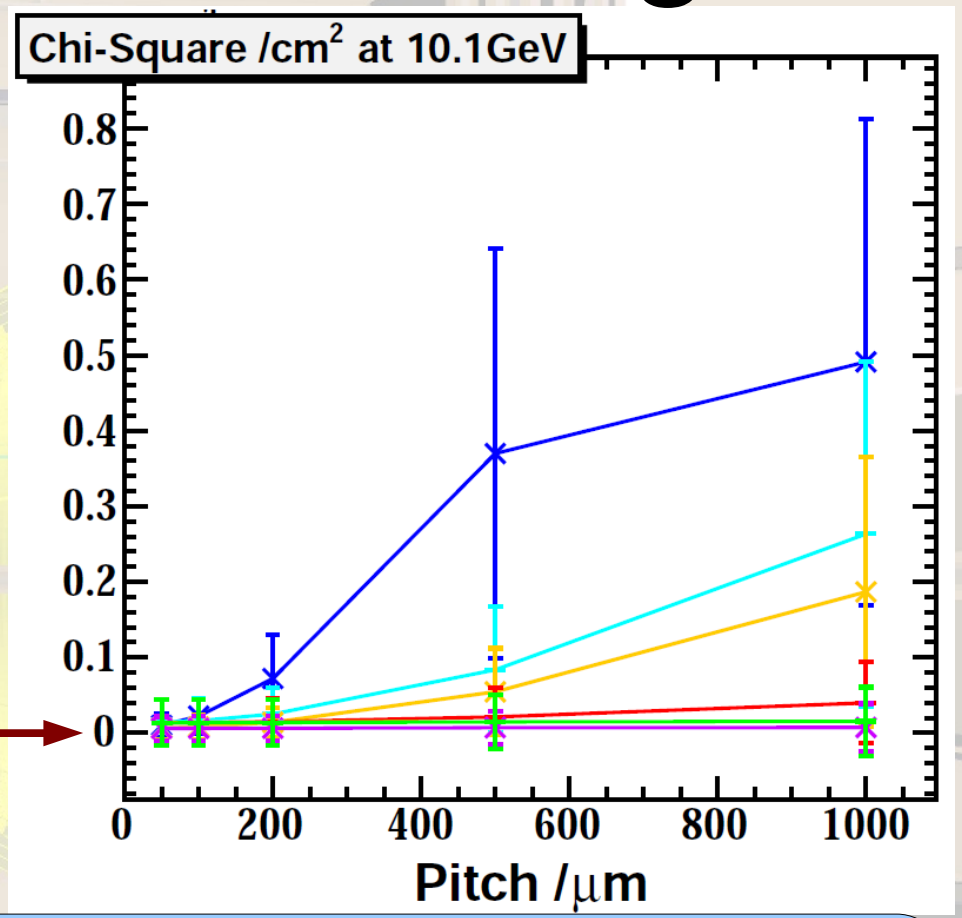
Low-Angle-Scattering

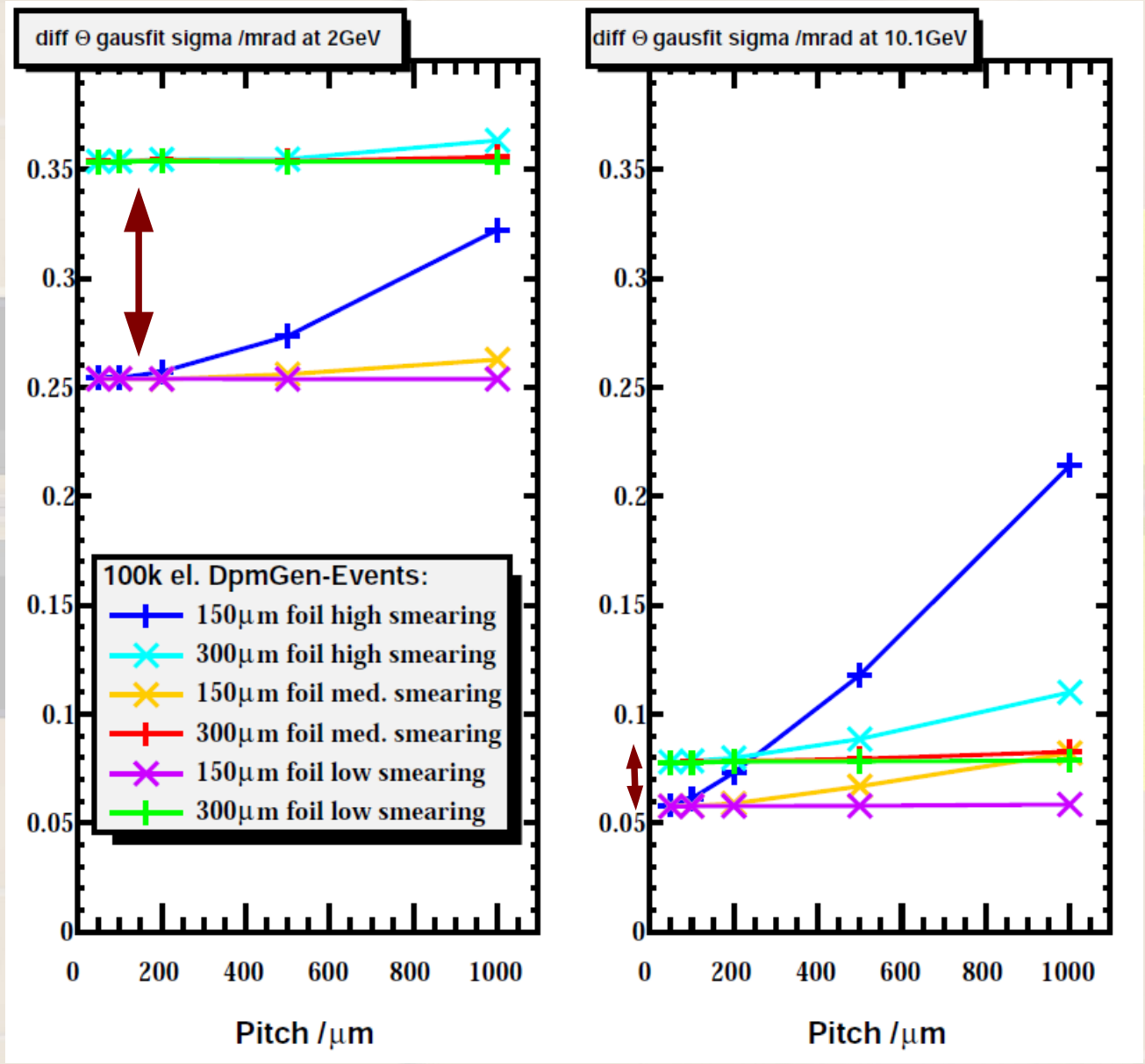




Mean Chi-Square of Straight-Line-Fit

- Sum of distances recohit to fit depends on low-angle-scattering & smearing
- Low smearing: reco ~= Geant-hit => just low-angle-scattering effects
- => low-angle-scattering roughly linear in thickness
- Blue line (high smearing on less charge): at high pitches not decreasing with “offset”

Theta-Reconstruction



Mean Theta-difference Reco- to True-Track

- 2GeV: low-angle-sc. dominant, 300 and 150µm sys. seperated
- At high energys the high noise in a smaller detector could have more effect then the low-angle-scattering

Conclusion

- low-angle-scattering => thin detector
- high noise => small pitch
- simulate with more realistic digitization
- get realistic noise values
- simulate noise more realistic (smearing+?)