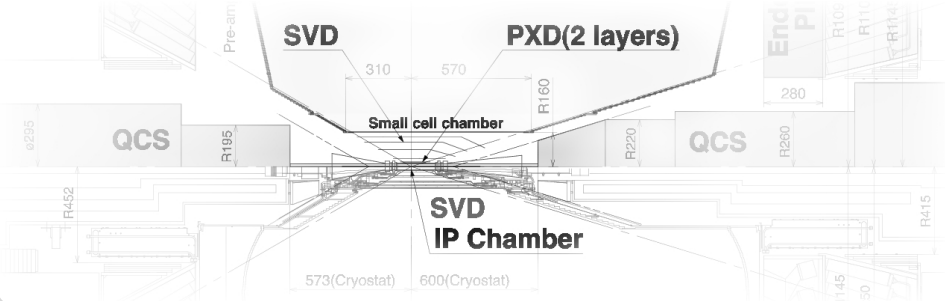


VXD TrackFinder Development at KIT

Status report - DESY face to face tracking meeting

Jonas Wagner | 22nd November 2016

INSTITUTE FÜR EXPERIMENTELLE KERNPHYSIK - IEKP



- 1 Single Track
 - Same Sample Training and Evaluation
 - Independent Sample
- 2 Multiple Tracks
 - Same Sample Training and Evaluation
- 3 MC Matching
- 4 Conclusion

2 samples:

Common parameters

PdgIds		± 13
nTracks		1
momentum	GeV	0.1 - 4
θ	°	0 - 360
φ	°	17 - 150

Sample A

- 2 mio events
- seed 1234

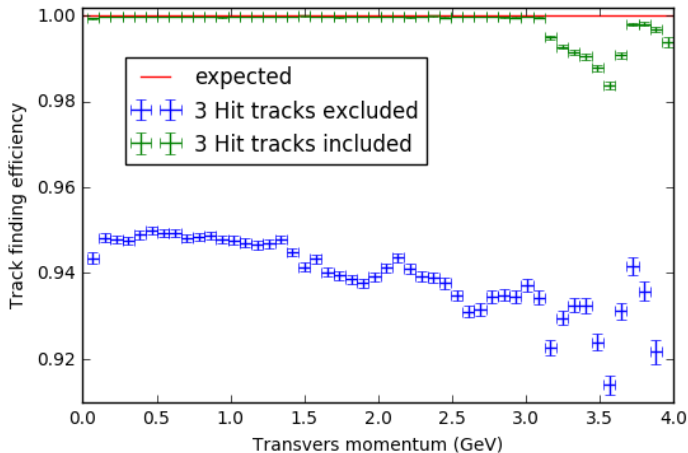
Sample B

- 1000 events
- seed 12345

Sample A

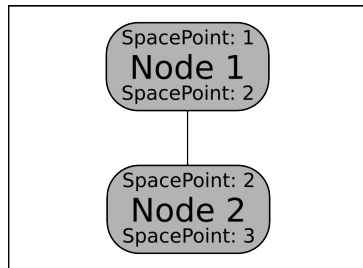
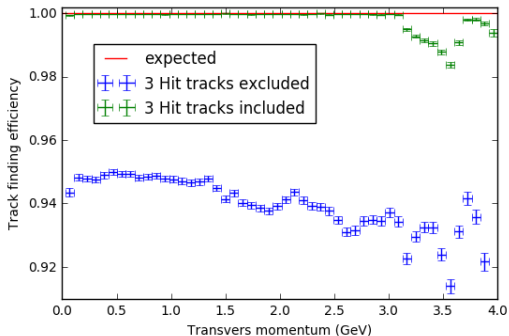
■ SectorMap trained on sample A

■ Evaluation on sample A



■ Finding efficiency: 99.91 %

3-Hit Problem



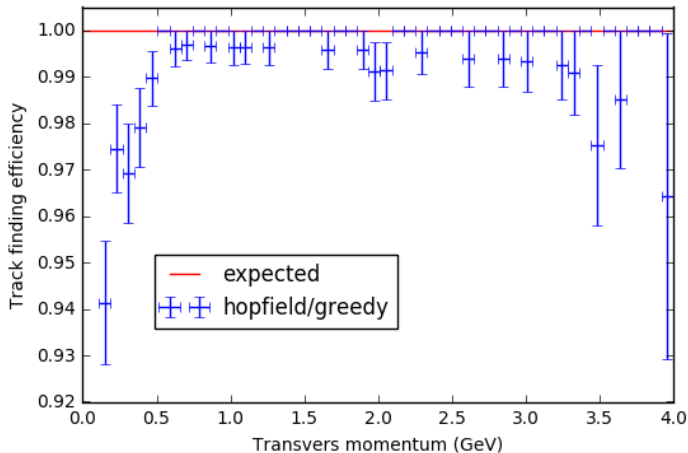
PathCollectorRecursive.h

```
/** parameter for setting minimal path length: (path length
    == number of nodes ...*/
unsigned int minPathLength = 3;
```

Sample B

■ SectorMap trained on sample A

■ Evaluation on sample B



■ Finding efficiency: 98.95 %

Single Track



Multiple Tracks



MC Matching

Conclusion

Sample C

Common parameters

PdgIds		± 13
nTracks		<u>10</u>
momentum	GeV	0.1 - 4
θ	°	0 - 360
φ	°	17 - 150

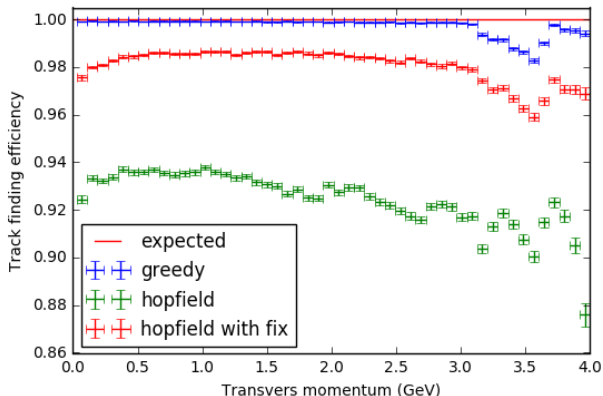
Sample C

- 200 000 events
- seed 1234

Sample C

■ SectorMap trained on sample C

■ Evaluation on sample C



■ Finding efficiency: 99.84 %

■ Fake rate: 46.88 %

■ Finding efficiency: 98.30 %

■ Fake rate: 0.71 %

Clusters can't be assigned to multiple tracks

MC RecoTracks		PR RecoTracks		Matching
Nr	SVD Clusters	Nr	SVD Clusters	
0	10 12 13 14 15 16 17 18	0	10 12 13 14 15 16 17 18	
1	11 12 19 20 15 21 17 22	1	11 12 19 20 15 21 17 22	

Clusters can't be assigned to multiple tracks

MC RecoTracks		PR RecoTracks		Matching
Nr	SVD Clusters	Nr	SVD Clusters	
0	10 12 13 14 15 16 17 18	0	10 12 13 14 15 16 17 18	100 % Purity
1	11 12 19 20 15 21 17 22	1	11 12 19 20 15 21 17 22	

Clusters can't be assigned to multiple tracks

MC RecoTracks		PR RecoTracks		Matching
Nr	SVD Clusters	Nr	SVD Clusters	
0	10 12 13 14 15 16 17 18	0	10 12 13 14 15 16 17 18	100 % Purity
1	11 12 19 20 15 21 17 22	1	11 12 19 20 15 21 17 22	62.5% Purity

- Needs to be considered if we want to allow overlap of tracks.
- Contributes to the difference between finding efficiencies of hopfield and greedy algorithms

Main tasks

- understand/fix filtersetup
- improve trackset selection
 - find solution for 3 hit tracks
 - understand the difference between finding efficiencies of hopfield and greedy algorithms