ROI FINDING

STATUS & PLANS

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Recent Developments

- finally moved from genfit::Tracks to RecoTracks
- extrapolation is limited to the sensor that are expected to be hit by the track
  - modified ROIGeometry and PXDIntercept classes
- function in the tracking script dedicated to the online tracking for the ROI finding
- in the add_simulation(…) python function the user can specify whether to simulate on not the PXD Data reduction (the default value is False)

30/09/2014

Name	Calls	Memory(MB)	Time(s)	Time(ms)/Call
VXDTF	10000	9	97.09	9.71 +- 86.97
PXDDataReduction	10000	1799	16890.74	**1689.07** +-3551.01
PXDdigiFilter	10000	0	34.32	3.43 +- 0.47
PXDClusterizer	10000	0	2.03	0.20 +- 0.04

19/11/2016

Name	Calls	Memory(MB)	Time(s)	Time(ms)/Call
SetupGenfitExtrapolation	2500	0	0.00	0.00 +- 0.00
SVD-only VXDTF	2500	0	13.92	5.57 +- 59.51
RecoTrackCreator	2500	0	0.93	0.37 +- 0.09
SVD-only GenFitter	2500	0	64.90	25.96 +- 10.94
SVD-only DAFRecoFitter	2500	0	63.42	25.37 +- 10.72
SVD-only TrackCreator	2500	0	7.44	2.98 +- 0.86
PXDDataReduction	2500	0	25.33	10.13 +- 4.15
PXDdigiFilter	2500	0	0.59	0.23 +- 0.07
PXDClusterizer	2500	0	0.26	0.10 +- 0.02

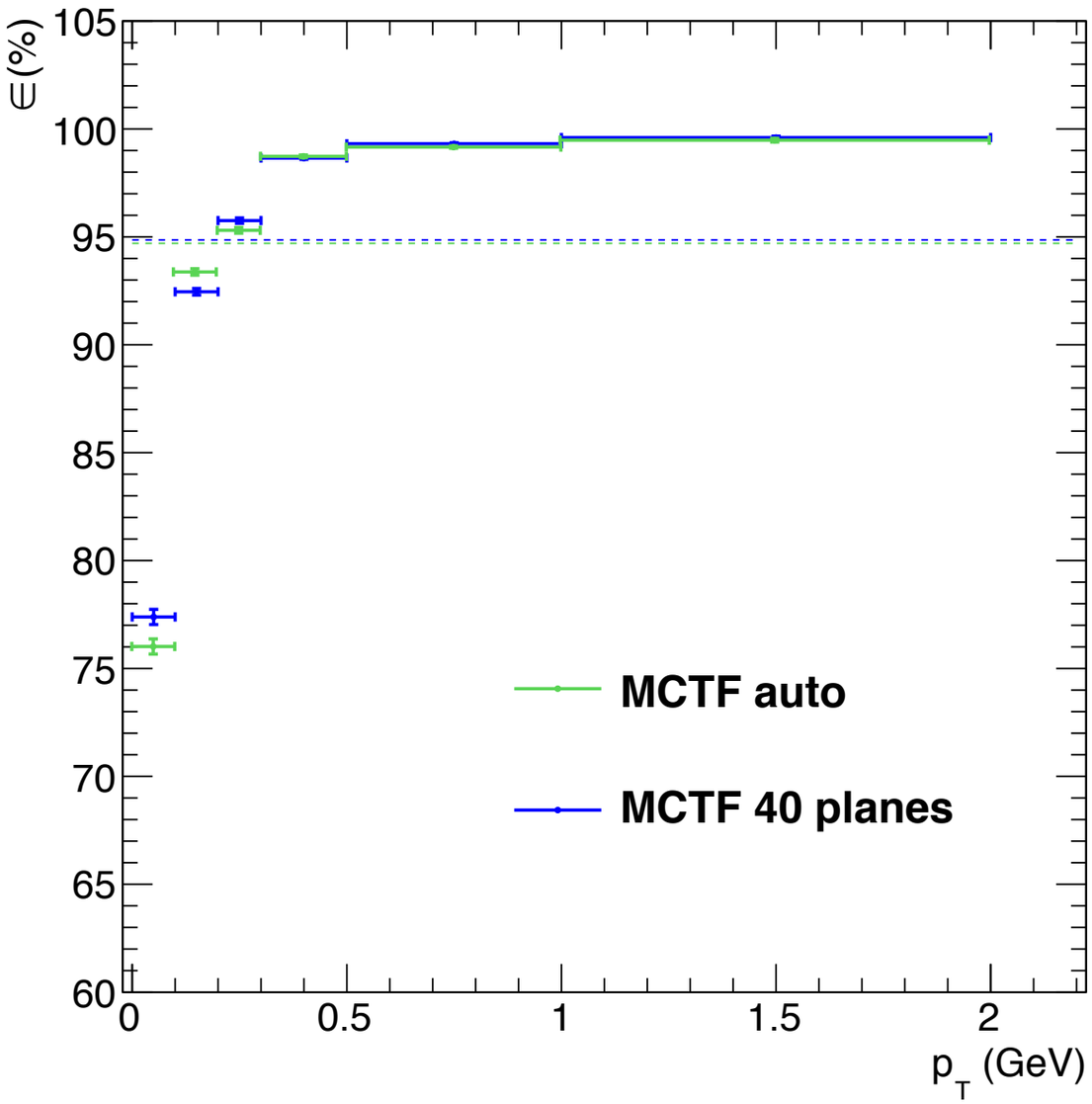
gained a factor 25 in execution speed

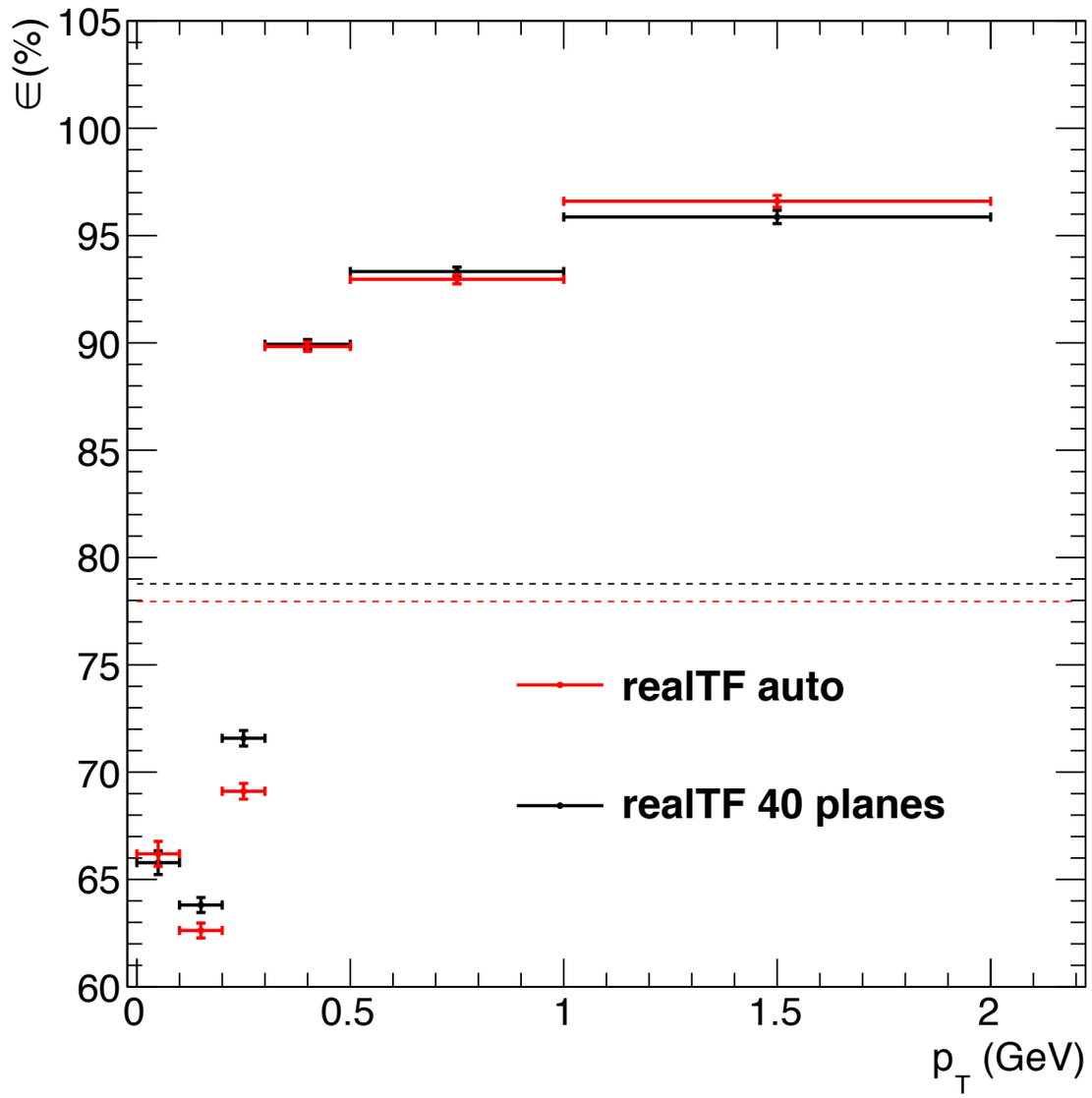
~65

&

ROI efficiency unchanged

Efficiency Comparison





➡ Comparable efficiency with the 40 planes extrapolation, or the automatic plane selection extrapolation

The Net ROI–Simulation Effect

	with ROIs	*tracking efficiency*	*efficiency factoring out geom. accept.*	*Pattern Recognition efficiency*
no bkg	no	**85.5 ± 0.2**	**94.0 ± 0.1**	**84.4 ± 0.1**
	yes	**84.1 ± 0.2**	**94.1 ± 0.1**	**87.6 ± 0.1**
std bkg	no	**81.7 ± 0.2**	**90.0 ± 0.2**	**82.7 ± 0.1**
	yes	**82.1 ± 0.2**	**91.9 ± 0.2**	**84.4 ± 0.1**

- Simulating the ROI-finding helps the Pattern Recognition algorithm
- tracking efficiency factoring out geometrical acceptance benefits form ROI simulation when standard background is simulated
- ROI finding is doing a pattern recognition job
- This study should be repeated vs p_T and adding a column "fraction of tracks with PXD hits"

Plans Towards a "Maintenance Mode"

➡ What is completely missing:

- *validation* plots for the simulation:
  - efficiency vs p_T and polar angle
  - reduction factor
  - mean and RMS of the distribution of the number of ROIs per module
  - statistical error of the intercept in the two directions, per layer

➡ What I would like to improve:

- efficiency (…)
- speed ✓
- carefully check the tracking script

```
add_tracking_for_PXDDataReduction_simulation(path, components=None, skipGeometryAdding=False)
```

➡ What needs to be re-thought:

- DQM plots: most of the validation plots + something else