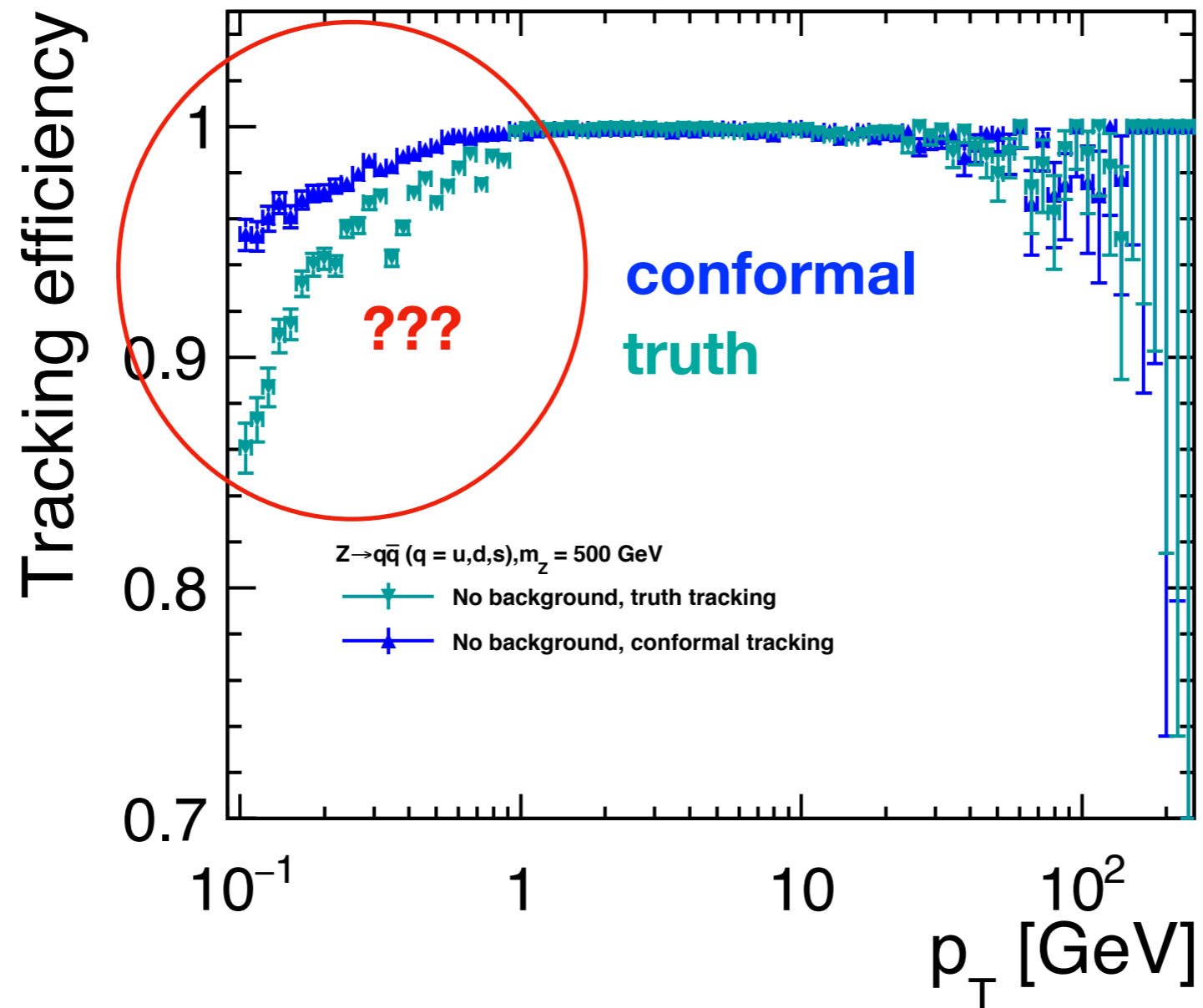


Investigating low pT tracking



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Software Meeting 30 Jan 2018

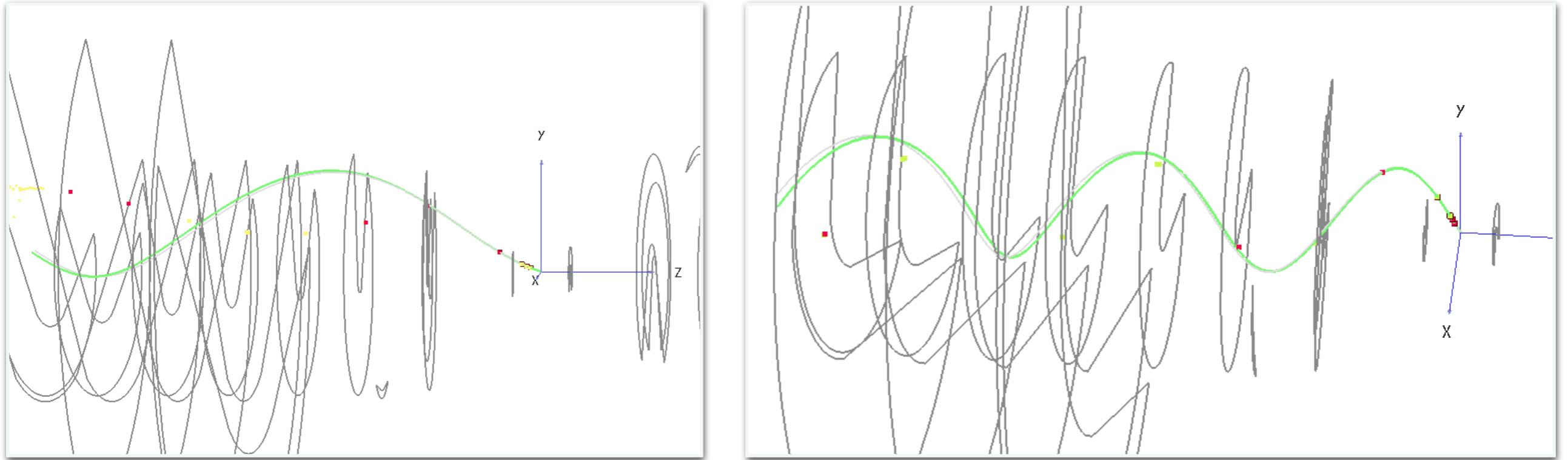
Single pions $E = 1 \text{ GeV}$, $10 < \theta < 89 \text{ deg}$

- Sample = 300 particles
- MC reconstructable = 281
- Conformal tracking: non reconstructed tracks = 0
- Truth tracking: non reconstructed tracks = 11

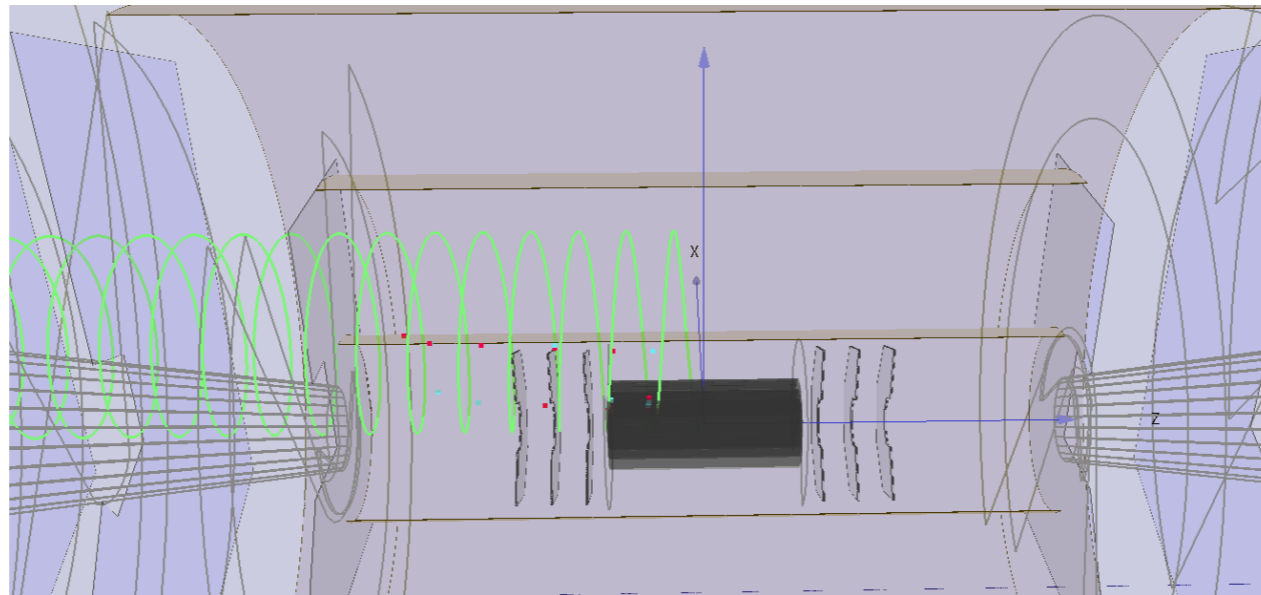
failing because of the fit: $\Delta\chi^2$ per hit $>$ max (100)

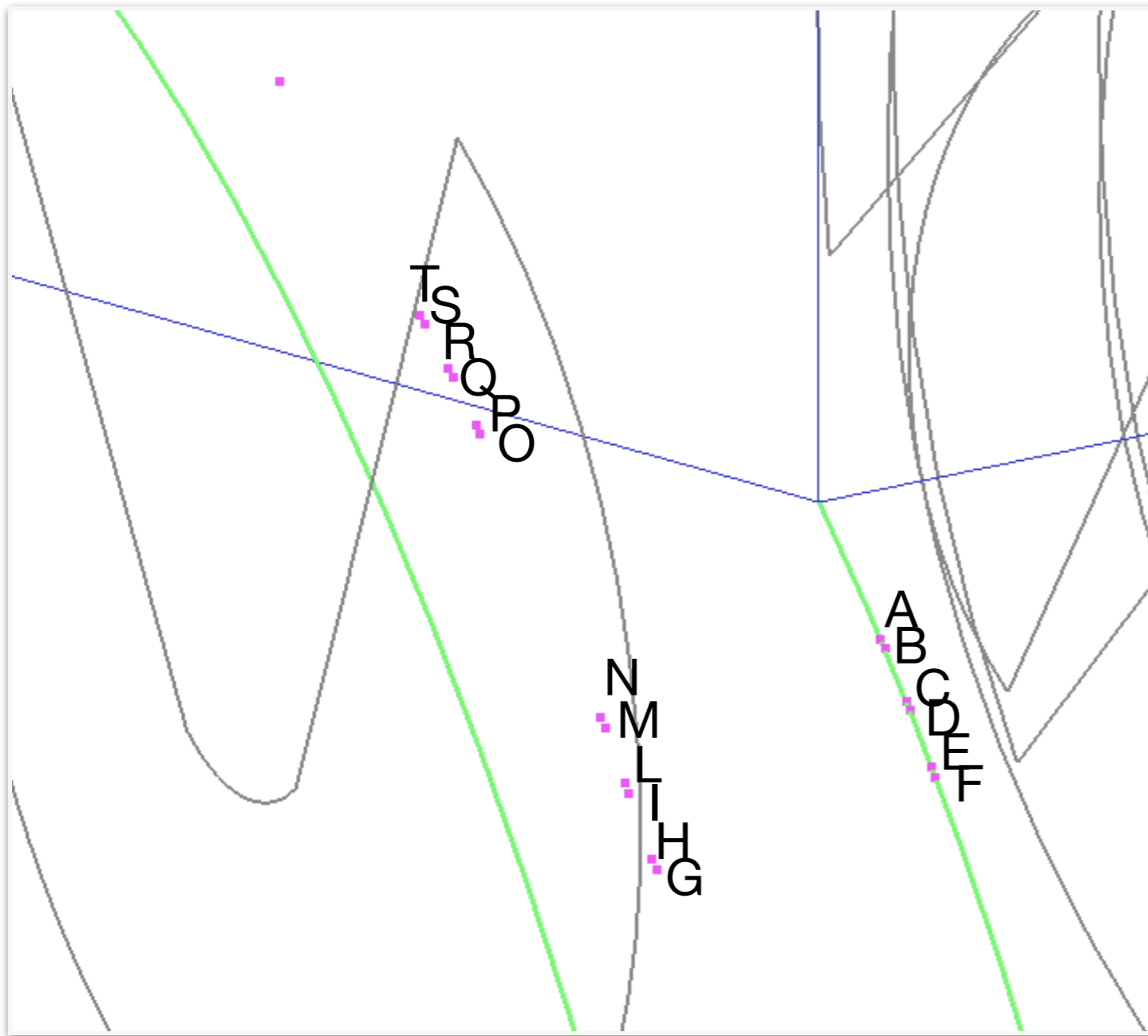
- Pre-fit: helix made out of 3 hits and its parameters given as input to the fit
- Default: pre-fit made with 1st, middle, last

low pT tracks for which the last hits are awfully off the “ideal” helix
(multiple scattering)



With the pre-fit using 1st, 2nd, 3rd hit: **4 not reco** / 281 reconstructable
These 4 evts:





What does the truth tracking do?

◆ sort hits by radius

A-O-N-B-M-P-Q-C-L-R-D-I-
H-E-S-G-F-T

◆ remove hits same layer

~~A-O-N-B-M-P-Q-C-L-R-D-I-~~
~~H-E-S-G-F-T~~

◆ prefit (with 1,2,3)

~~A-O-N-B-M-P-Q-C-L-R-D-I-~~
~~H-E-S-G-F-T~~

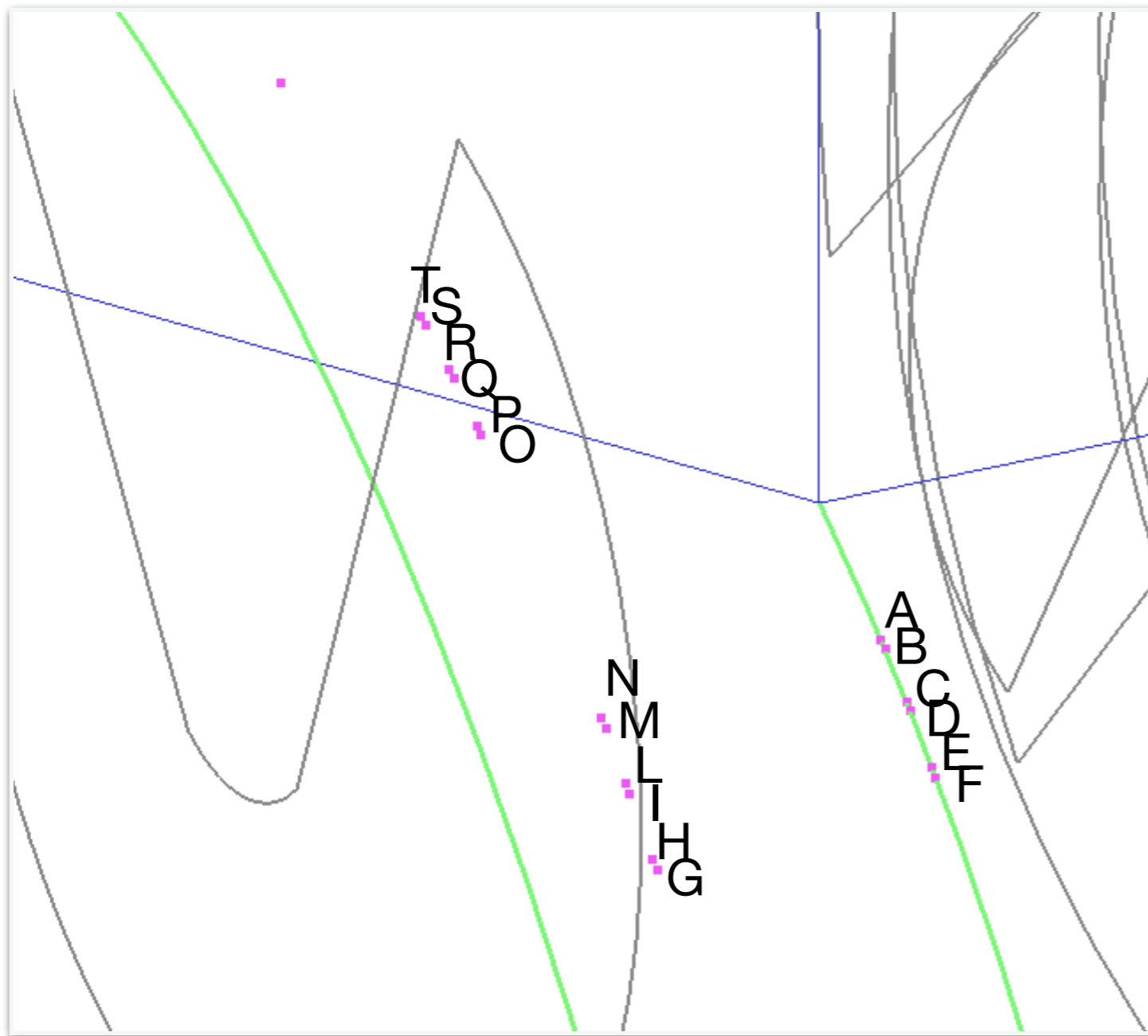
◆ fit fails? sort by z

A-B-x-G-H-Q-R

◆ prefit (with 1,2,3)

A-B-x-G-H-Q-R

X FAILS



What if we don't remove hits?

- ◆ sort hits by radius
A-O-N-B-M-P-Q-C-L-R-D-I-
H-E-S-G-F-T
- ◆ prefit (with 1,2,3)
A-O-N-B-M-P-Q-C-L-R-D-I-
H-E-S-G-F-T
- ◆ fit fails? sort by z
A-B-C-D-E-F-
- ◆ prefit (with 1,2,3)
A-B-C

✓ **SUCCEEDS**

With no removal of the hits & prefit 1-2-3: 0 not reco / 281 reconstructable

Removal of the hits for loop tracks seems not a good solution...

How to recover low pT tracks:

- ◆ flag the loopers (based on the number of hits?)
 - ◆ if loopers: do not remove hits in the same layer
- ◆ prefit with 1,2,3

Maybe this solves flavour tagging discrepancies truth / conformal ?

Changing the prefit: implications for conformal tracking

- Conformal tracking reconstructs the tracks in both tested cases
 - **prefit 1-middle-last** and **prefit 1-2-3**
- The number of reco hits undergoes only a negligible variation

