

**Preliminary beam test results
of Asian modules**

17th Nov. 2016

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on behalf of the Asia module group

We would appreciate a lot of helps from other groups especially Ralf, Felix, Volker, Leif, Oliver and Serguei!

General information

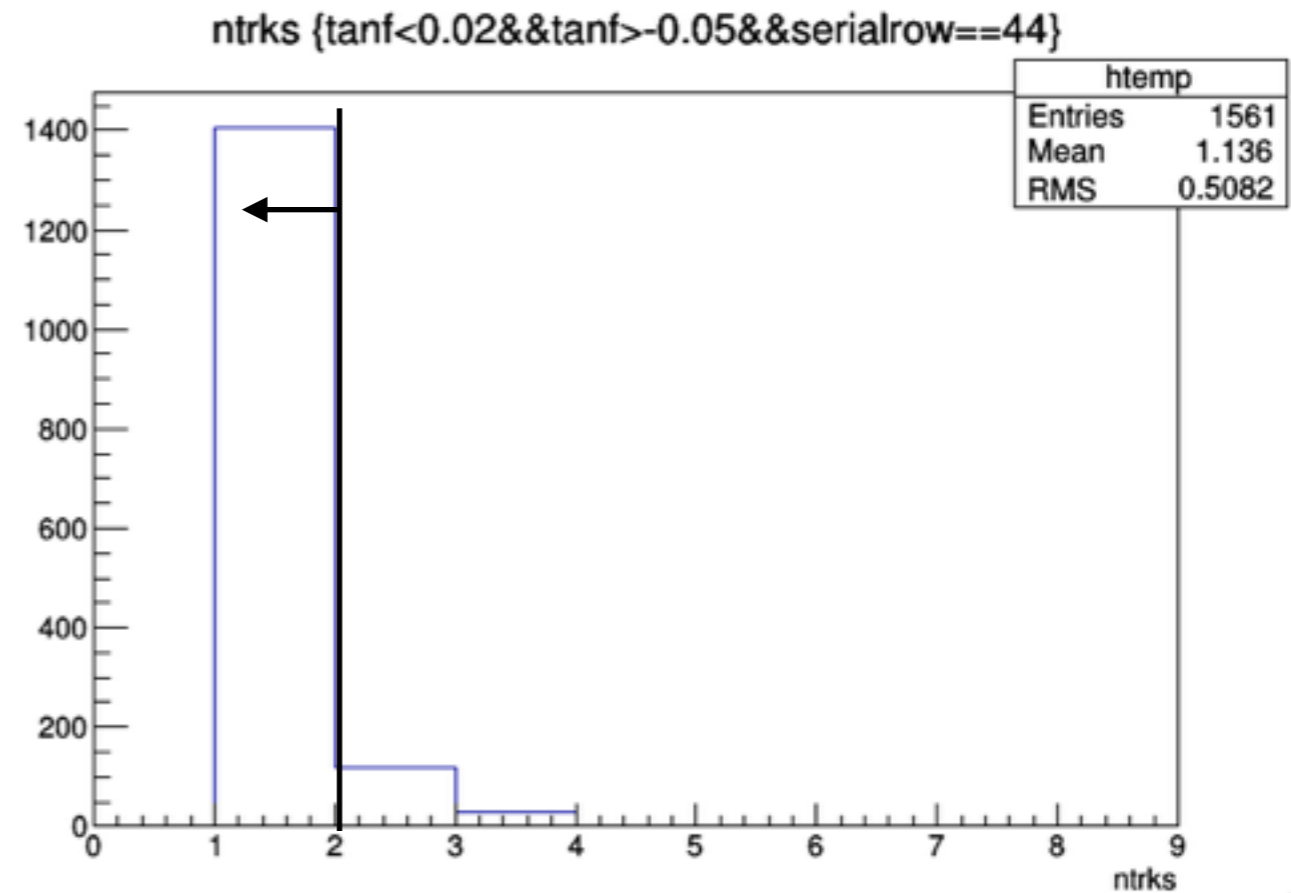
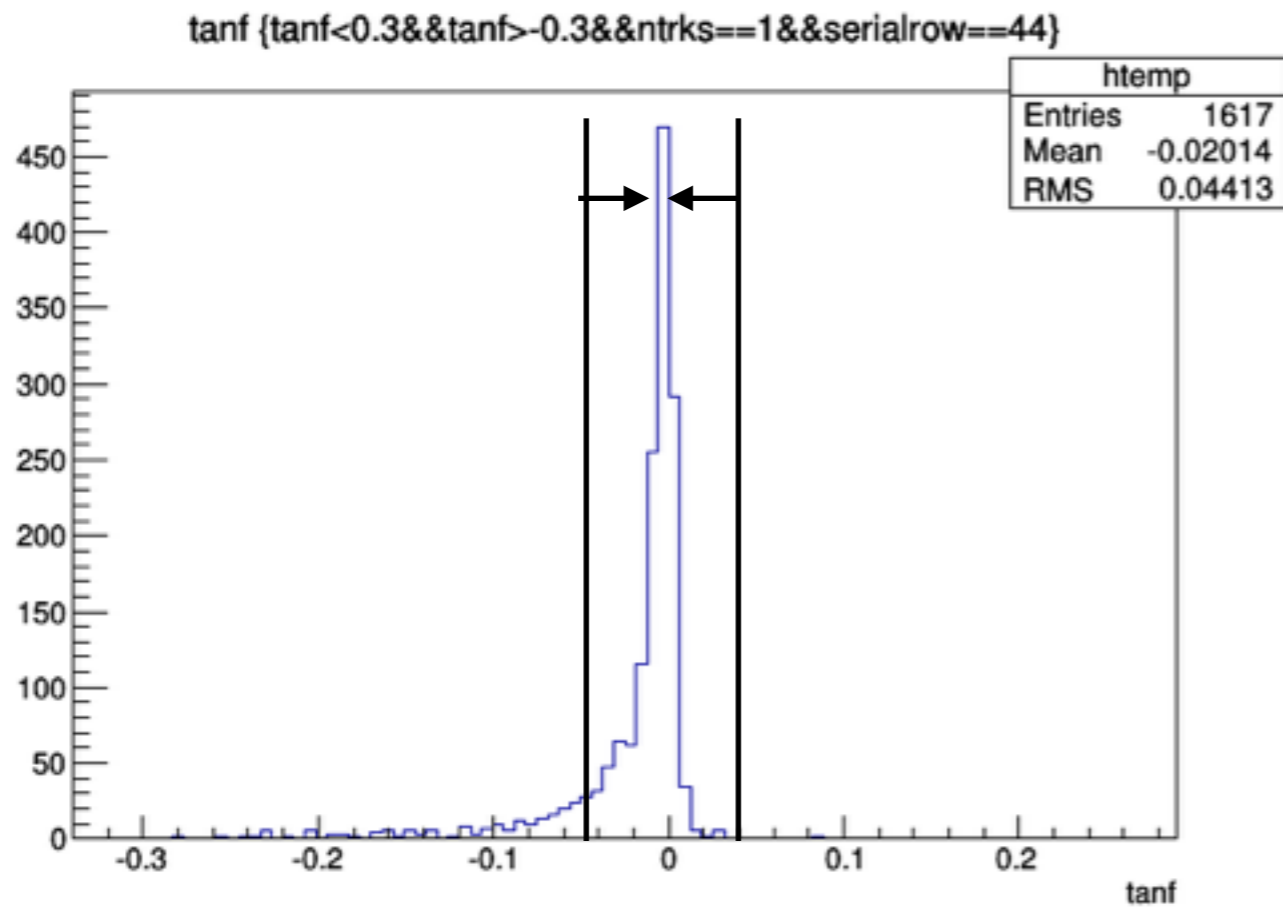
- Z scan, $\phi = 0^\circ$, $B=1\text{T}$, $E=230\text{V/cm}$ (Run 19972 - 19985)
- $\text{H}_2\text{O} \sim 70\text{ppm}$, $\text{O}_2 \sim 60\text{ ppm}$
- MarlinTPC framework used.
- 2000 events analyzed. (20000 events taken.)
- single module analysis (**w/ gate**, single RCU)



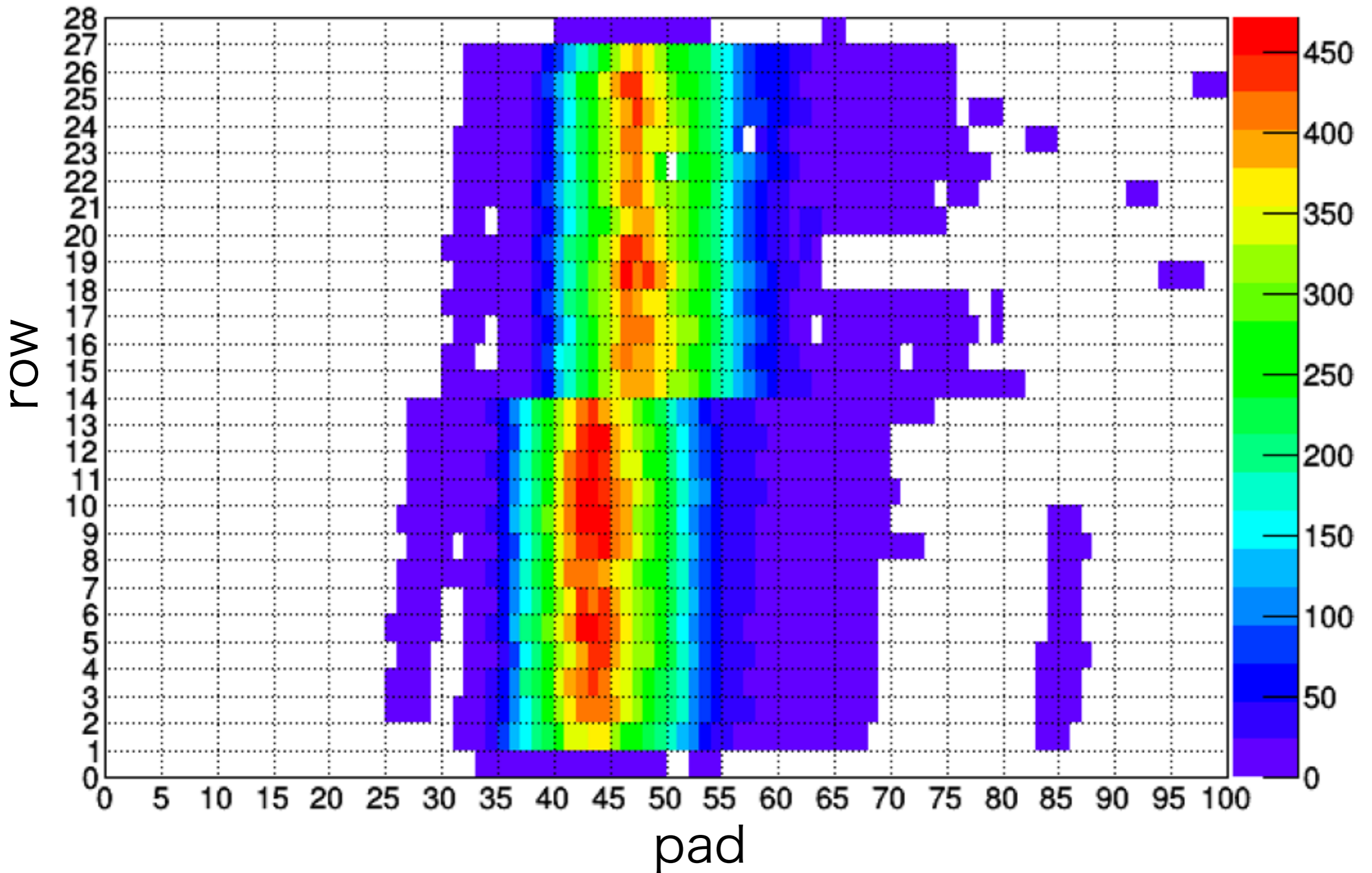
Event selection

Track angle cut :
 $-0.05 < \tan\Phi < 0.02$

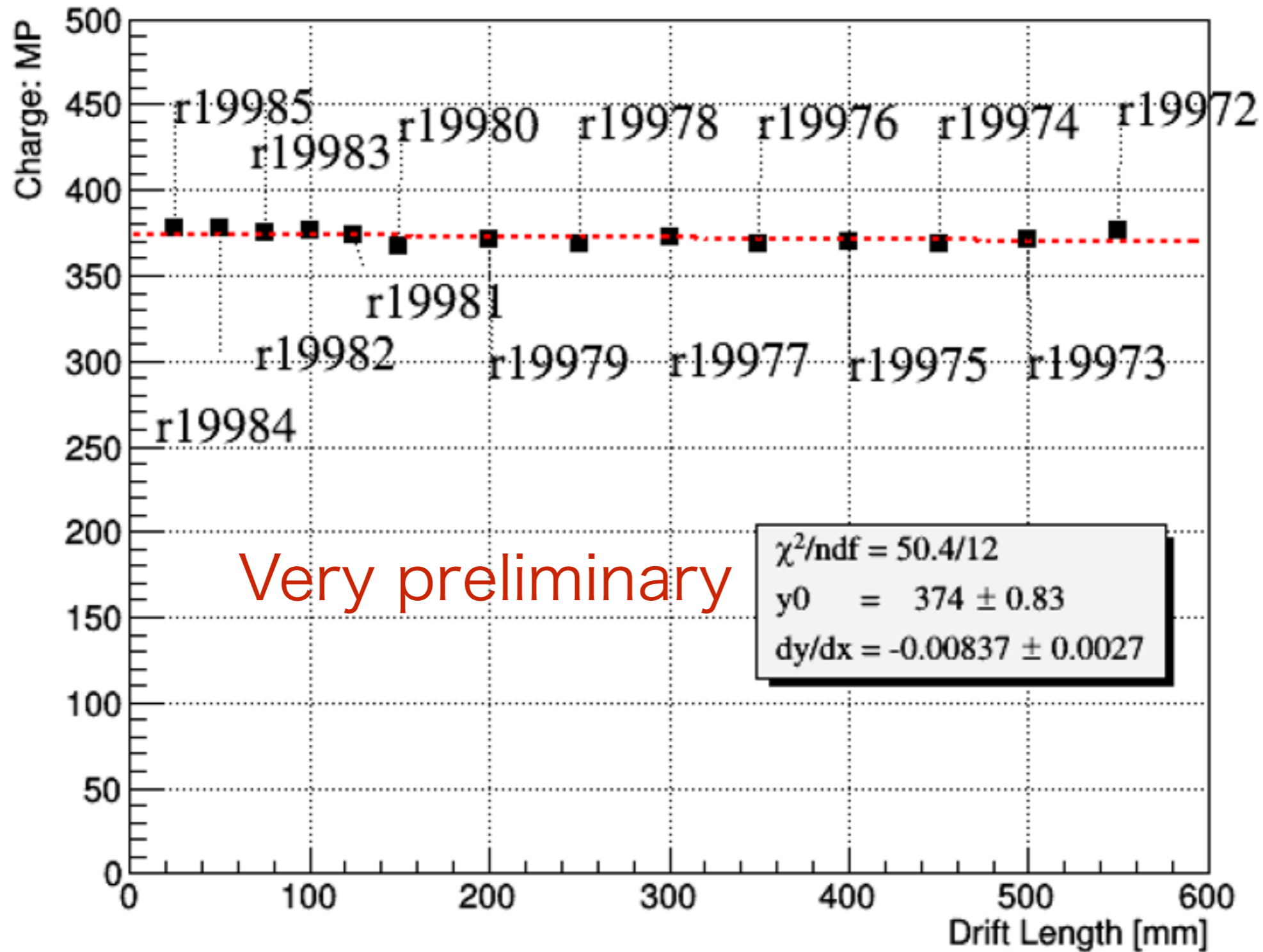
of tracks per event:
 $n_{\text{trks}} = 1$



Beam trajectory shown by pad- and row-numbers

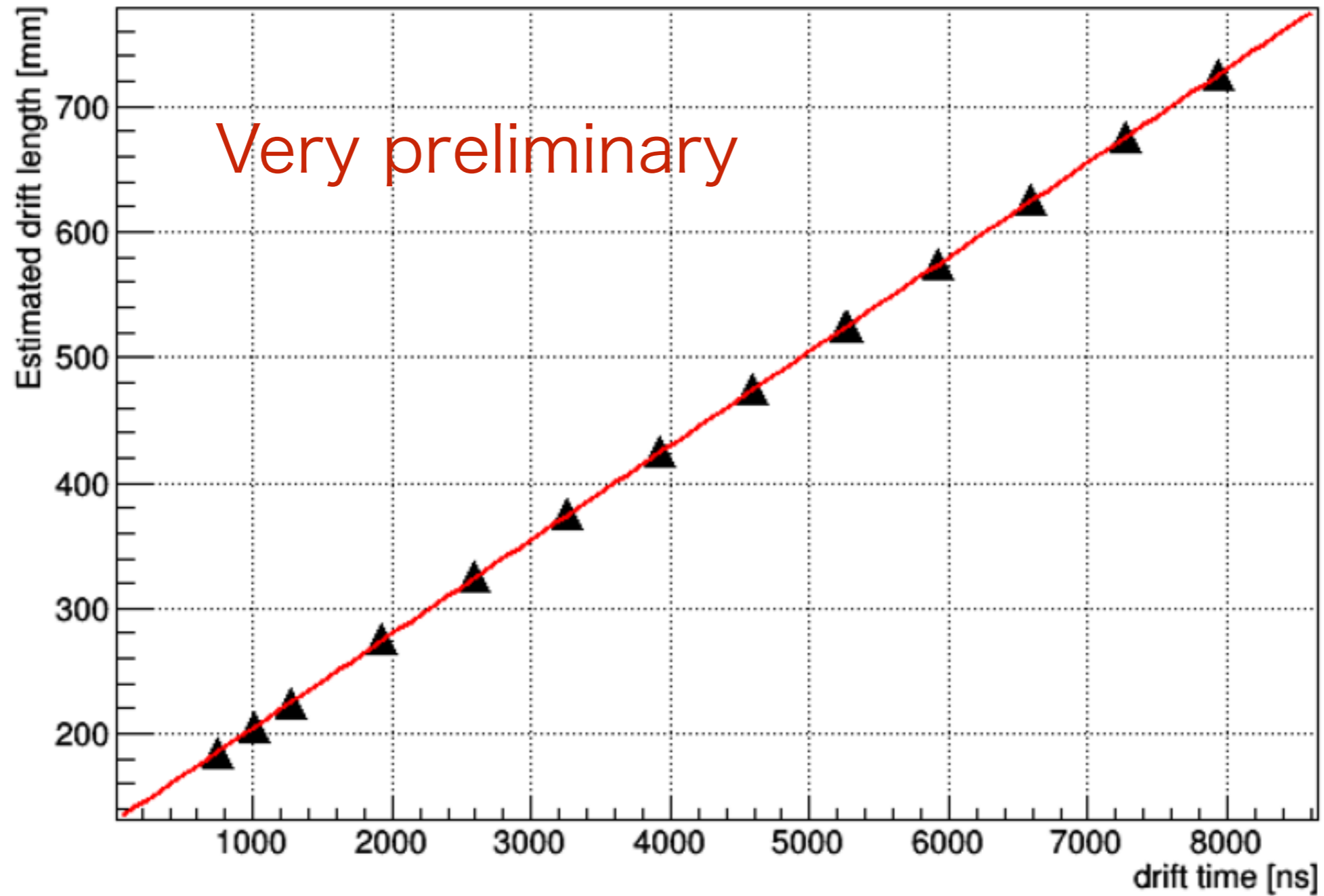


Charge Sum (Module3 Row16)



Looks no attachment.
More like 2010 than 2012!

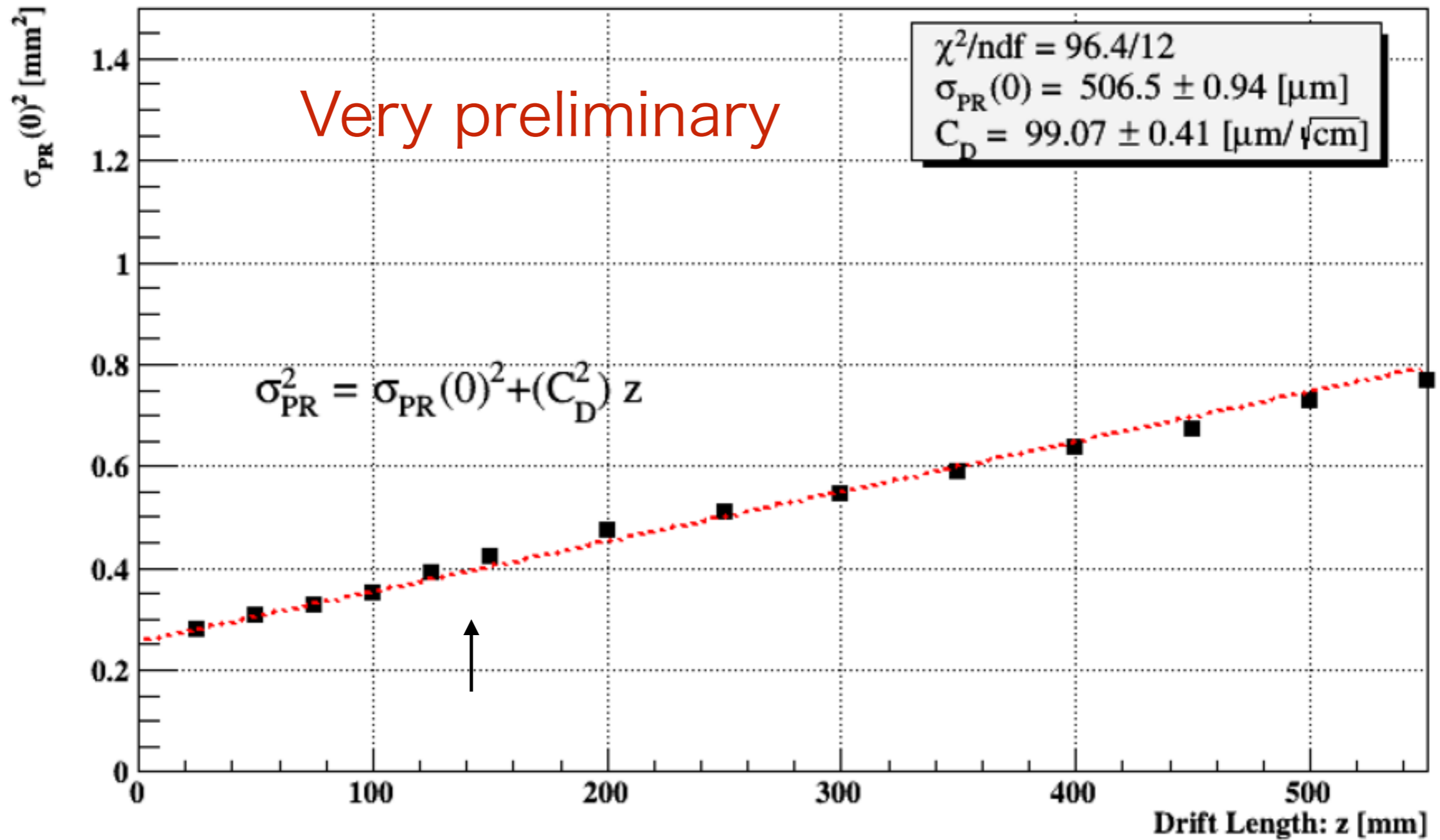
Drift velocity



Fitted value : $\sim 7.5 \text{ cm}/\mu\text{s}$

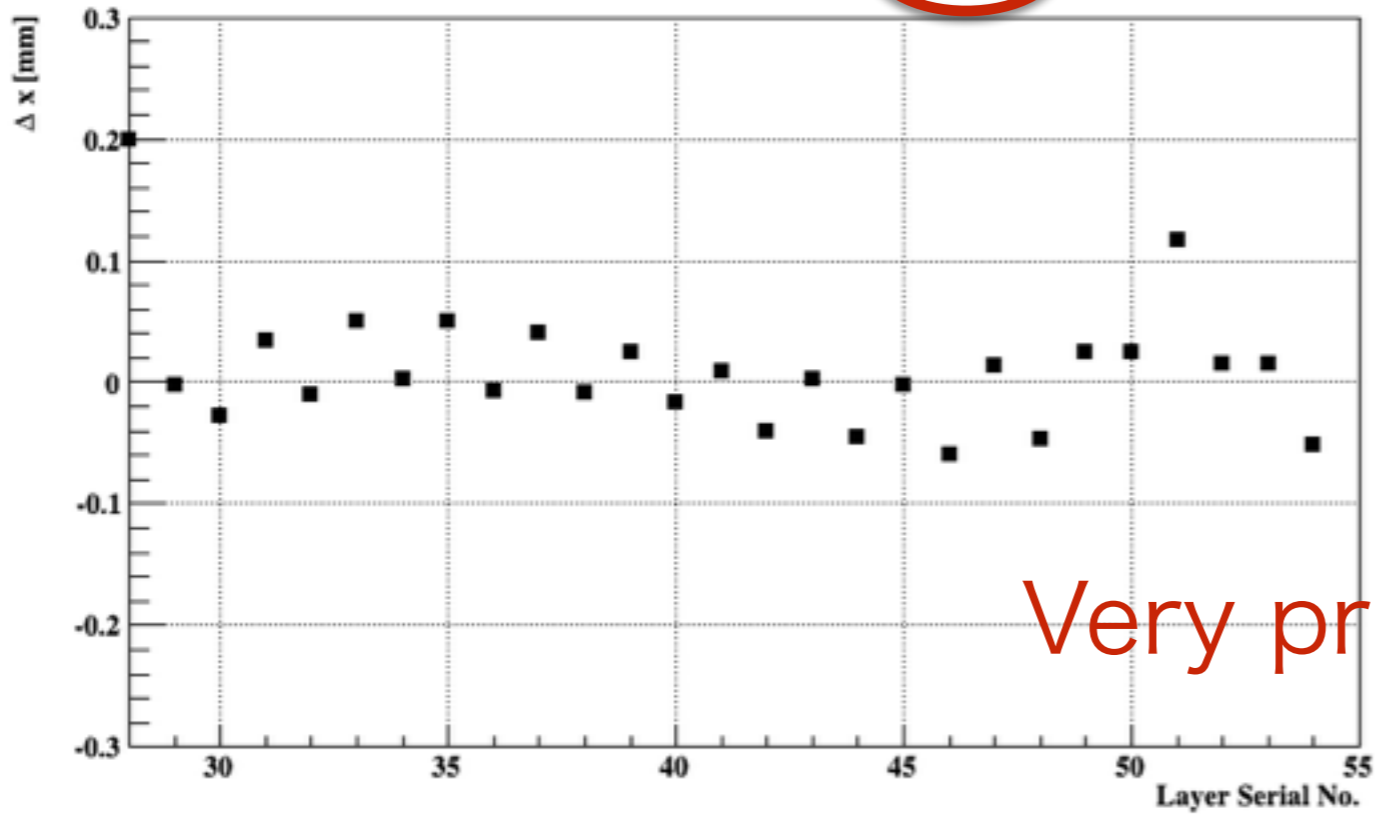
Diffusion constant

Pad Response (Module3 Row16)



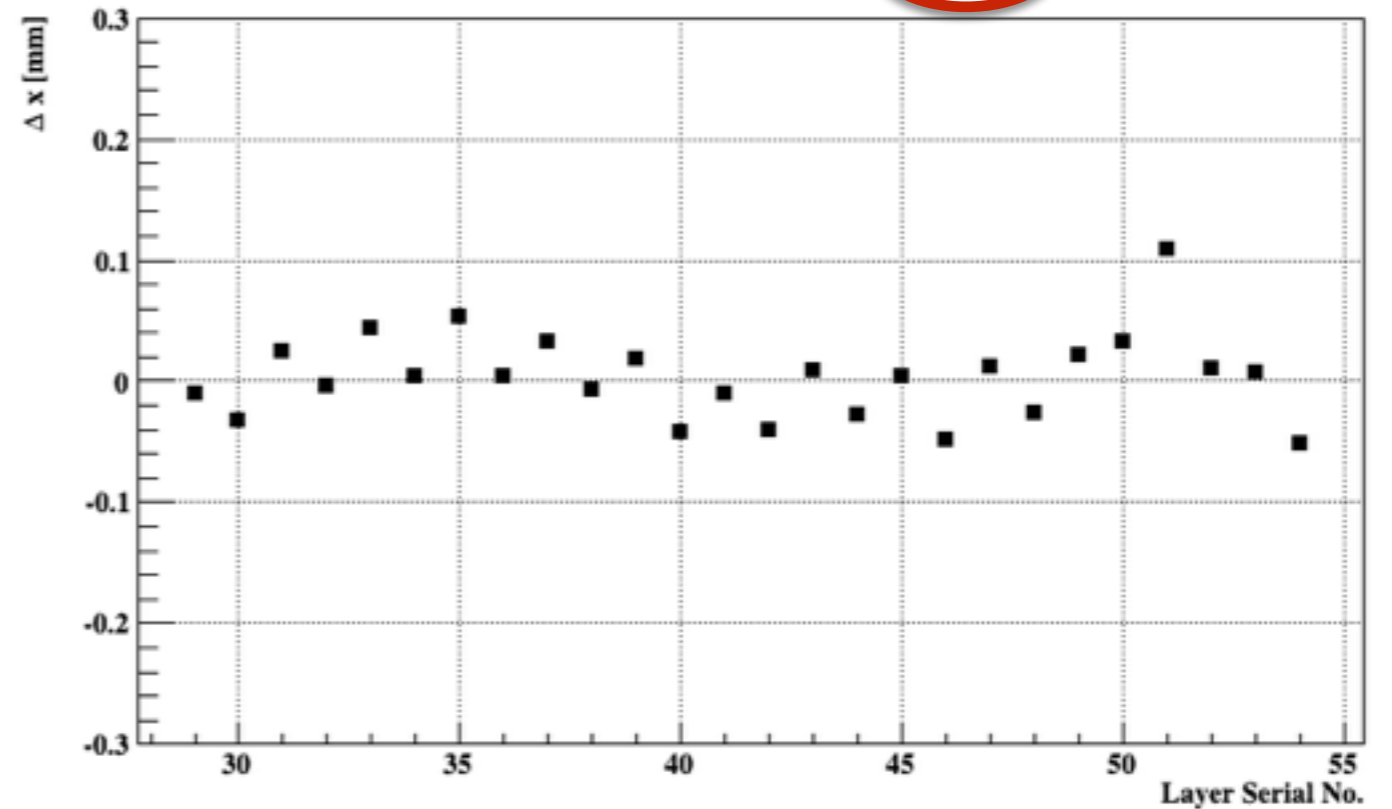
Residual (X) for each row

Residual (Drift Length **7.5[cm]**)



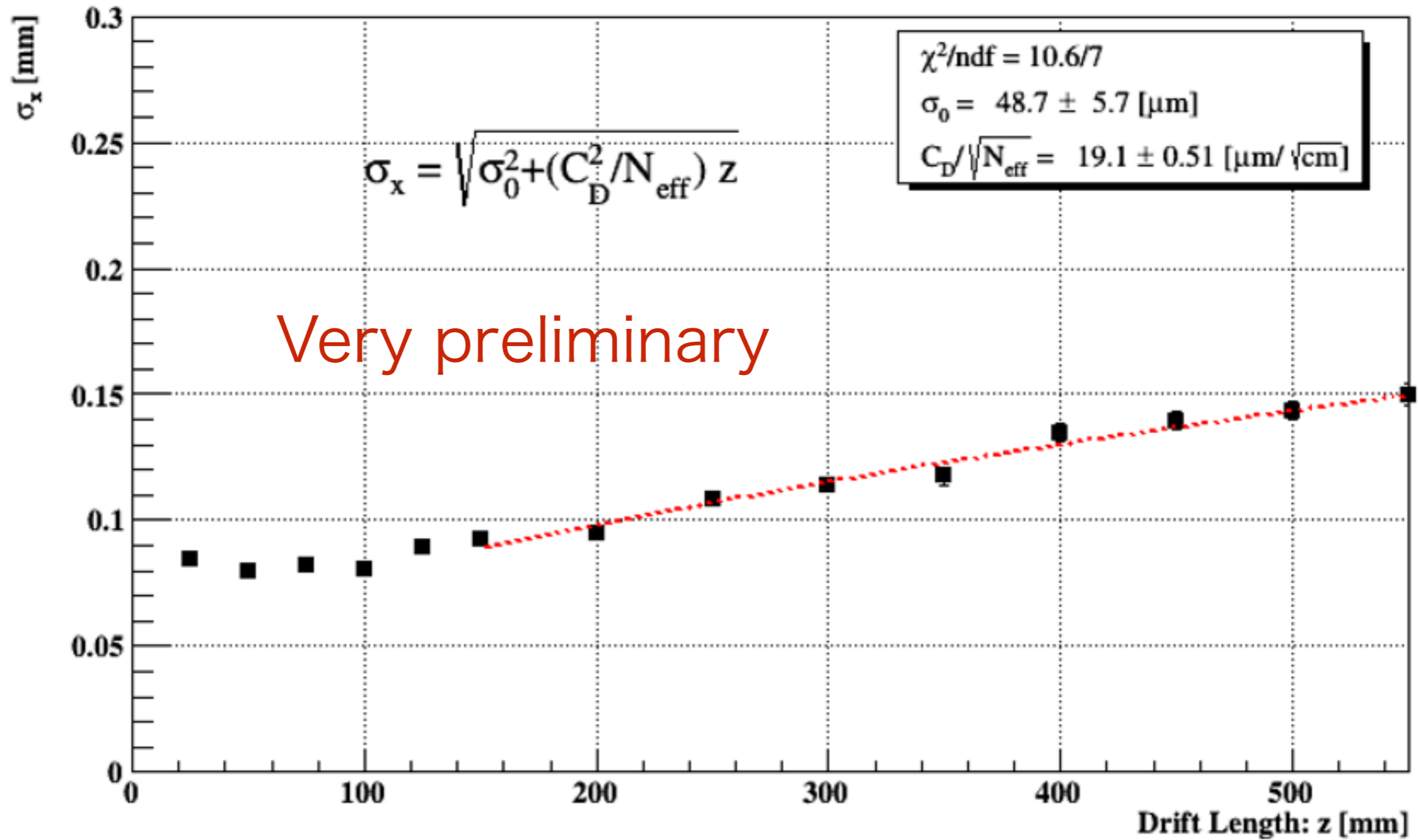
Very preliminary

Residual (Drift Length **55[cm]**)



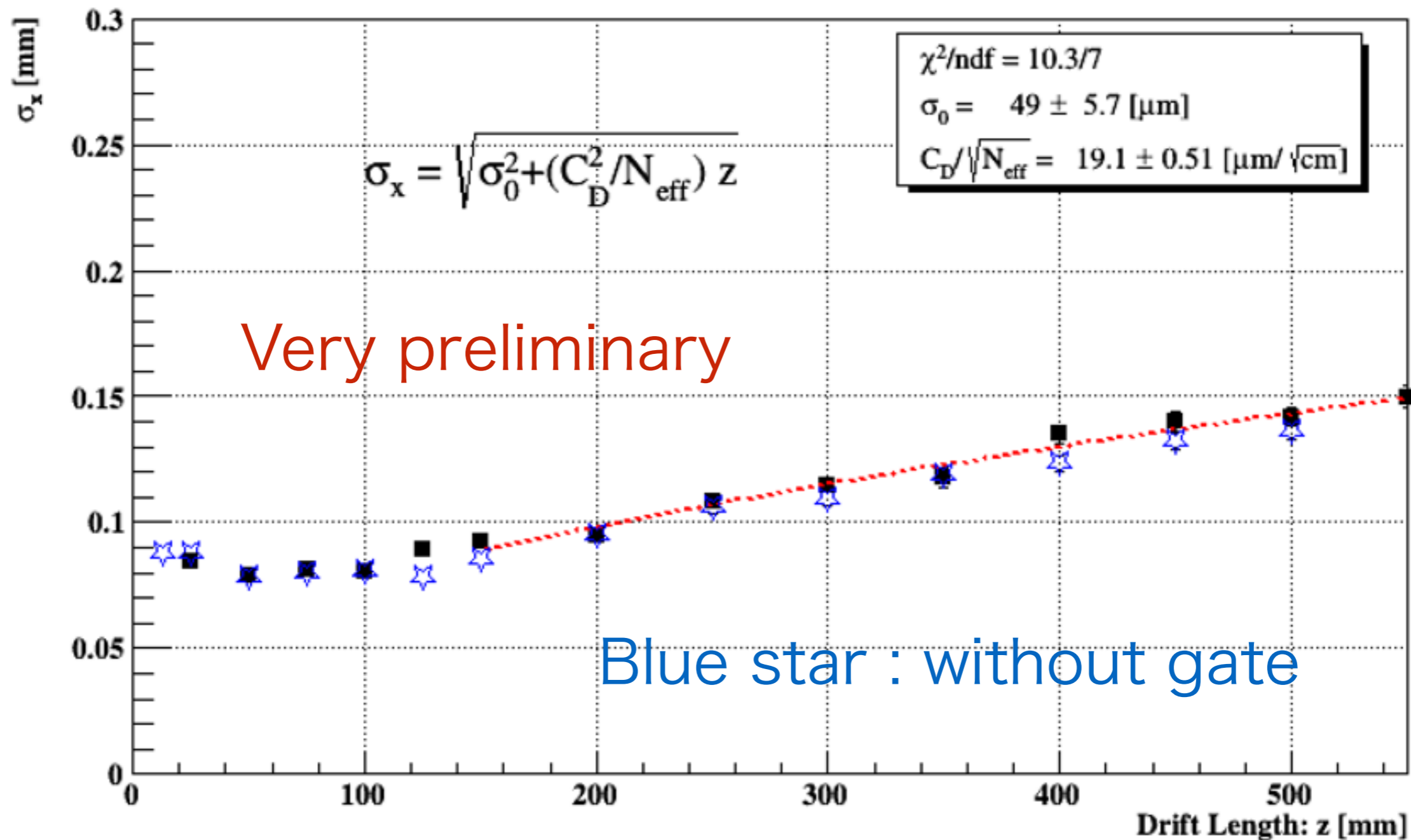
Point resolution (X)

GM Resolutin (Module3 Row16)

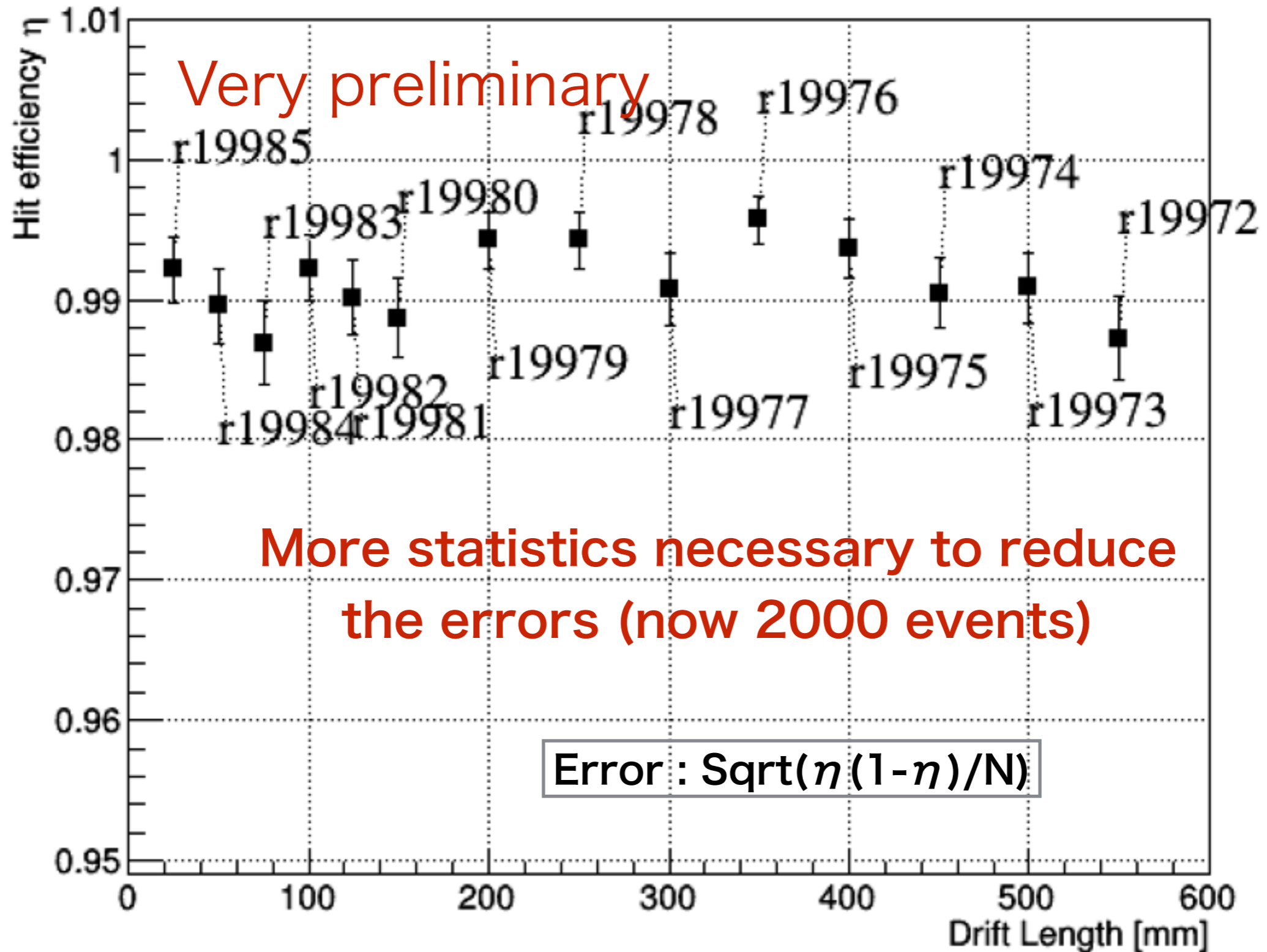


Point resolution (X) with data w/o gate

GM Resolutin (Module3 Row16)



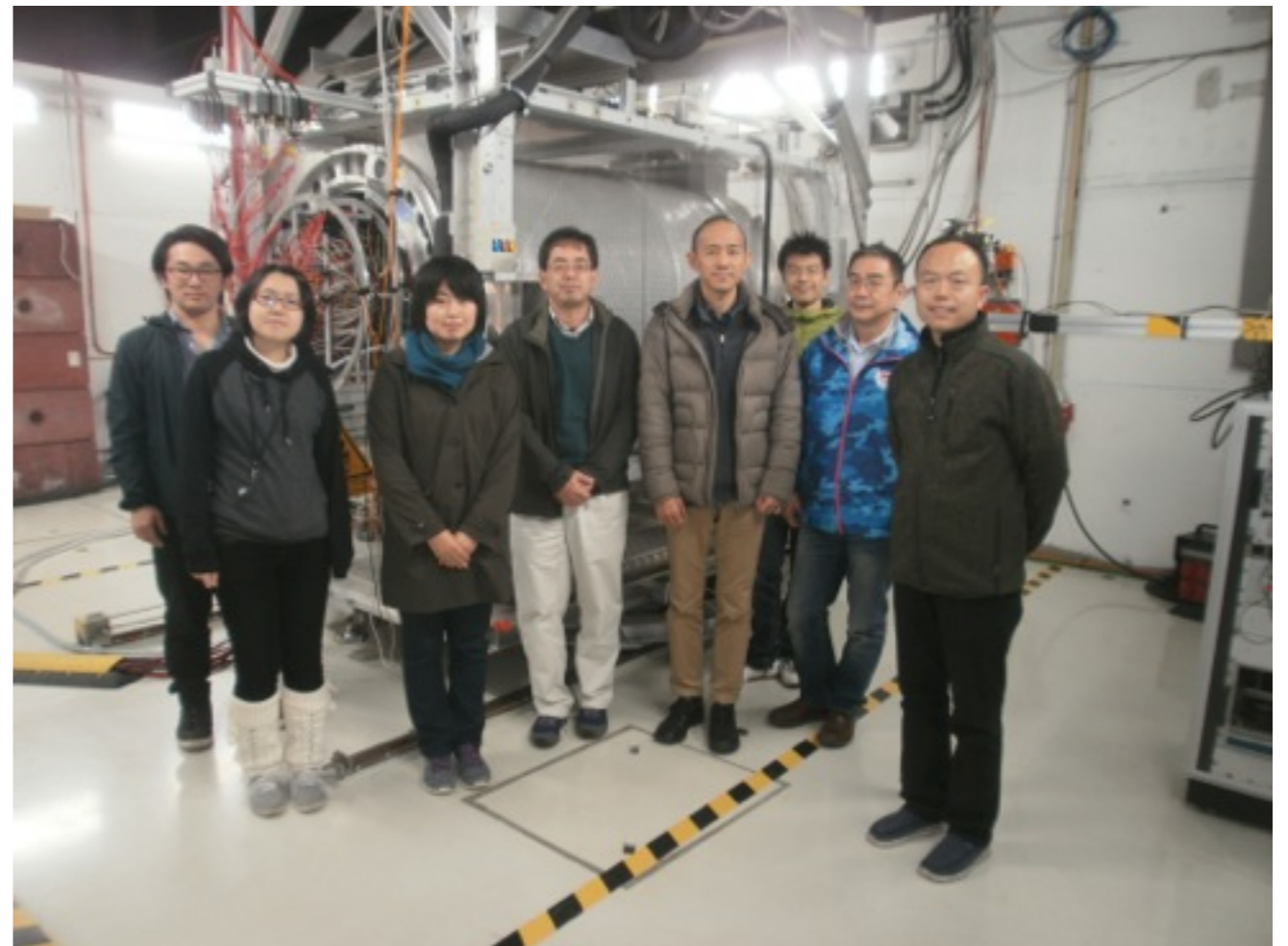
Hit efficiency (Module3 Row16)



Conclusion:

We think we have successfully taken data. Preliminary results look promising, but there are several things to be understood.

We're going to start more comprehensive analyses. Stay tuned!



Backup

Details for analyzers:

parameters in **the reconstruction steps**

(PulseFinderProcessor)

MinimumPulseHeight : 3

MinimumPulseLength : 2

TimeCalculationMode : default (using Inflexion point)

(RowBasedHitFinderProcessor)

MinMaxPulseSliceHeightOverride : 12

(TrackMakingKalmanFilterProcessor)

MaxDeltaChi2 : 600

MaxSkipRows : 5

MinTrackHits : 10

(RootFileProcessor)

SkipRows : 0, 22, 27

← Kalman-filtering again to remove effects from bad channels and retrieve track information.

(meaning that you put artificially a large error on hits on those pad rows that are covered by the GEM frames or have bad channels within the beam trajectories.

This is important to avoid having bad effects on tracks.)

Hit efficiency estimation

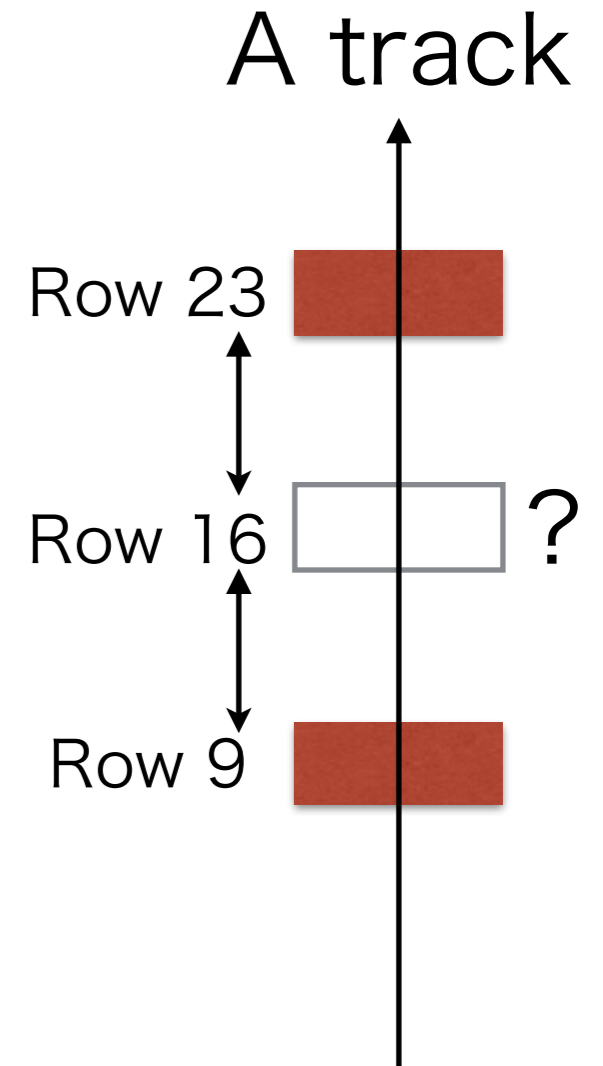
Looked at row-16 (module 3)

7 rows away to avoid effects by the diffusion.

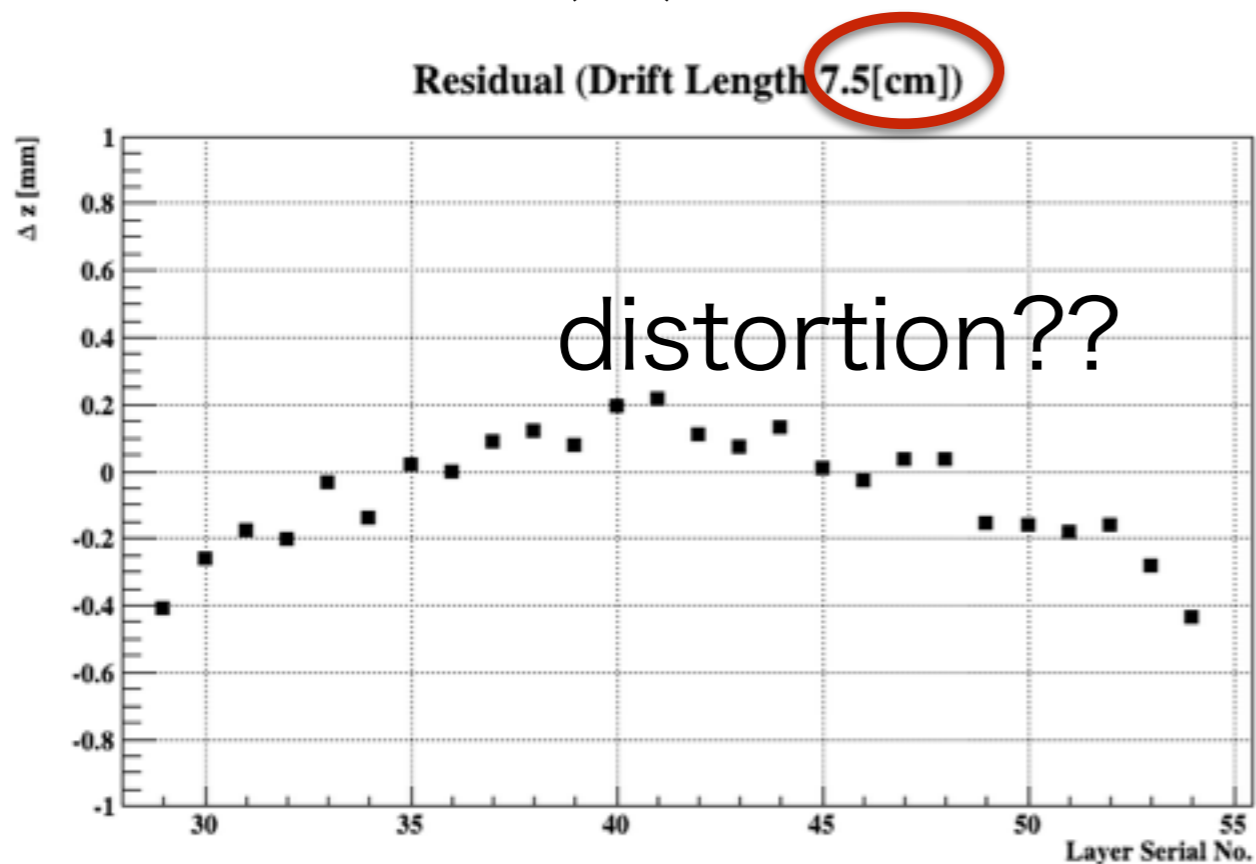
Basic idea :

Test if Row 16 has a hit associated with a track that has hits both on Row 9 and Row 23.

To reduce biases, minimum number of hits per track is set to be a relatively small value (=10) in the track reconstruction step.

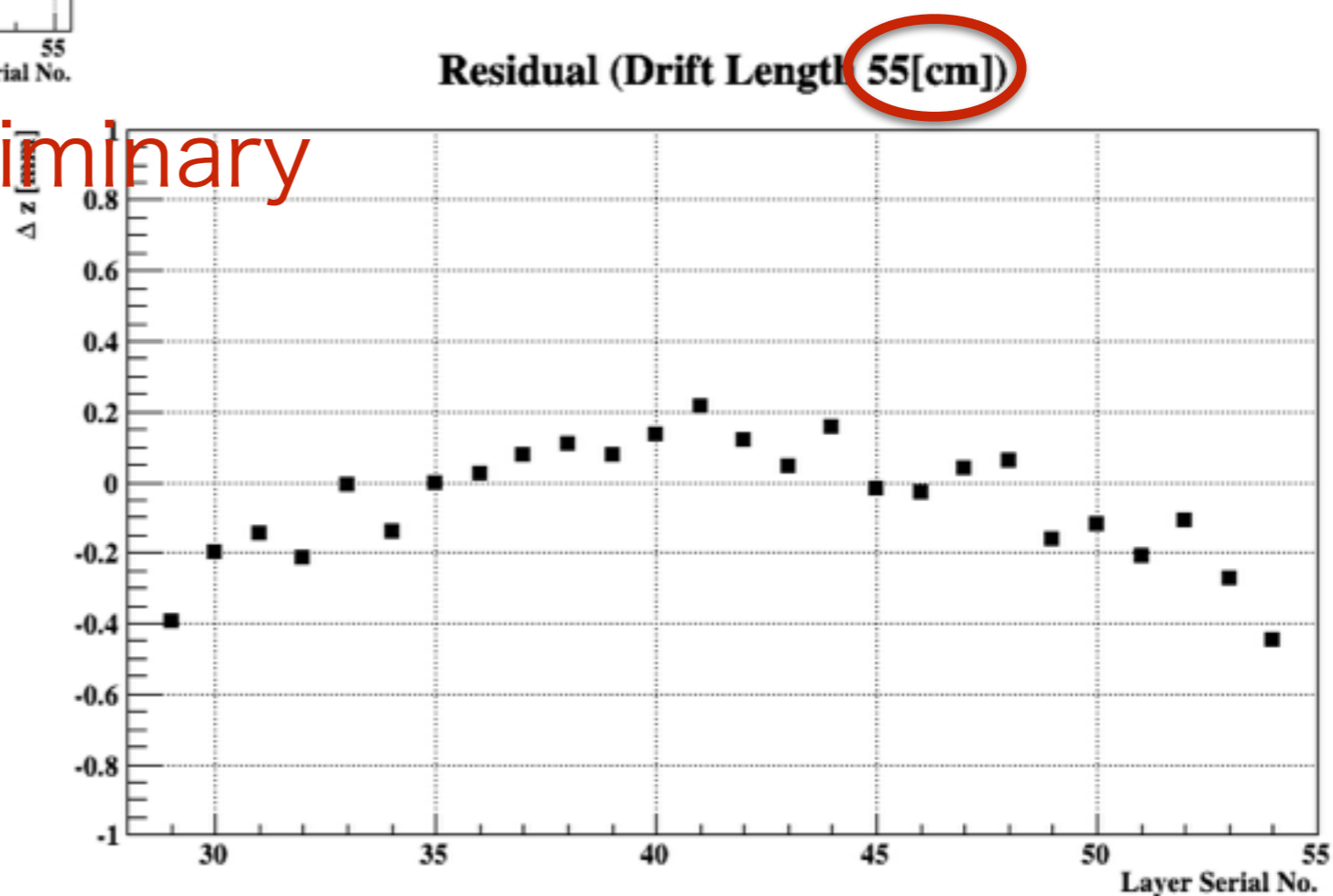


Residual (Z) for each row



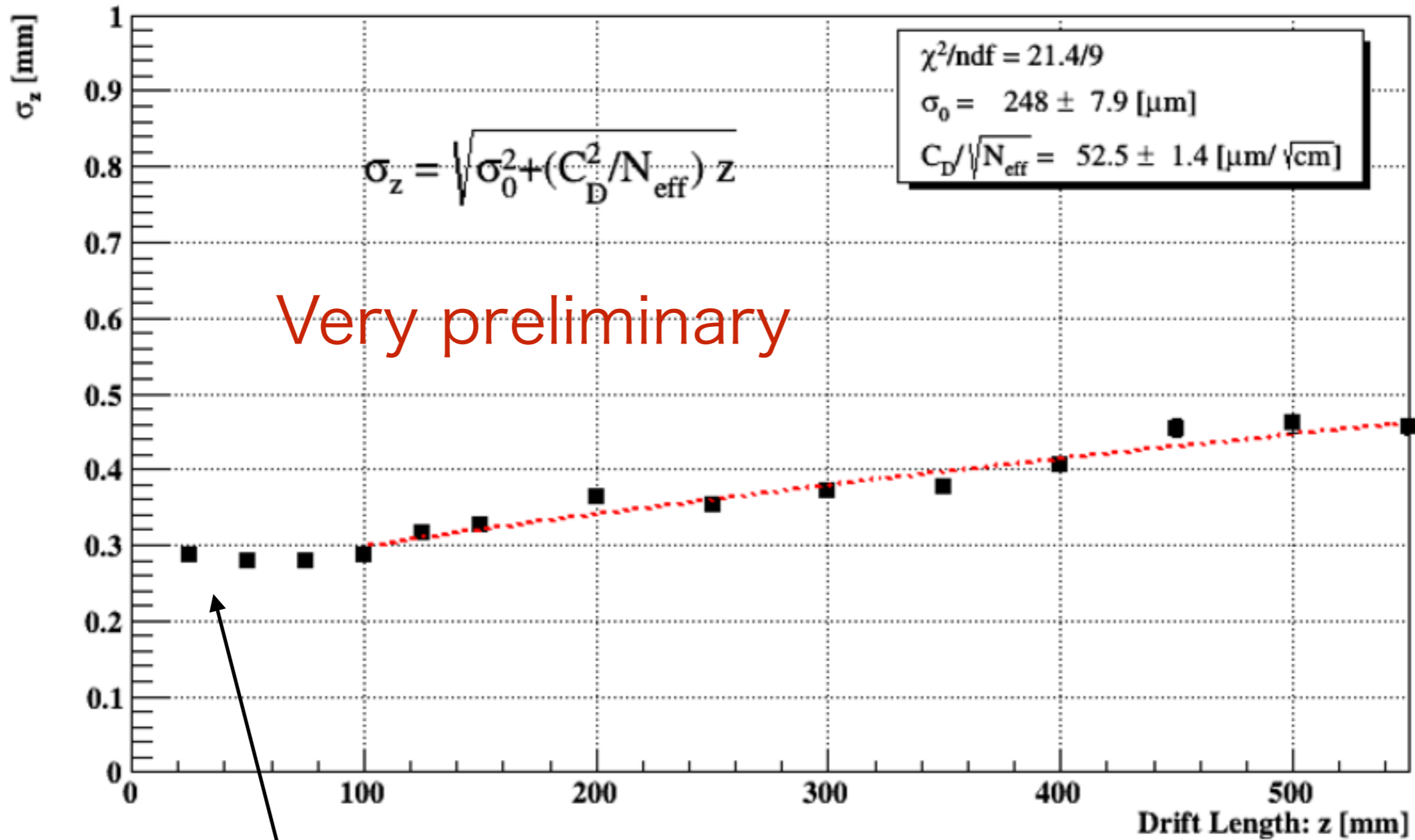
using “inflexion point” method
to reconstruct Z position.

Very preliminary



Point resolution (Z)

GM Z Resolutin (Module3 Row16)



Hodoscope effect?? Why?