Test beam 2015.
Residuals and Pads per Hit.

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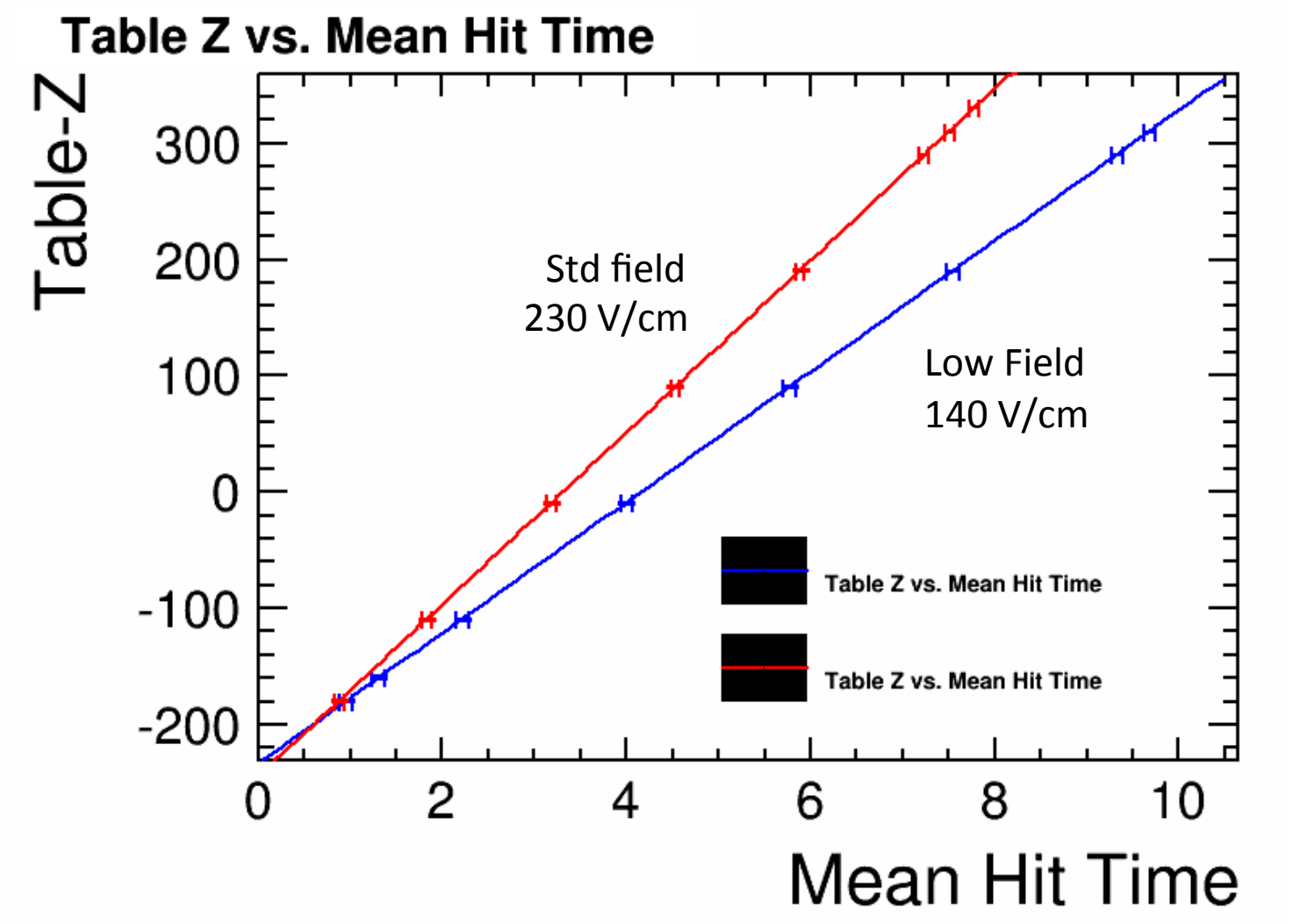
March 24, 2015

TO and drift velocity

T_0 determination from data

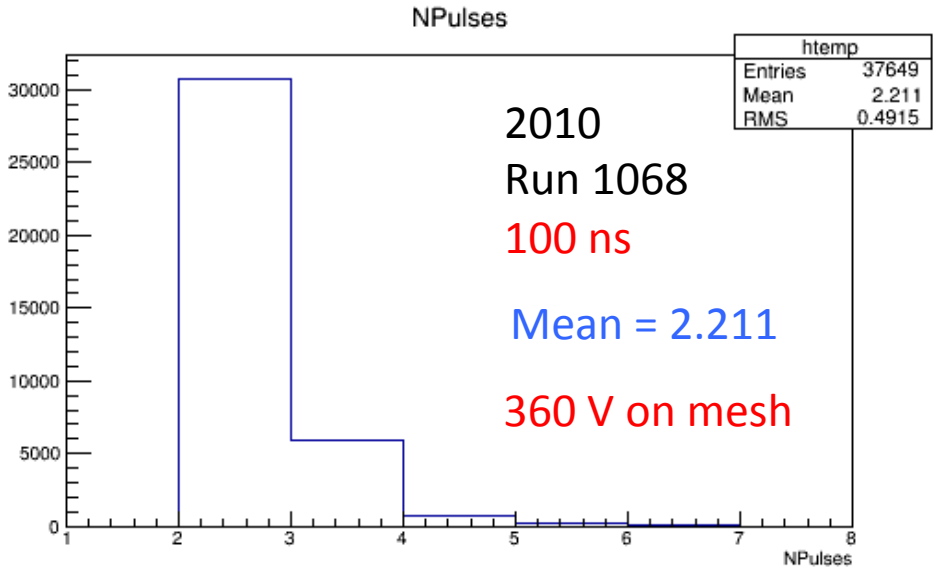


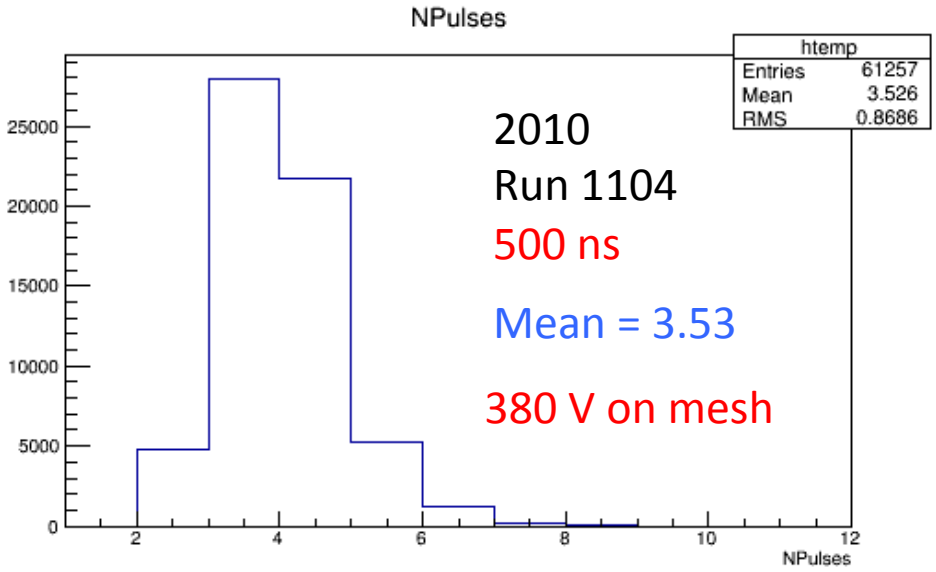
T= 632 ns, V_drift_std = ~ 74 µm/ns, V drift_low= ~ 56 µm/ns.

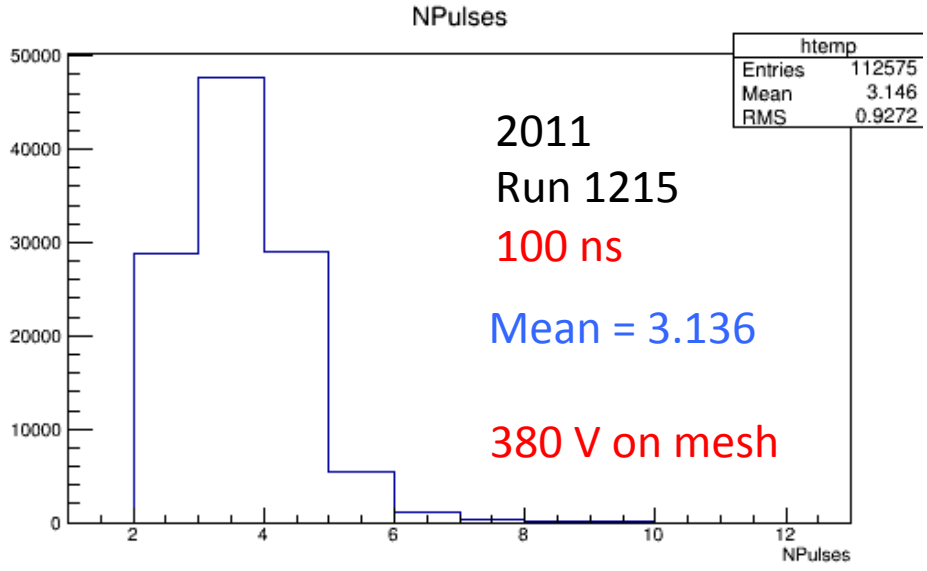
Drift velocity is somehow smaller than before? Used to be 76 µm/ns …

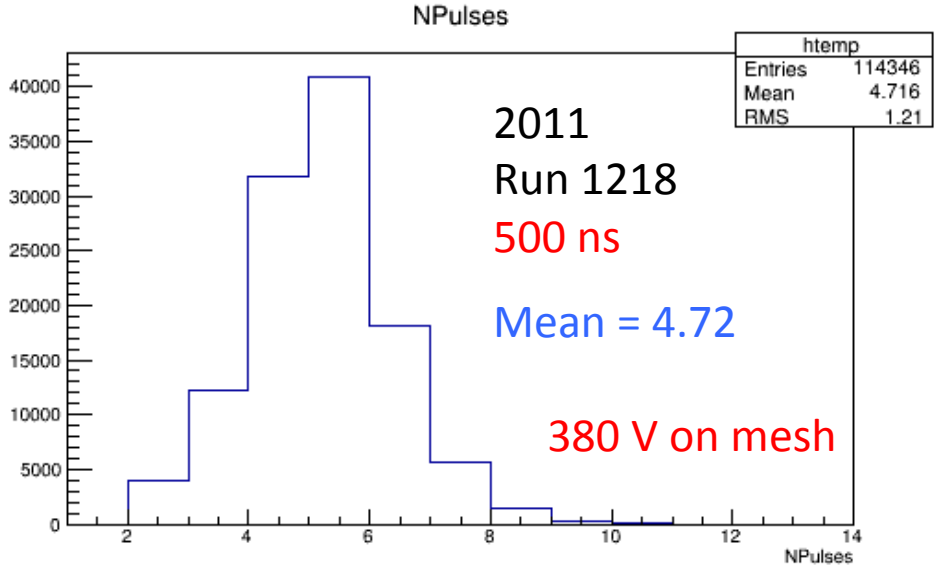
Pads per hit.
Historical overview.

2010 – 2011 data



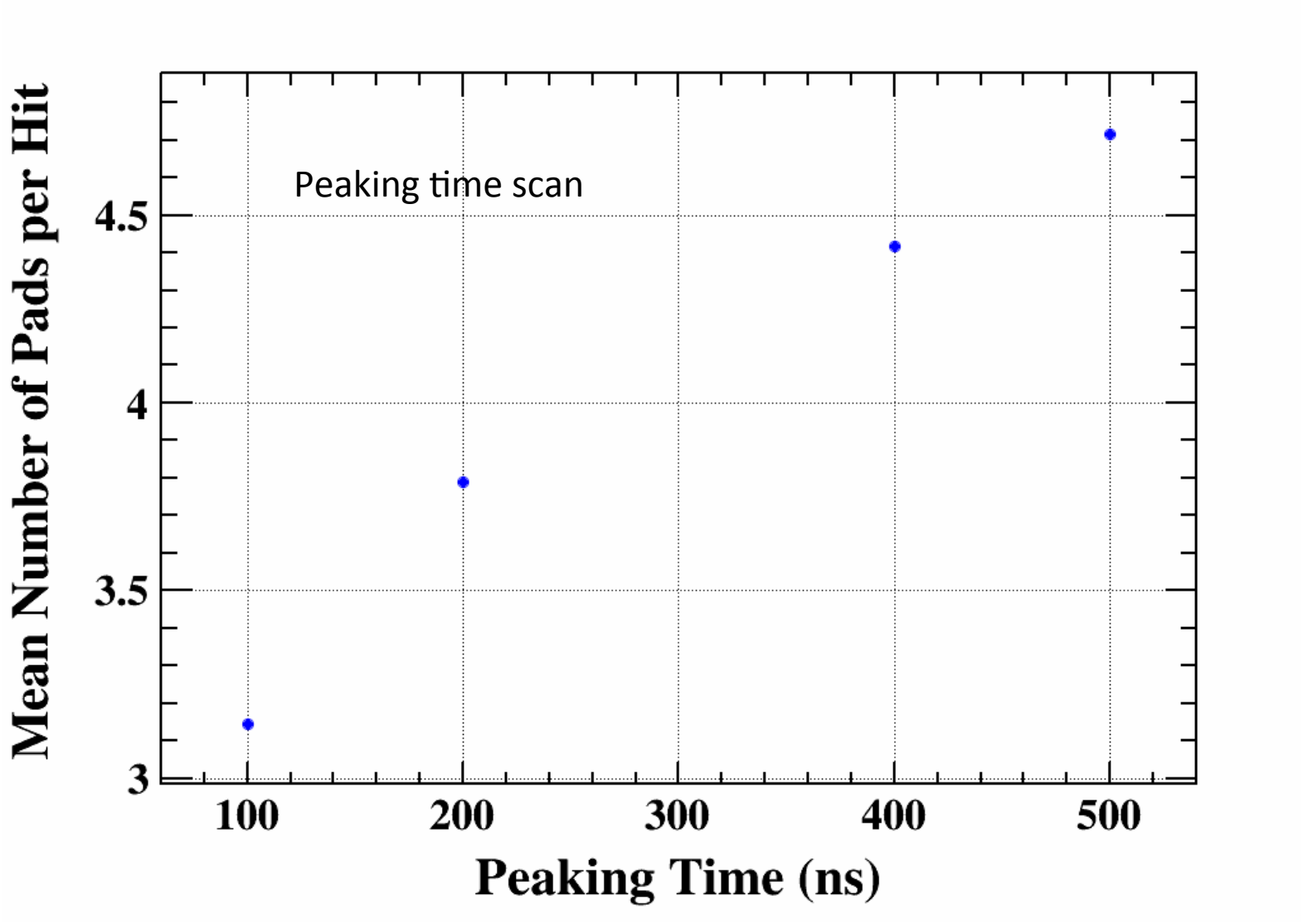




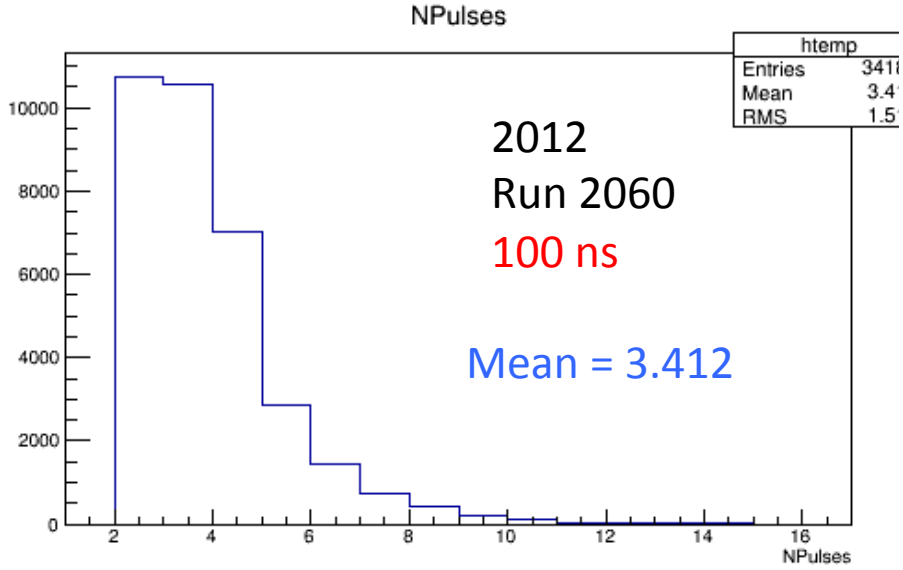


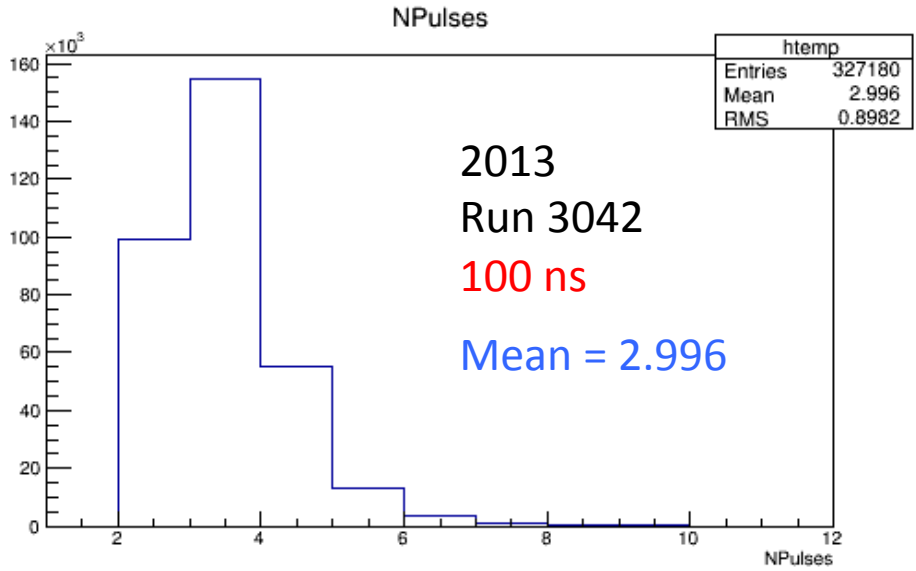
10 cm drift

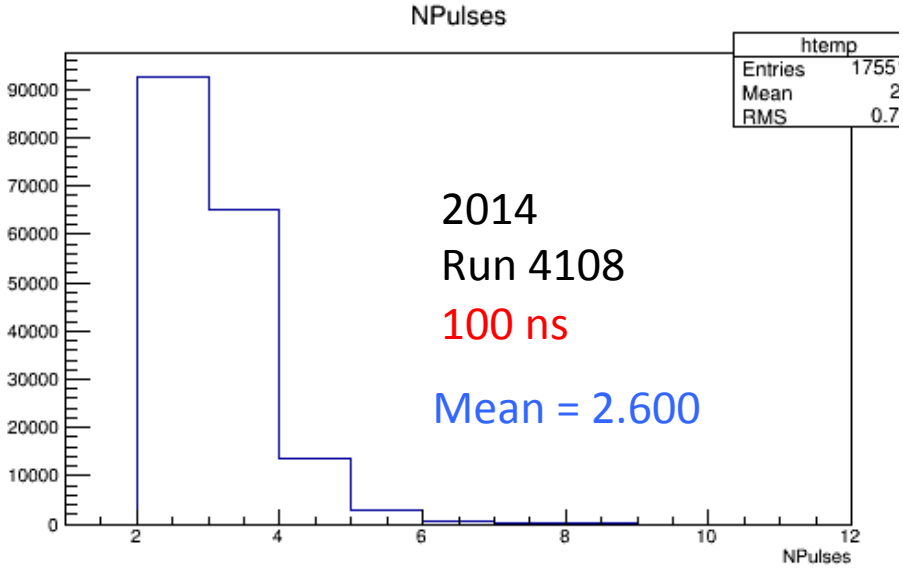
2011 data

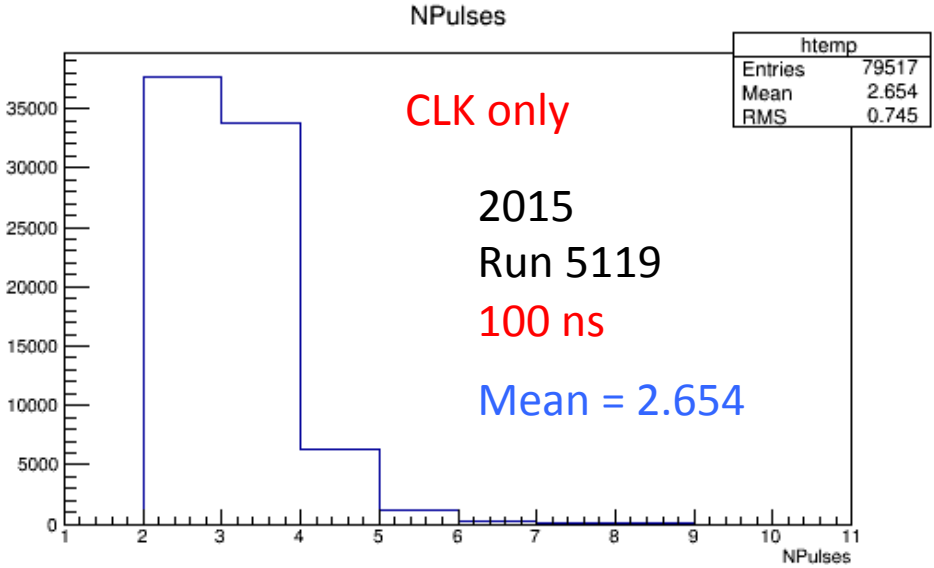

Peaking time scan
Mean Number of Pads per Hit
4.5
4
3.5
3
100
200
300
400
500
Peaking Time (ns)

2012 – 2015 CLK 100 ns





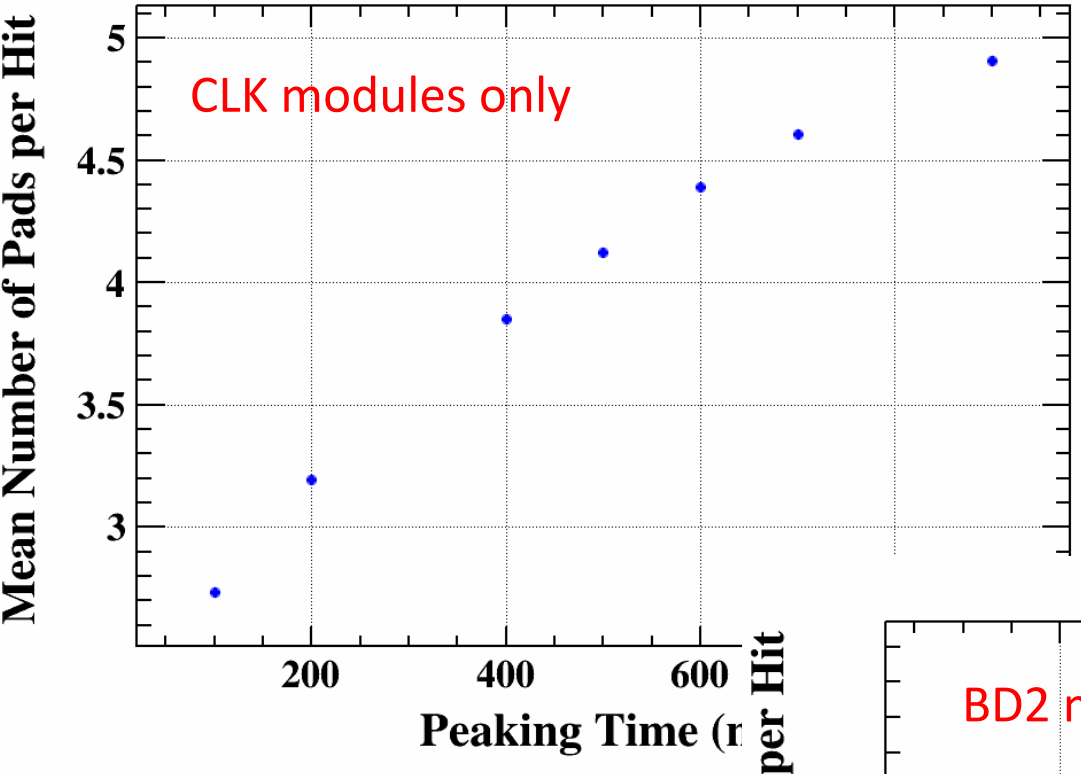


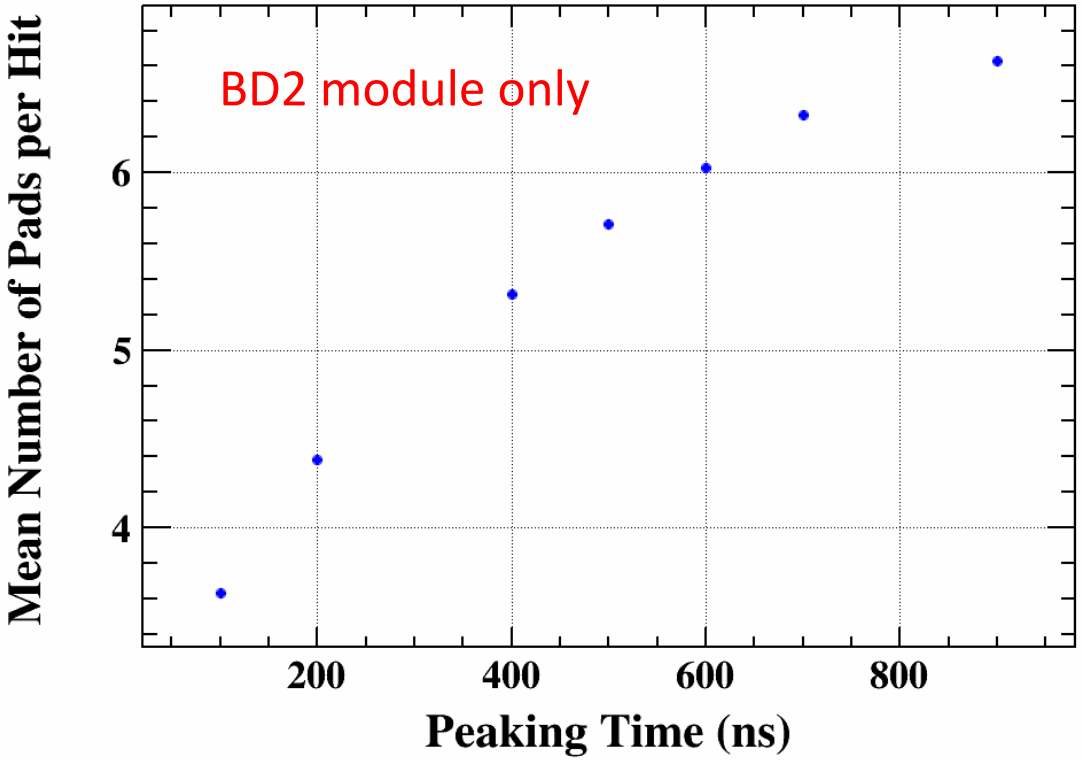


Should be mostly 10 cm drift

Could be fluctuations, but Pad per hit mean value has dived in 2014-2015?

Pads per hit scan – 2015, CLK vs BD





Significant increase in charge spread for BD2

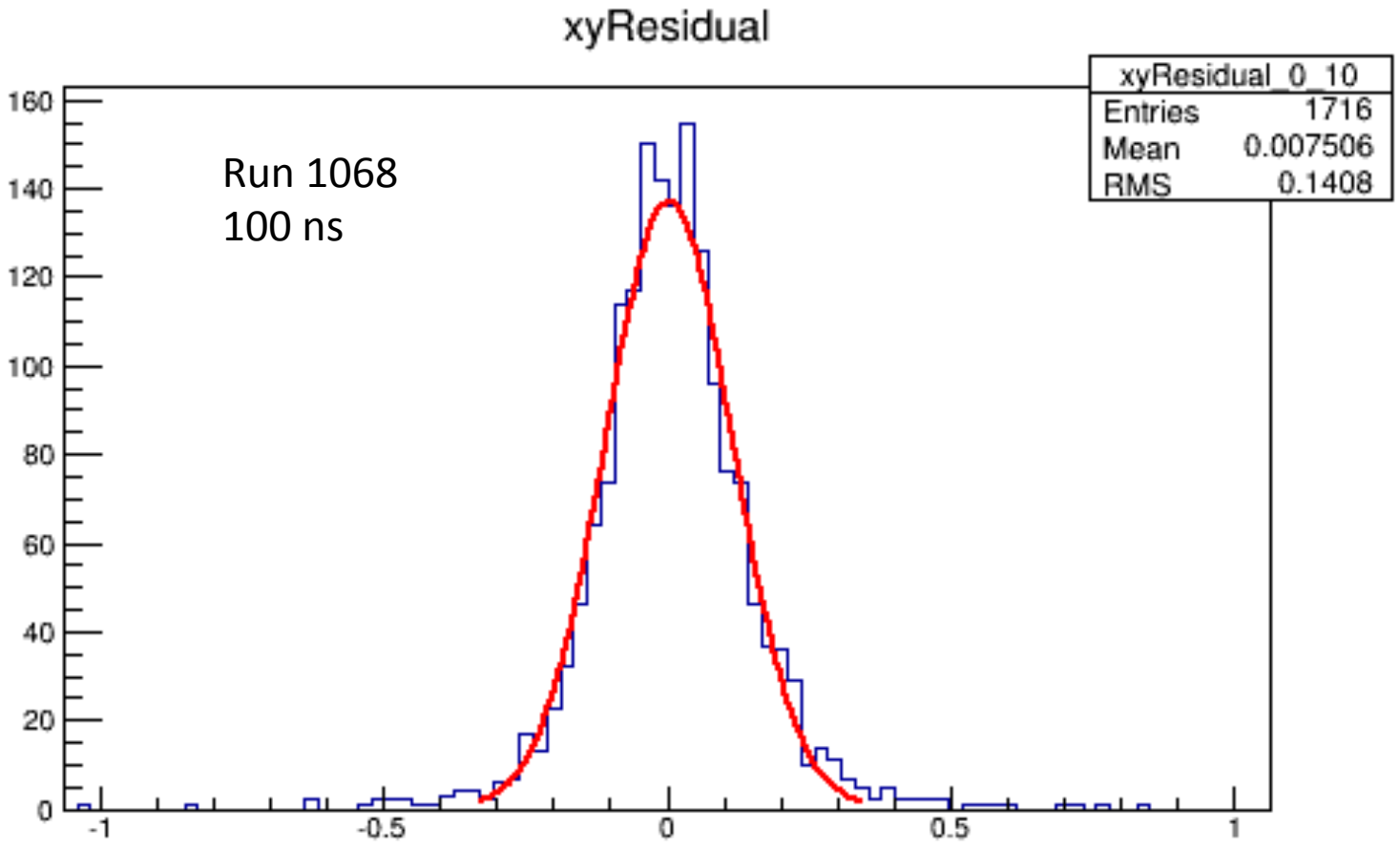
Summary

- Attempt to look at the pads per hit issues by comparing the data at _mostly_ 10 cm drift distance.
- Note that there is a difference in this value between 2010 and 2011, probably due to less gain in 2010.
- The mean value has fluctuated across years for the same peaking time. However, it is quite low for CLK modules in 2014 and 2015. Impact of electronics changes or what?
- BD2 demonstrates quite extraordinary increase.

Residuals in XY,
again, from historical point of view

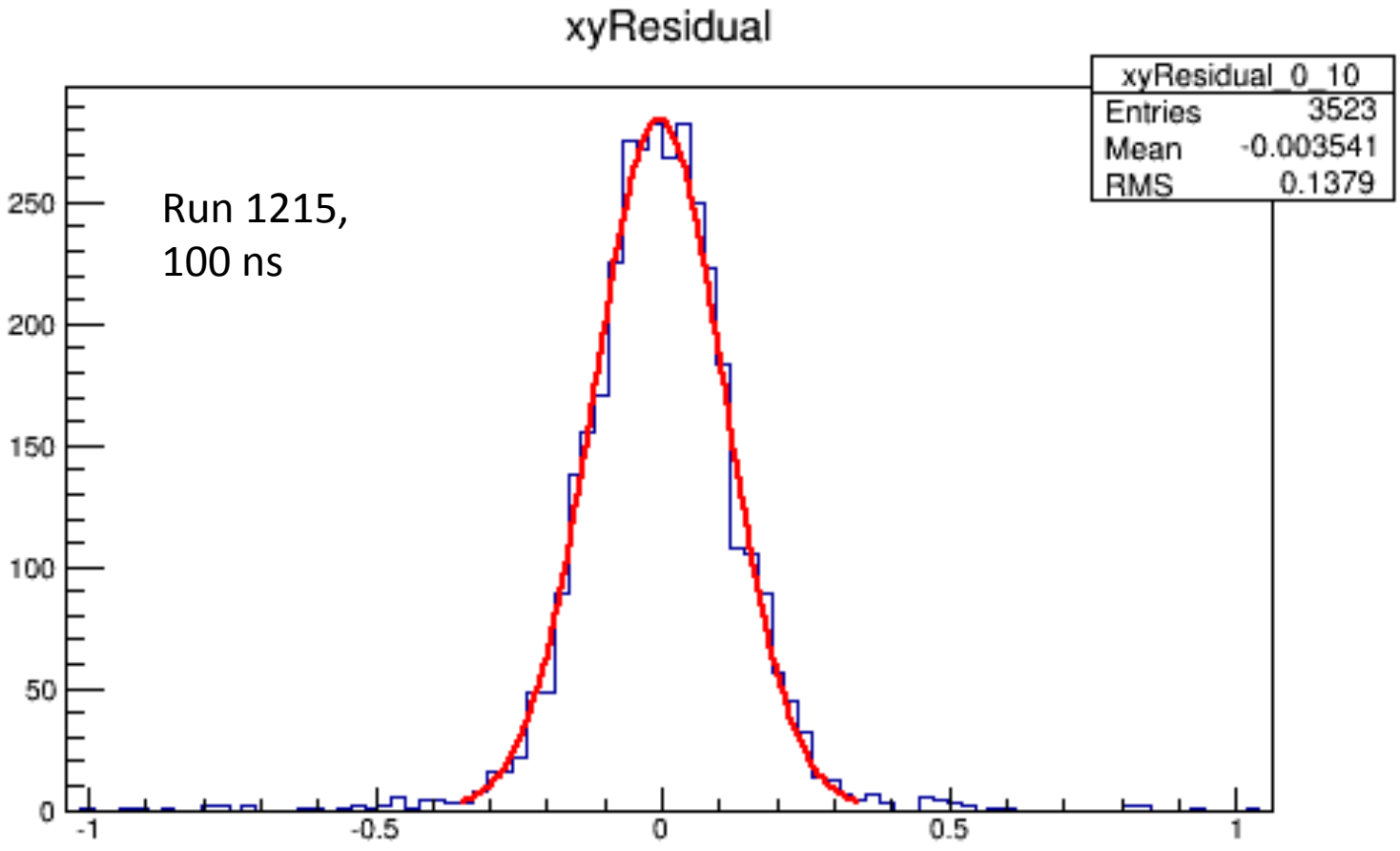
- How we fit the residuals in transverse and longitudinal direction affects our resolution performance results.
- This is an attempt to compare how well we did the fitting in the past and how we do it now.
- Note that for XY resolution, the mean calculation method is a Gaussian fit within a range of 3 sigma (a default one).

2010 data, Row 10, Module 0



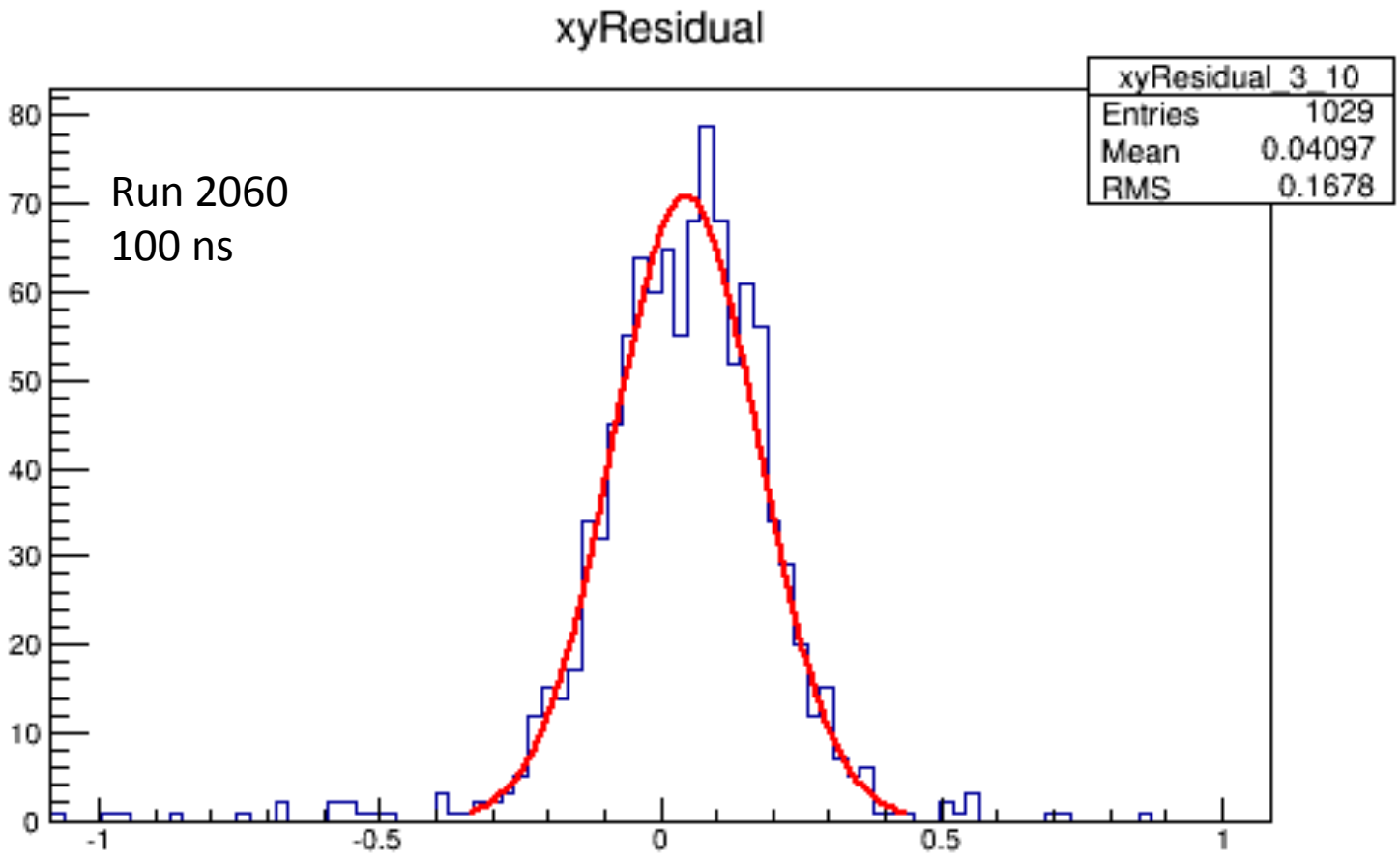
Limited events statistics, but fit looks OK.

2011, Row 10, Module 0



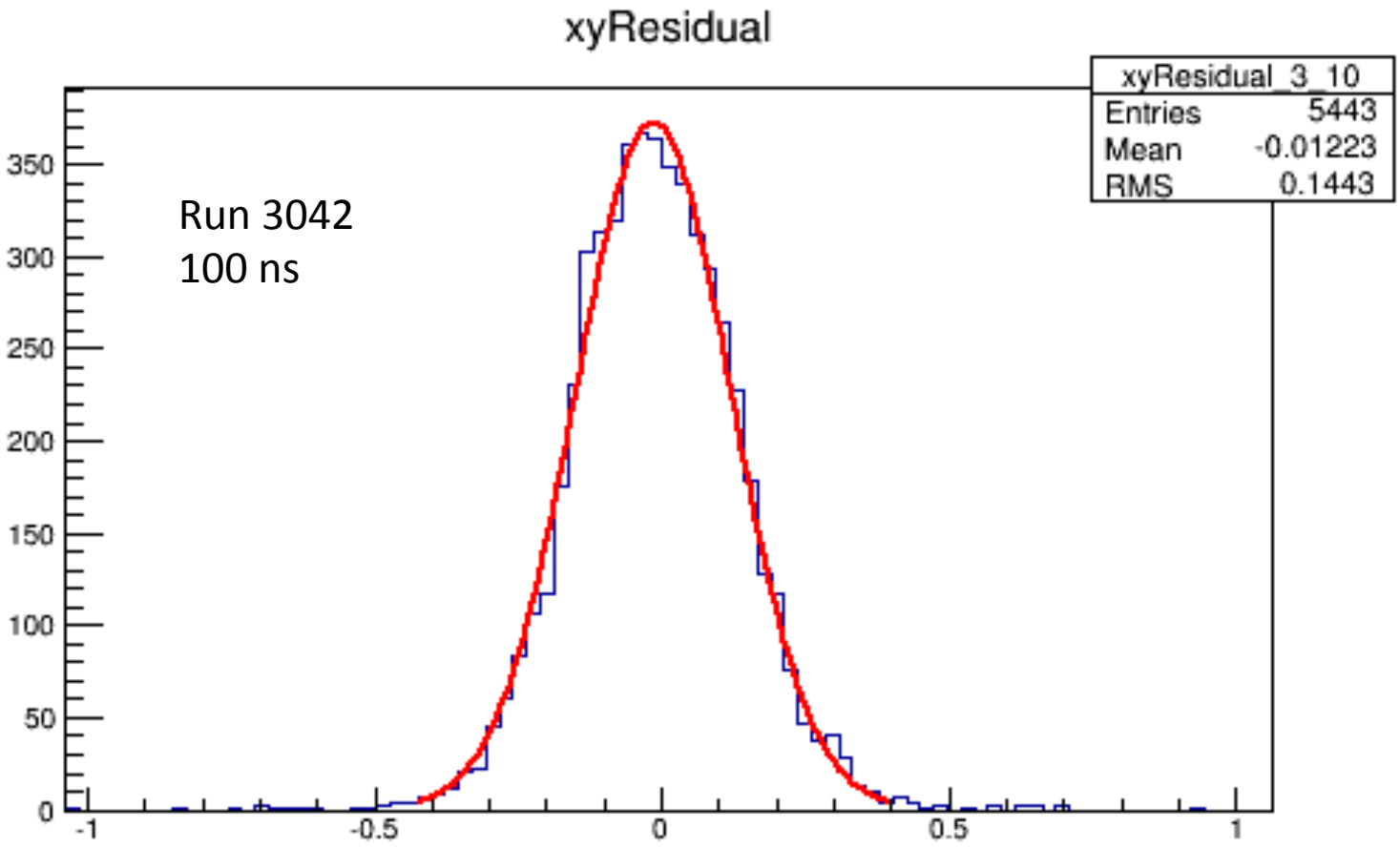
Fit looks fine to me

2012, Row 10, Module 3



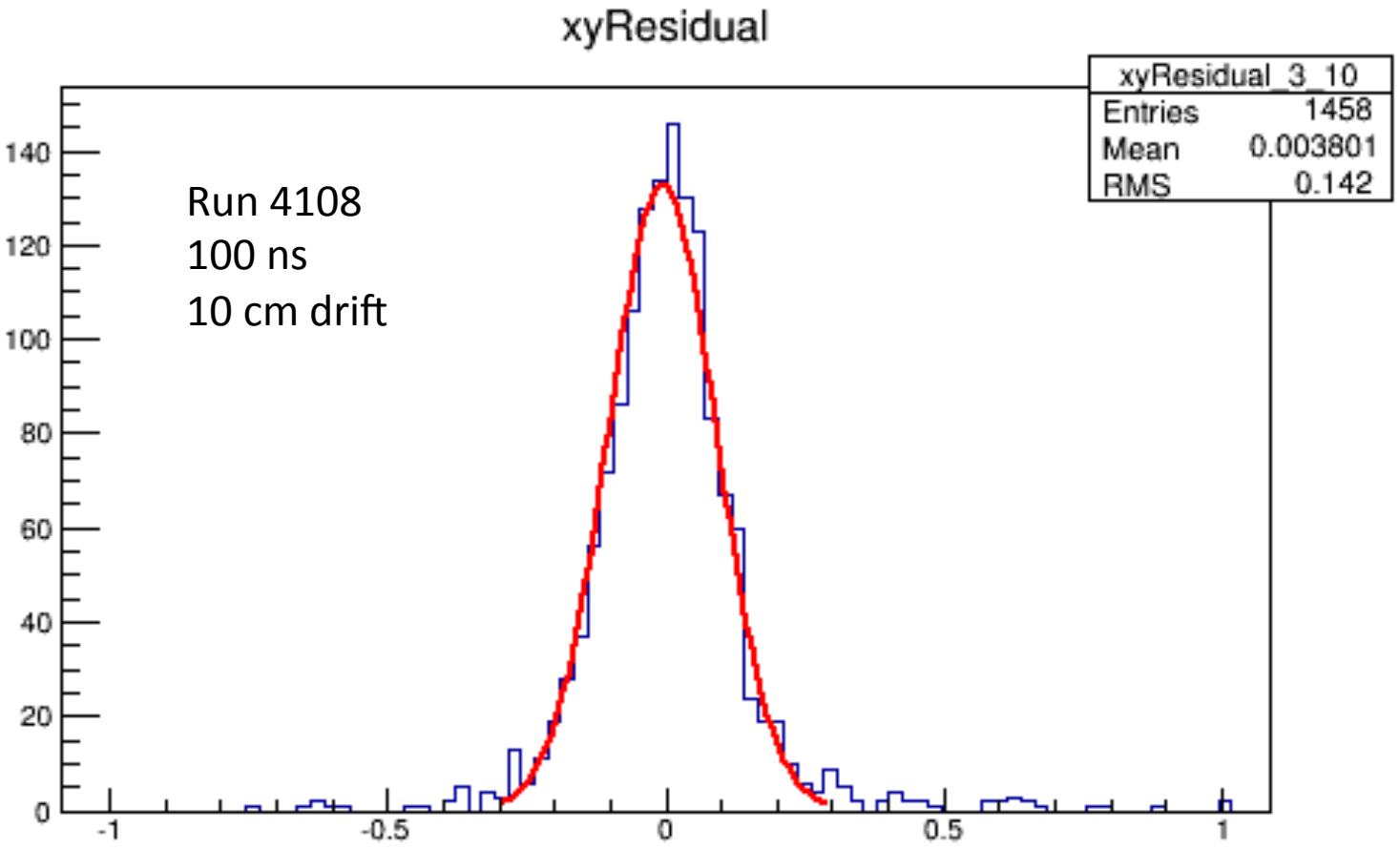
Event statistics is not great, but fit looks OK…

2013, Row 10, Module 3



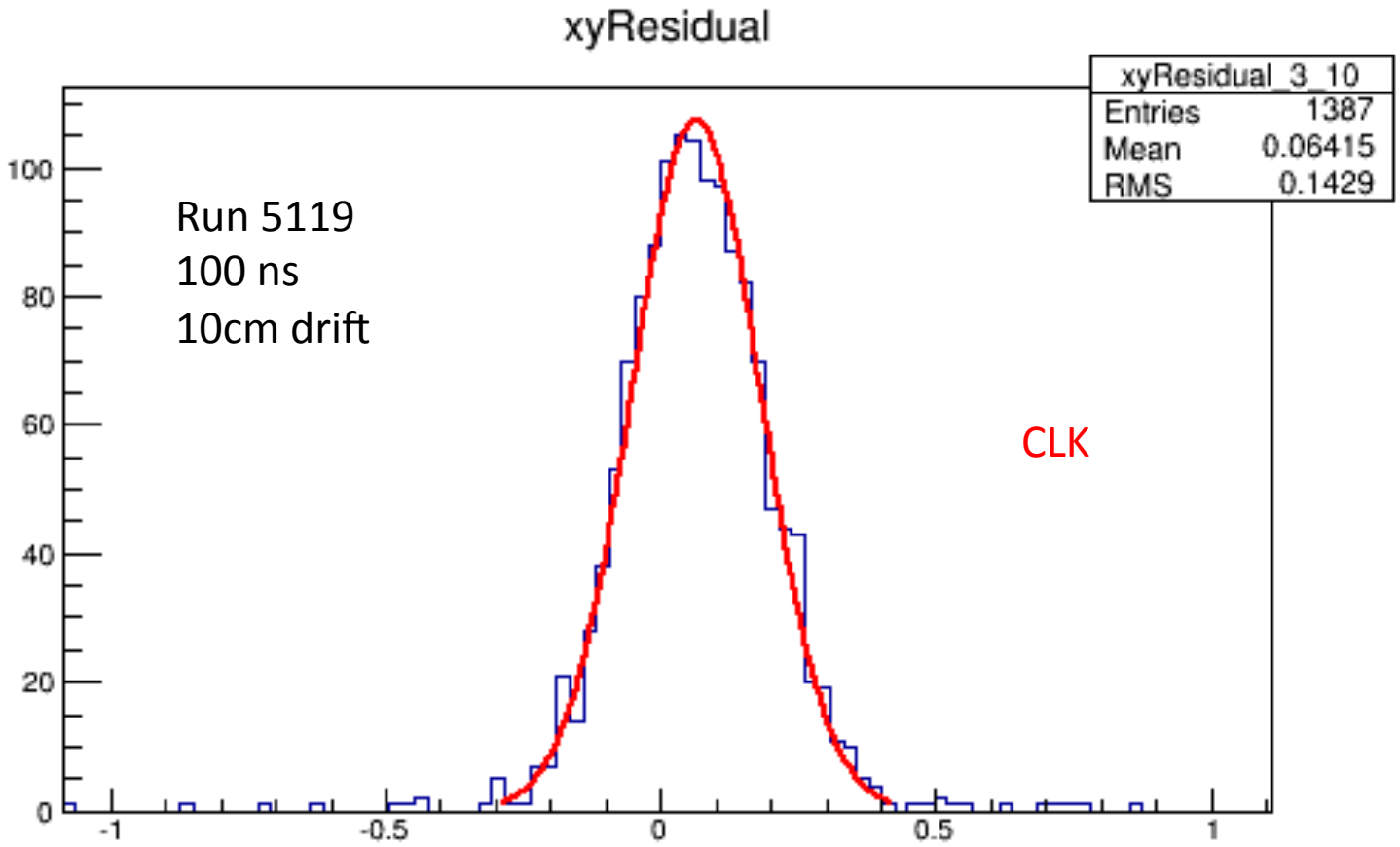
Fit looks very good to me.

2014, Row 10, Module 3



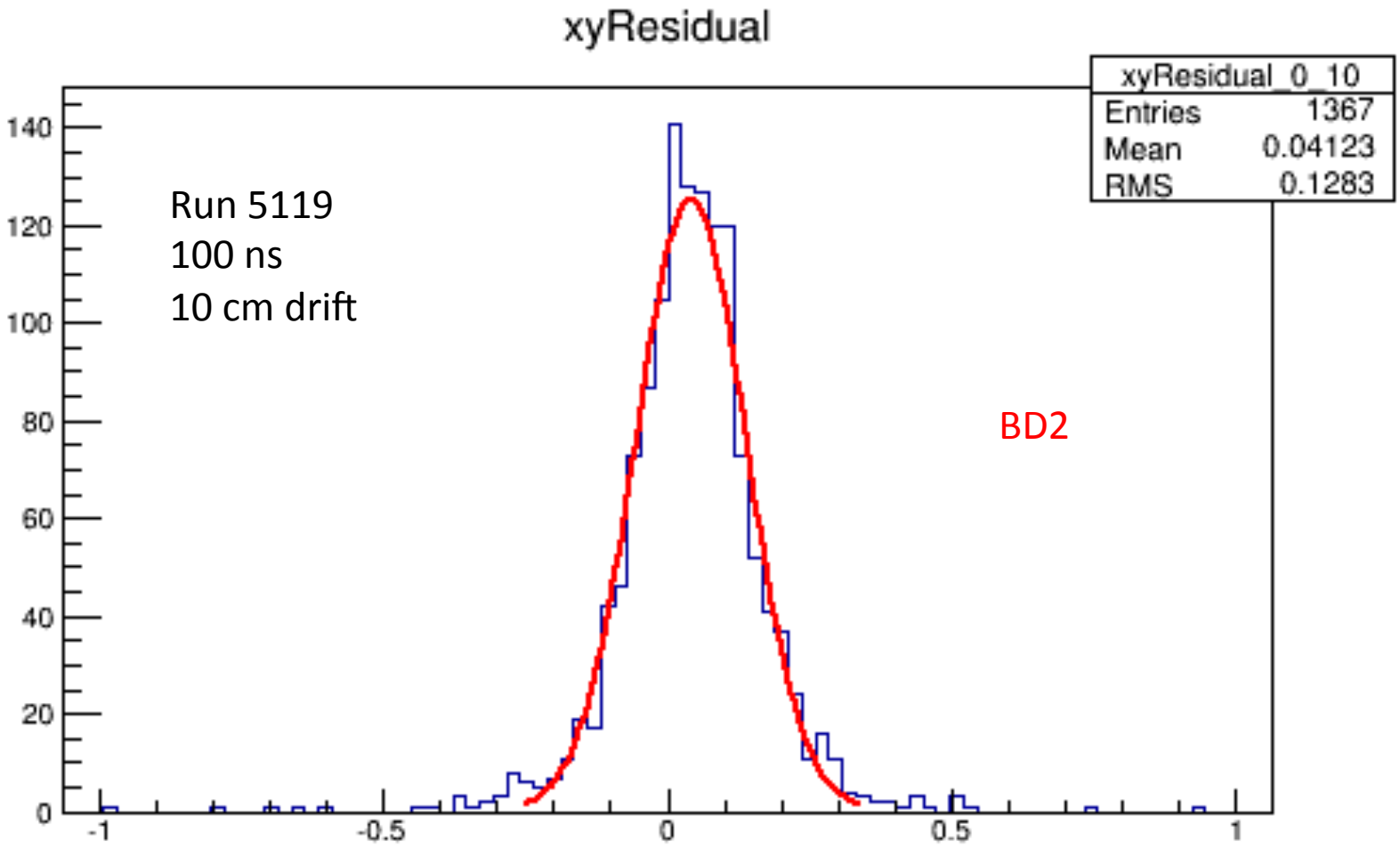
Looks not perfect, but it is OK, I guess. Statistics is not greatest.

2015, Row 10, Module 3



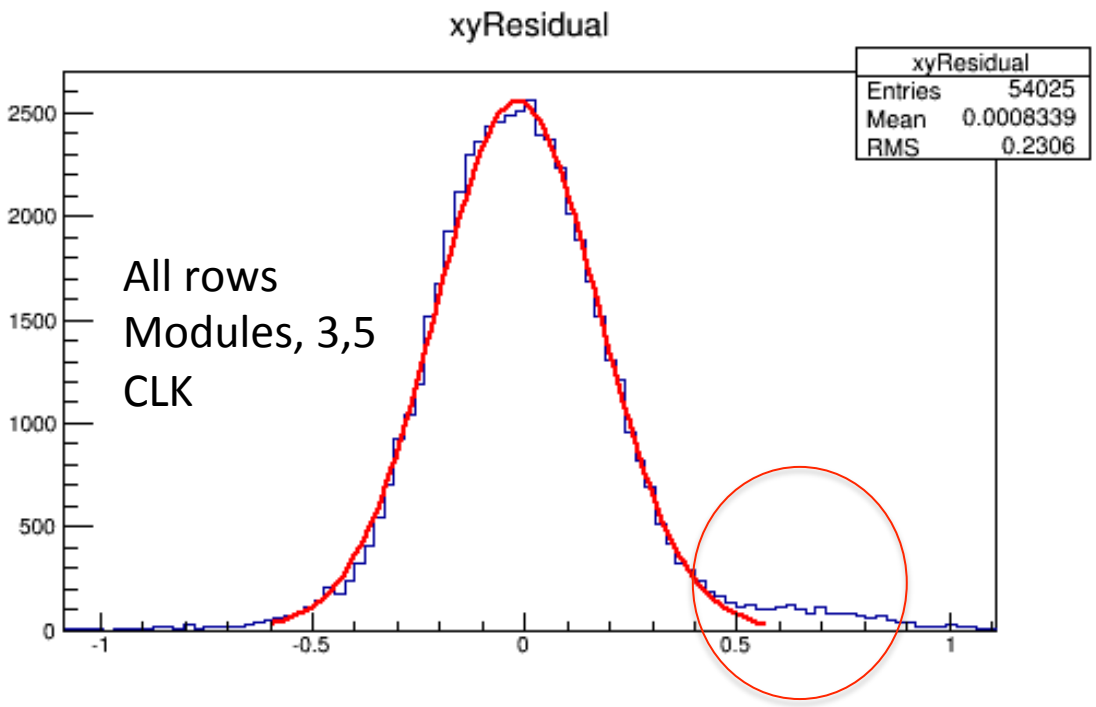
Fit looks OK for this row.

2015, Row 10, Module 0



Poor statistics, but fits is OK for this row?,

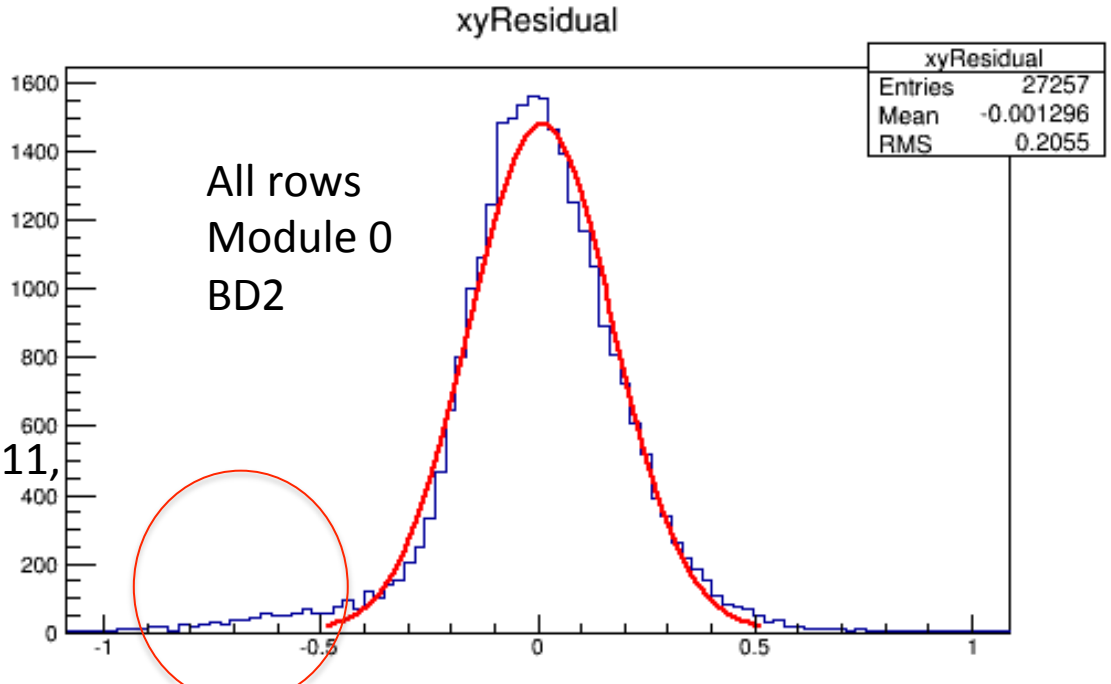
HOWEVER ->

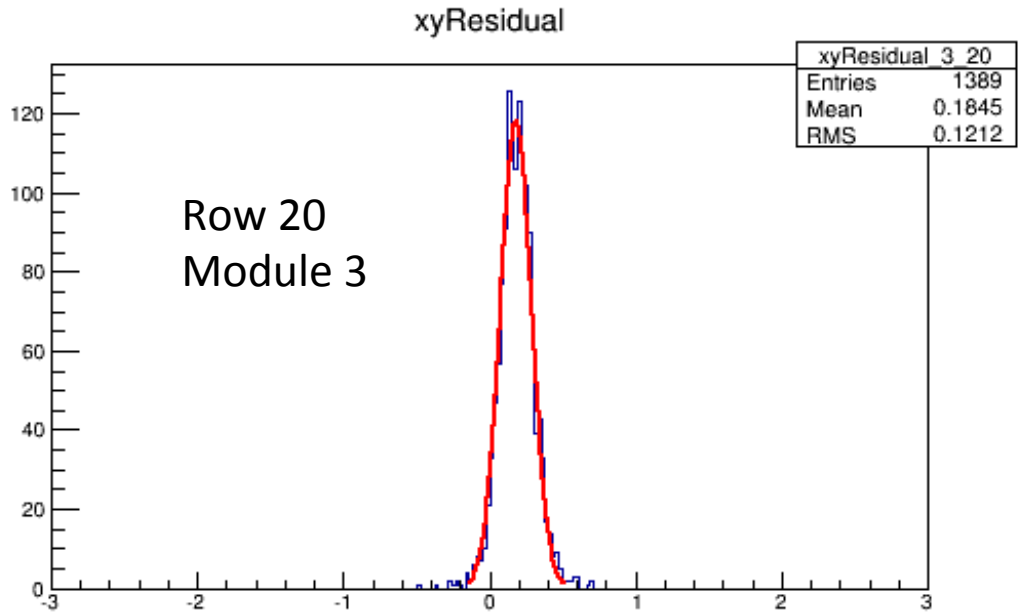


All Rows together (2015)

Note that it is not something relevant only to 2015.

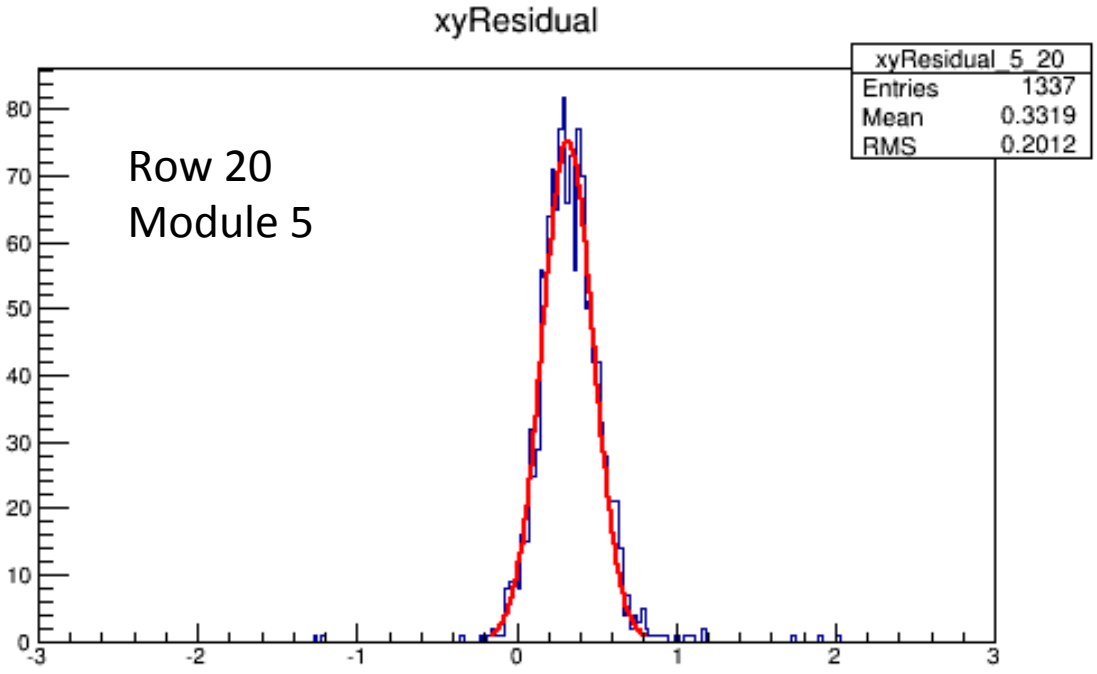
If one look at XY residuals in all rows, it is the same typical story of tails for ANY year, 2010, 2011, or later.



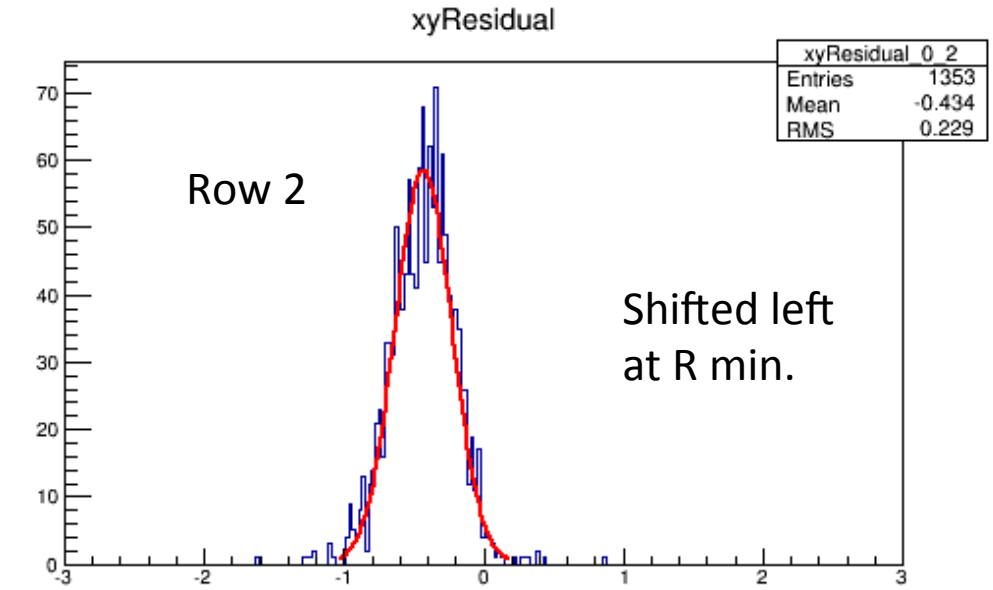


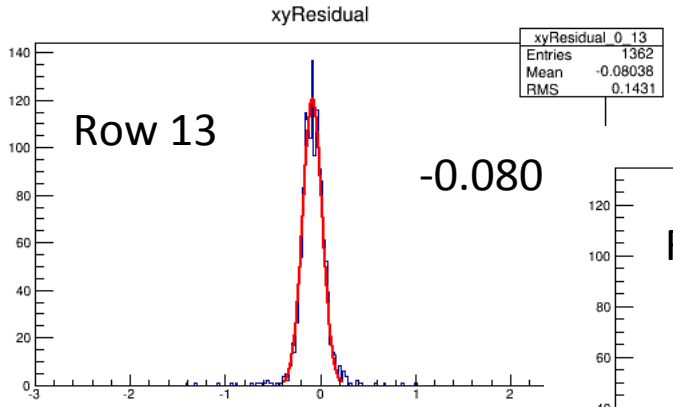
For CLK modules

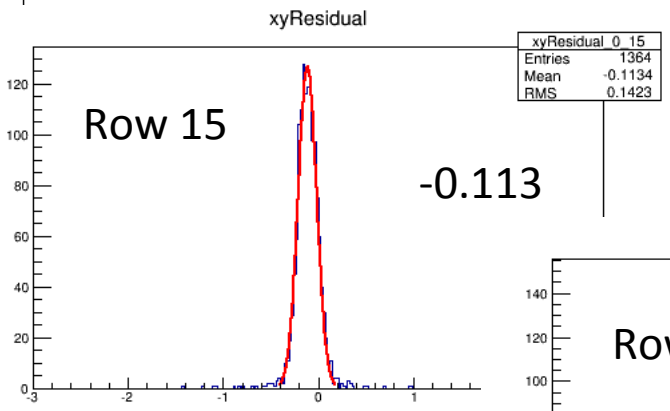
Both maxima shifted right closer to R max.

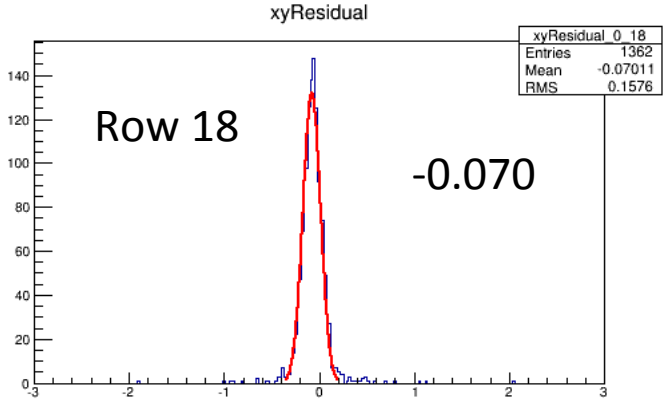


BD2 Module



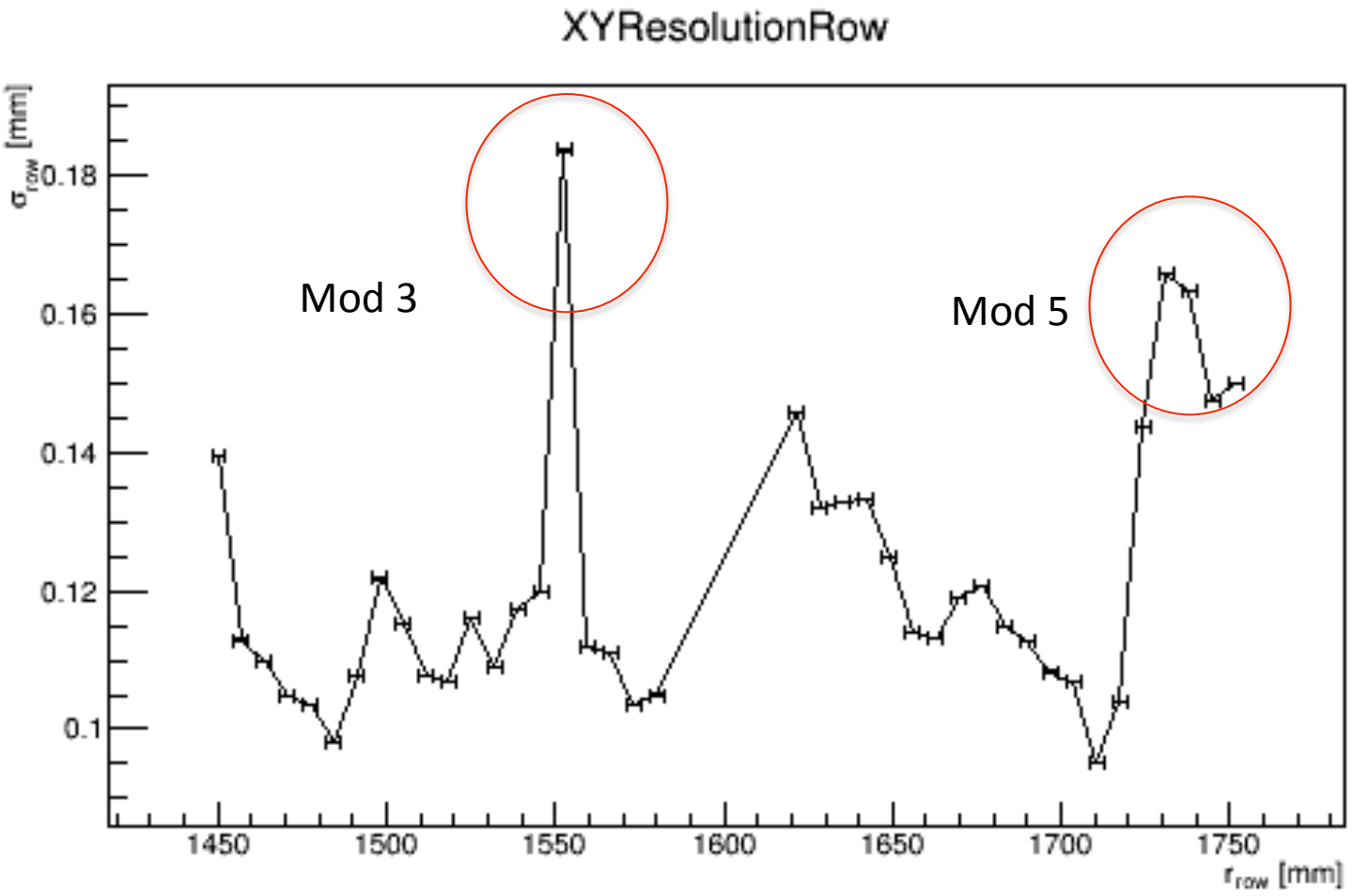






Getting skewed to the left, starting from Row 10,
Then rebounds to the right at R max.

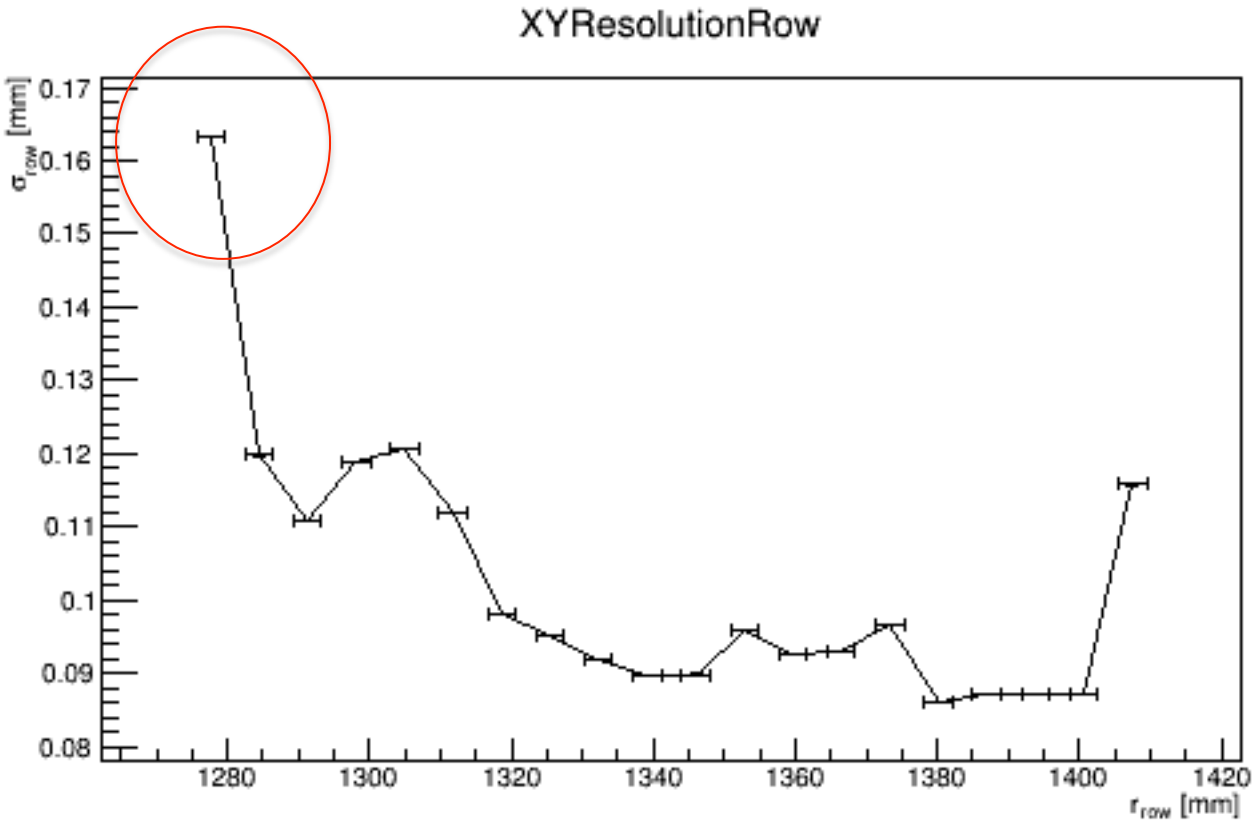
2015 XY resolution by row



CLK modules

Resolution gets significantly worse at the upper edge of Module 2 (worst case) and Module 5.

2015 XY resolution by row



BD2 module

XY resolution gets worse at the edges, especially at lowest radius, but
A bit less than in CLK modules.

Summary

- Comparing fit for residuals (for the same selected row), shows no drastic deviations from Gaussian, year by year. Fit was performed within 3 sigma region.
- Across rows, the maximum of residuals tends to move around. Most of the shifts are observed at the module edges.