comparing resolution plots (progress report).

Rashid Mehdiyev,

Carleton U.

Oct 2 2014

Data used and analyzed

- **2014, 2010**, 2011 data were tried using
  - With Different PRF

The jobs were run on SL5 and SL6 machines to see possible differences – quite negligible.

  - Jobs were run on SL5 and SL6 machines to see possible differences – found to be quite negligible.
  - PRF tried: Sec, Sum and Product
  - Time methods: Gauss Inflection, Gauss Mean, Peak, Mean, Weighted Mean, Mid Point and Gamma5.
  - Plots in this talk presented only with Gauss Inflection method.
  - Corrections applied – bias (row by row) or distortion corrections

  - SL5 version use ILCsoft v01-17-02
  - SL6 version used ILCSOft v01-17-05

The main goal of my exercise was to feel how to work with different data sets and learn some useful tricks/methods.
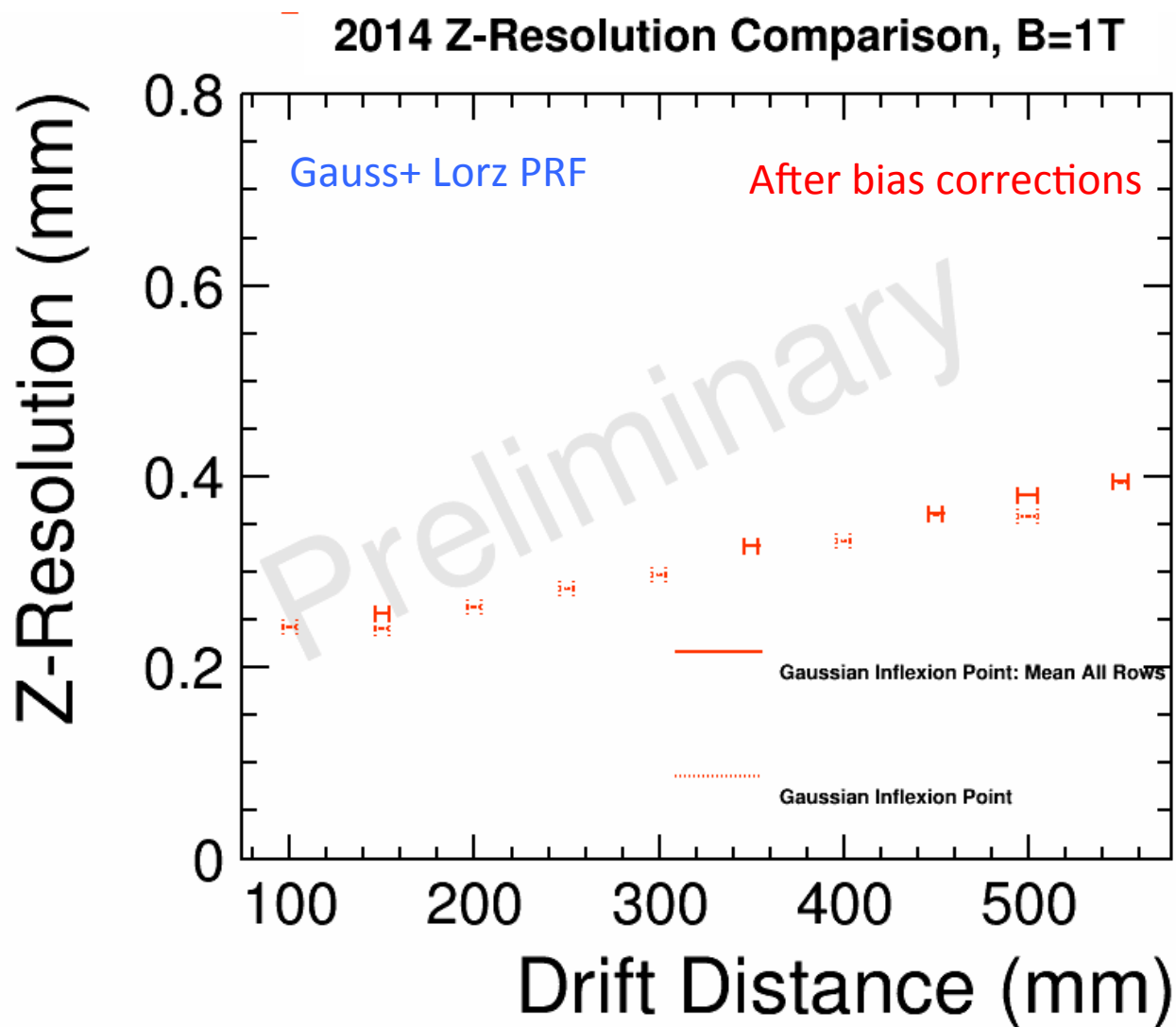
Software used

- SL5 version use ILCSoft v01-17-02
- SL6 version used ILCSOft v01-17-05

- Exploited several versions of the scripts what Peter left behind:
    - Middle of July
    - End of August
    - Sept. (last) version.

- Working on the last version, adding more functionality and settings – the idea is to make this version as user friendly as possible. In the "past", the setting for every data sets were scattered across different directories. Now it should be easier to use

Software: work to do

- Find ways to fix batch submission with the new scripts – something is not fully scalable.
- Add more switches to vary remaining "forks" in data processing:

- CentreColumns
- DeadRowList
- MaxTimeSpreadOverride
- TOFFSET
  - Above parameters are varied from Run to Run. Not sure I know where is the source of this information. Right now using whetever I could find in Peter's directories.

- T0
- DRIFT
  - Also should be used as optional parameters on the analysis jobs.
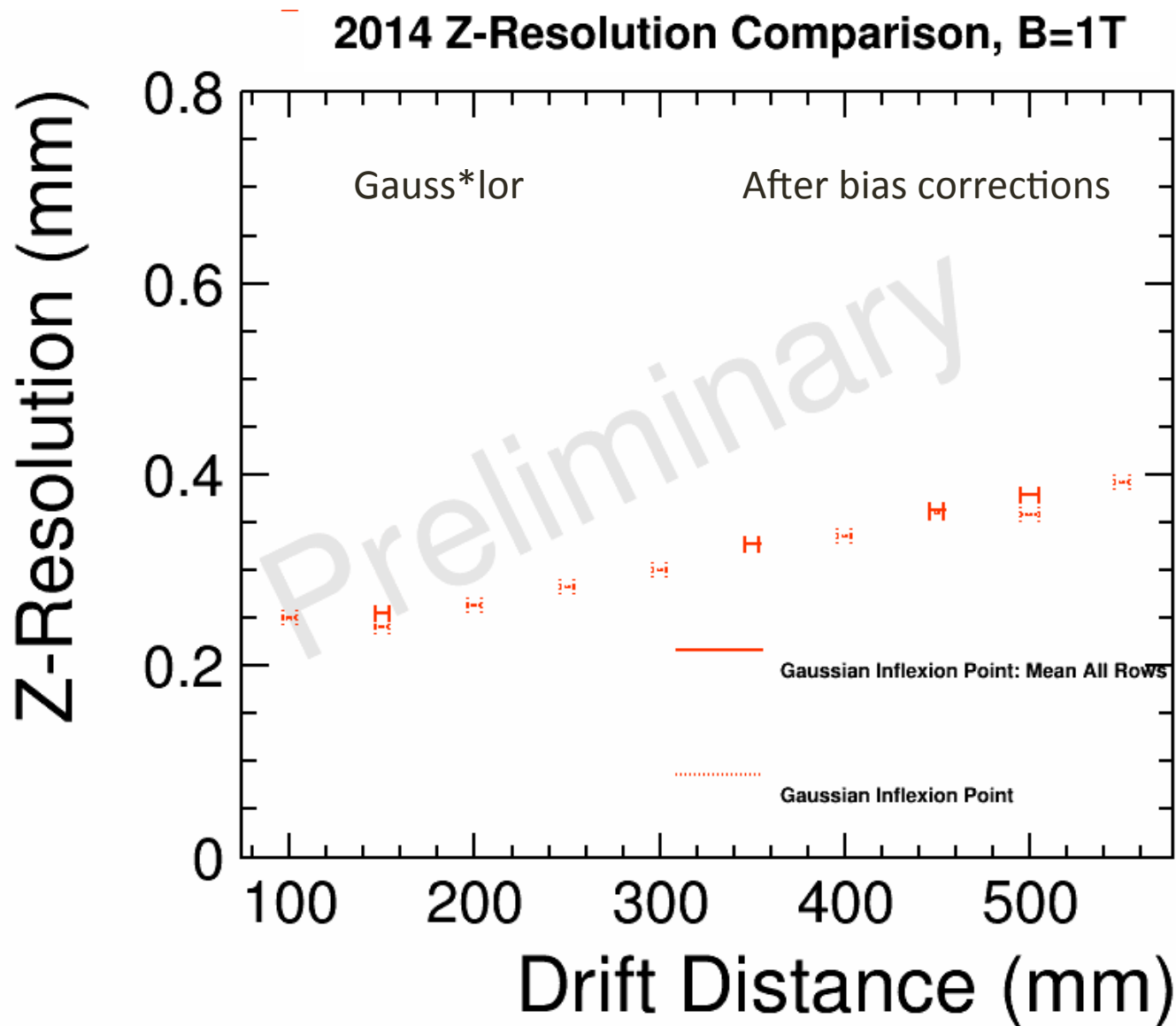- Need to be sure that Peter completes Carleton TPC Wiki Page with all "know hows".
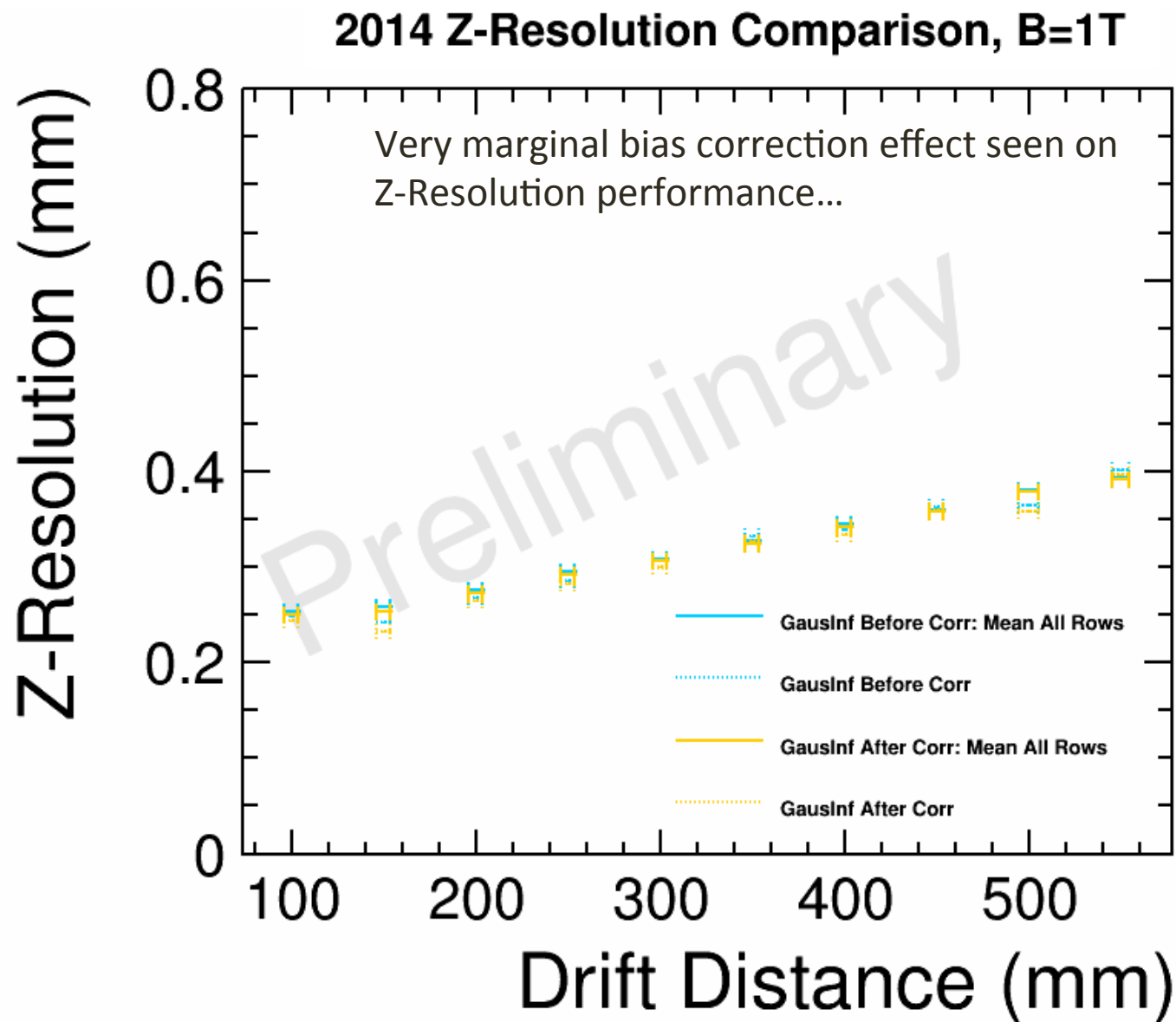
Plots .....

2014 Z-resolution with Sum PRF

2014 Z-Resolution Comparison, B=1T

Gauss+ Lorz PRF

After bias corrections

Gaussian Inflexion Point: Mean All Rows

Gaussian Inflexion Point

Z-Resolution (mm)

Drift Distance (mm)

I think this looks great

Z-resolution with Product PRF

(Small) bias corrections effect on Z-res.

2014 Z-Resolution Comparison, B=1T

Very marginal bias correction effect seen on Z-Resolution performance...

GausInf Before Corr: Mean All Rows

GausInf Before Corr

GausInf After Corr: Mean All Rows

GausInf After Corr

Z-Resolution (mm) vs Drift Distance (mm)

rphi resolution with Sum PRF

2014 rphi Resolution Comparison, B=1T
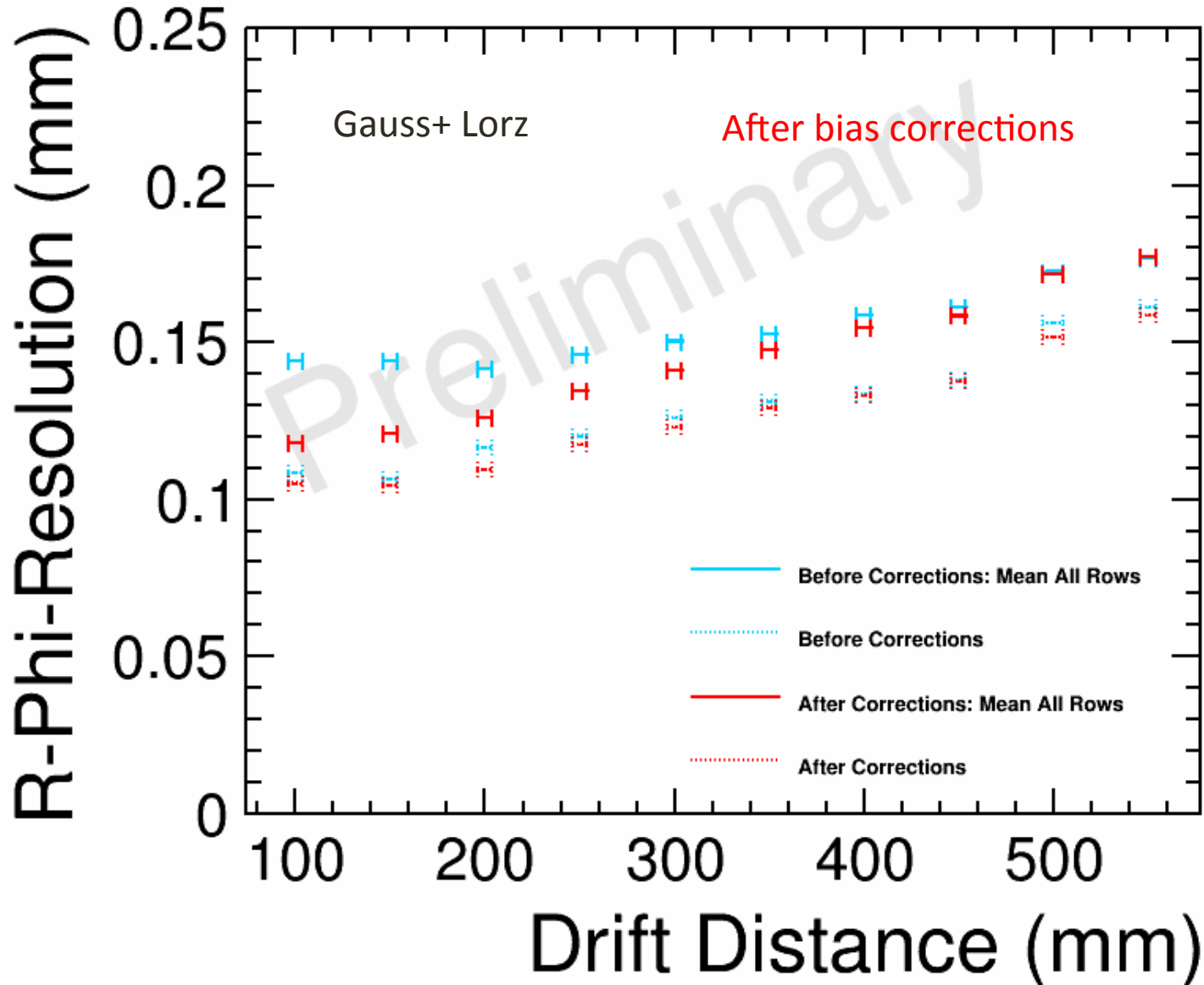
Gauss+ Lorz

After bias corrections

Preliminary

Before Corrections: Mean All Rows

Before Corrections

After Corrections: Mean All Rows

After Corrections
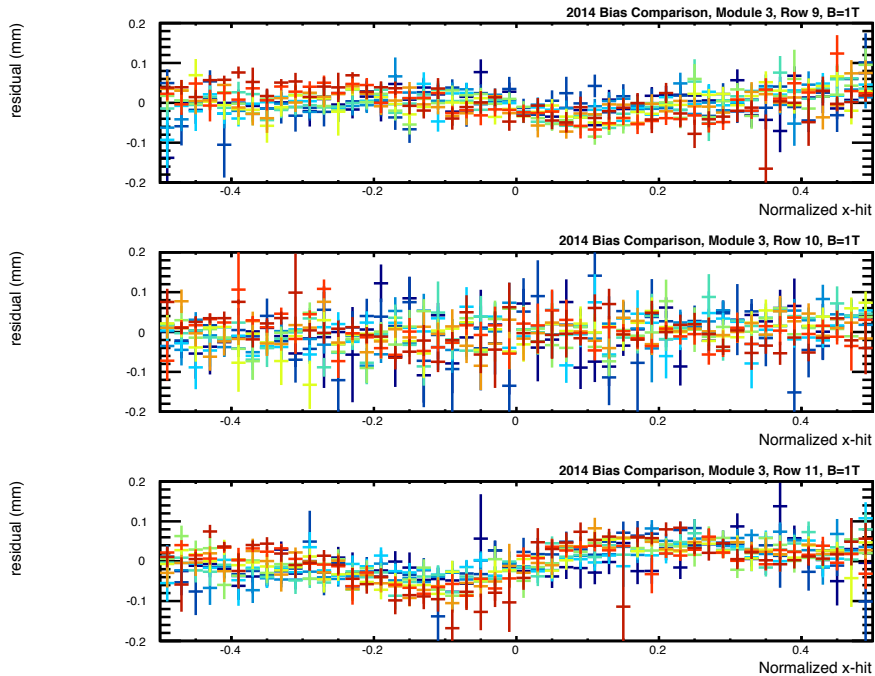
R-Phi-Resolution (mm)

Drift Distance (mm)
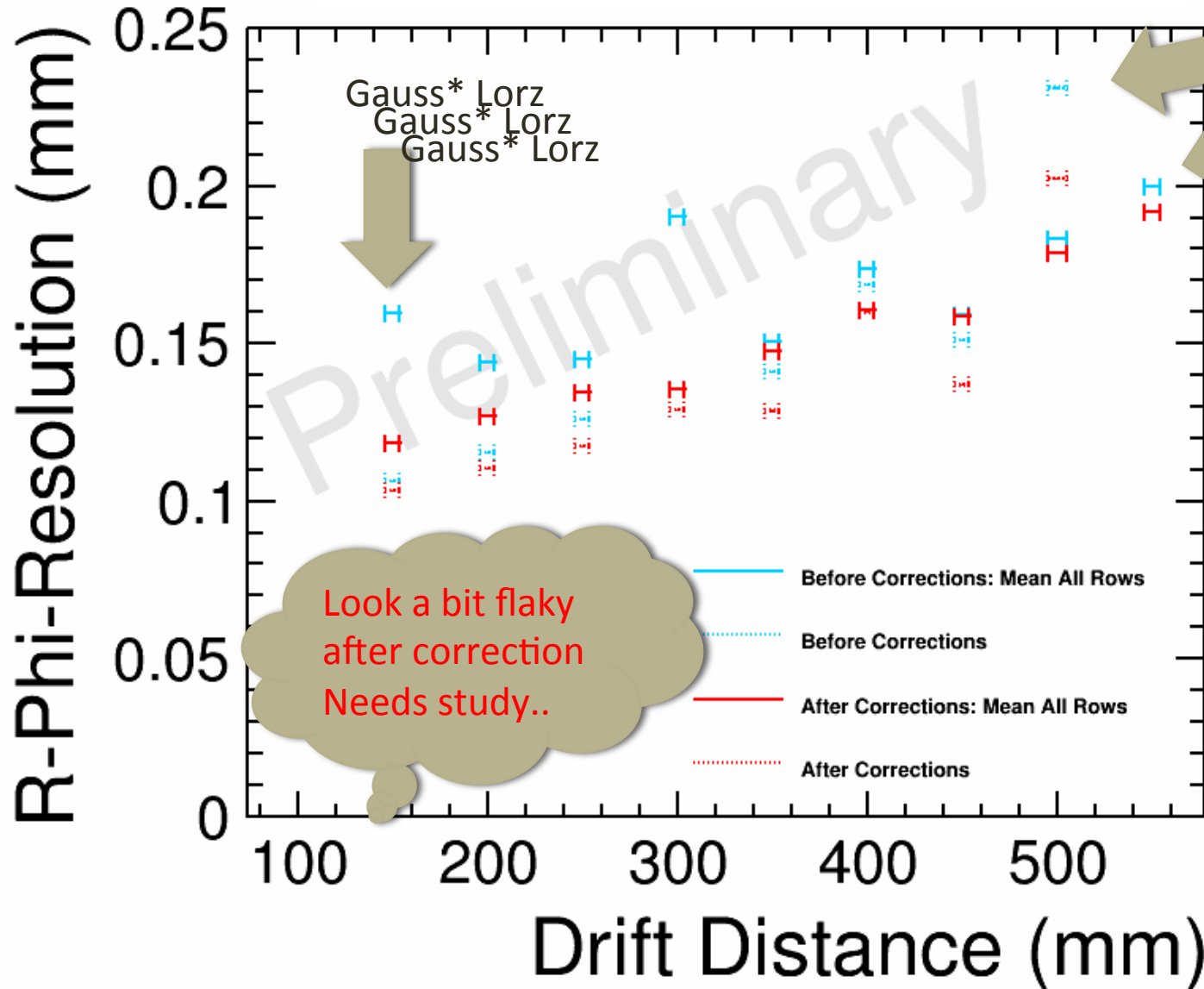
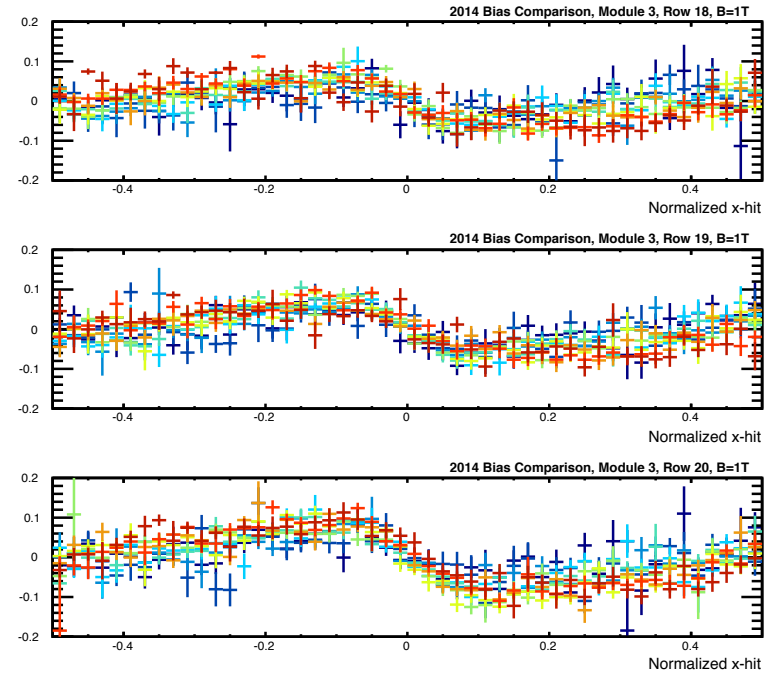# rphi resolution with Product PRF

Rphi resolution with Product
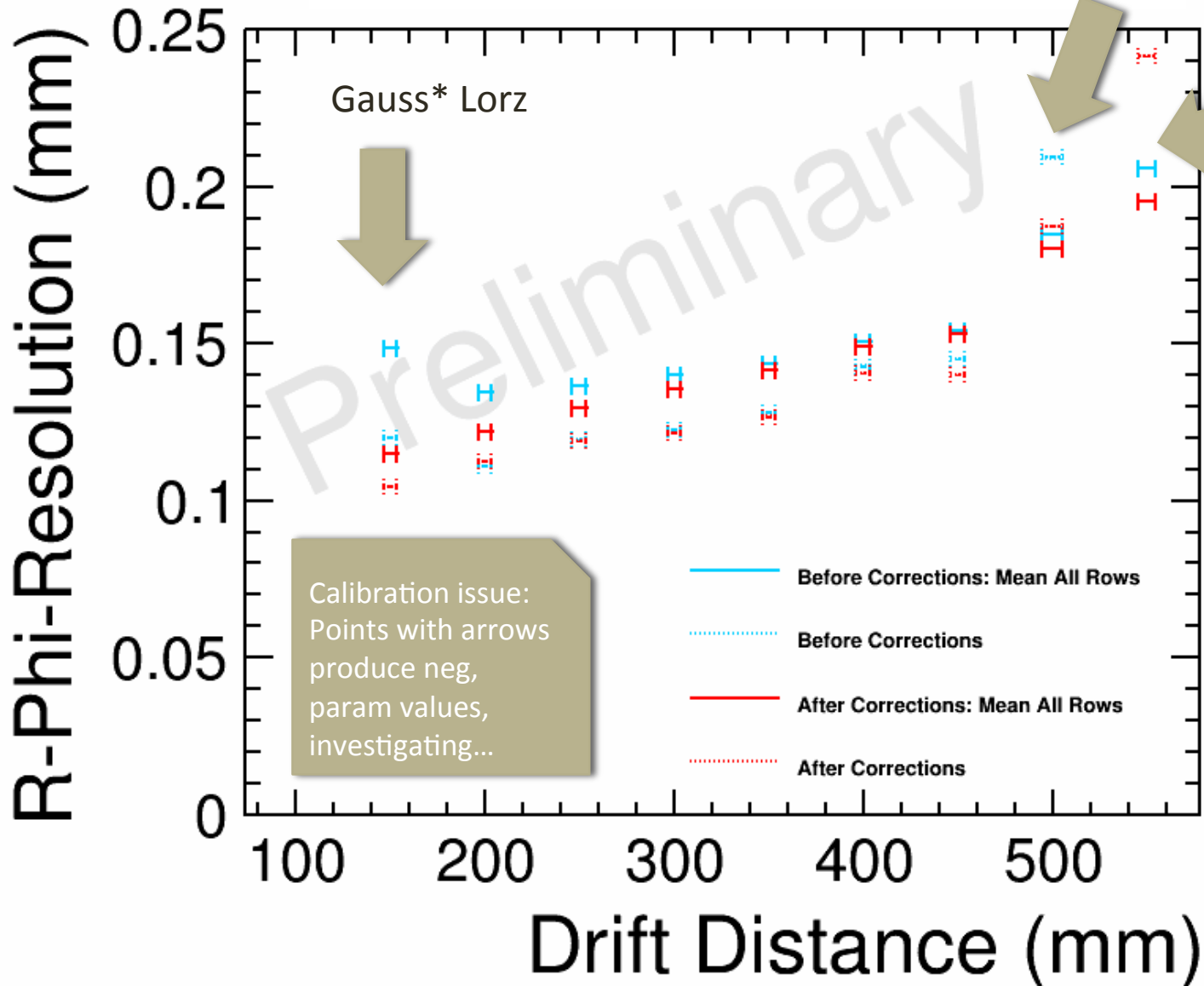
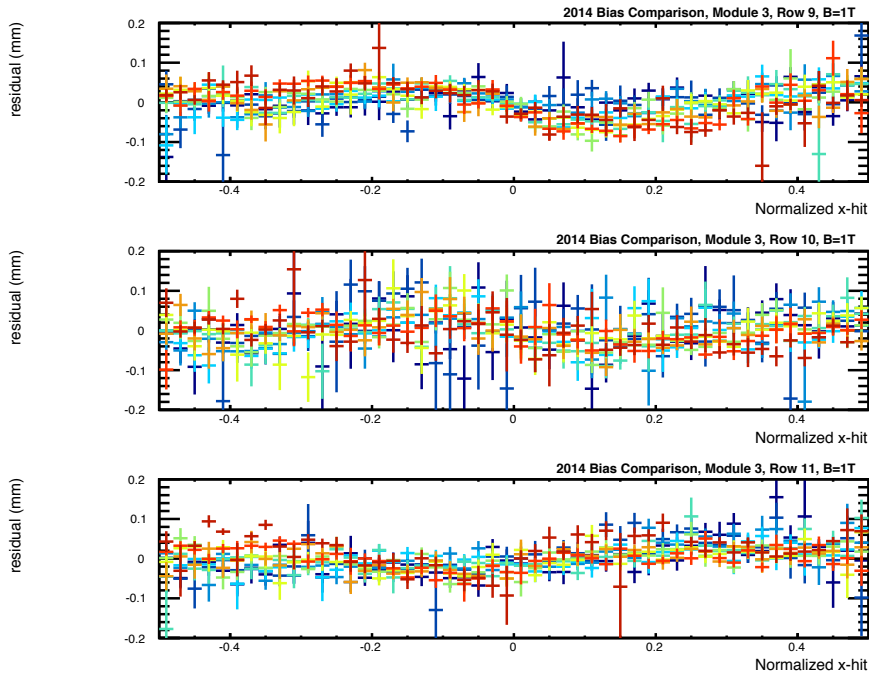# Bias corrections: by rows

Rows 9-11

Rows 18-20

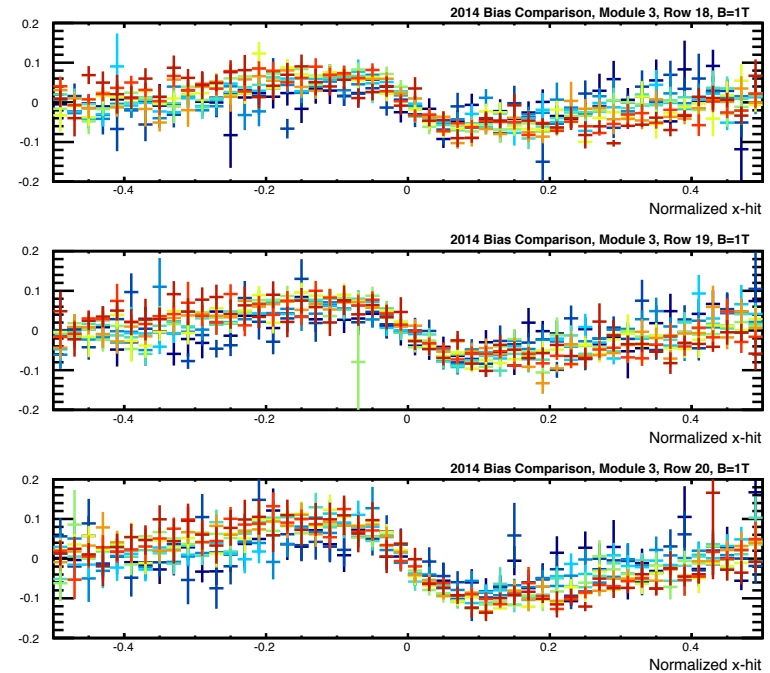Looks a bit more wiggly than Peter's 2014 data plot, circa June 30th 2014, why?

Sum PRF used

Bias corrections: by rows

Rows 9-11

Rows 18-20

Looks a bit more wiggly than Peter's 2014 data plot, circa June 30th 2014, why?

Shows some PRF dependence.

Sec PRF used

2010 data

- Thanks to Paul, David and Serguei, we could download the data runs to Carleton and I have converted all raw data files to slcio.

- IT is not _all_ data what was on the drive. Hopefully we would get the rest of the data at some point this year.

- I have run analysis jobs over 2010 data, with 500 ns peaking time and 2 variants: 360 V and 380 V on mesh (13 runs each)
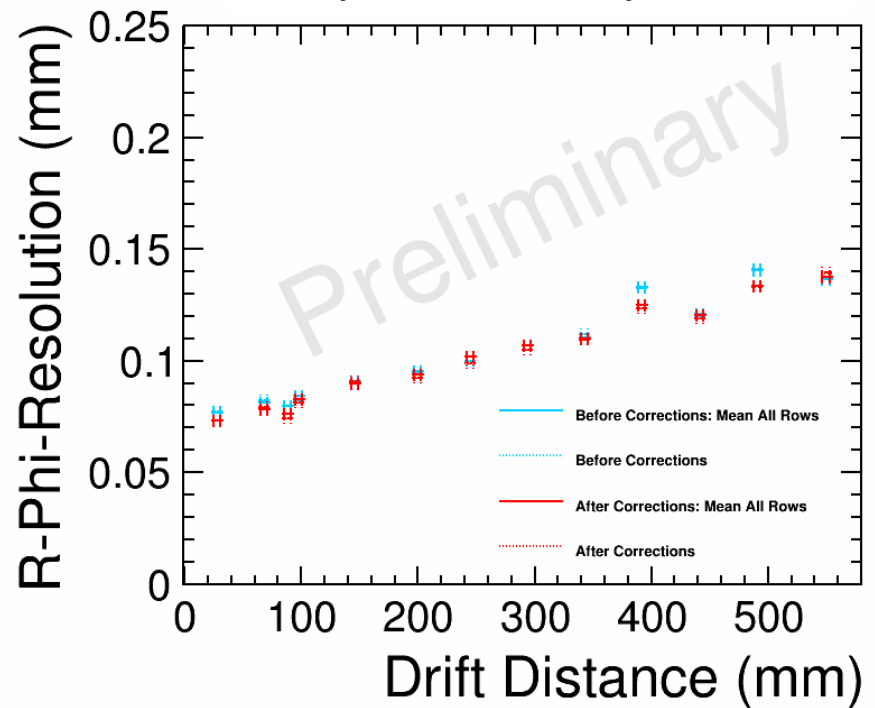
- Plots to follow:

14

Rphi Resolution - 2010
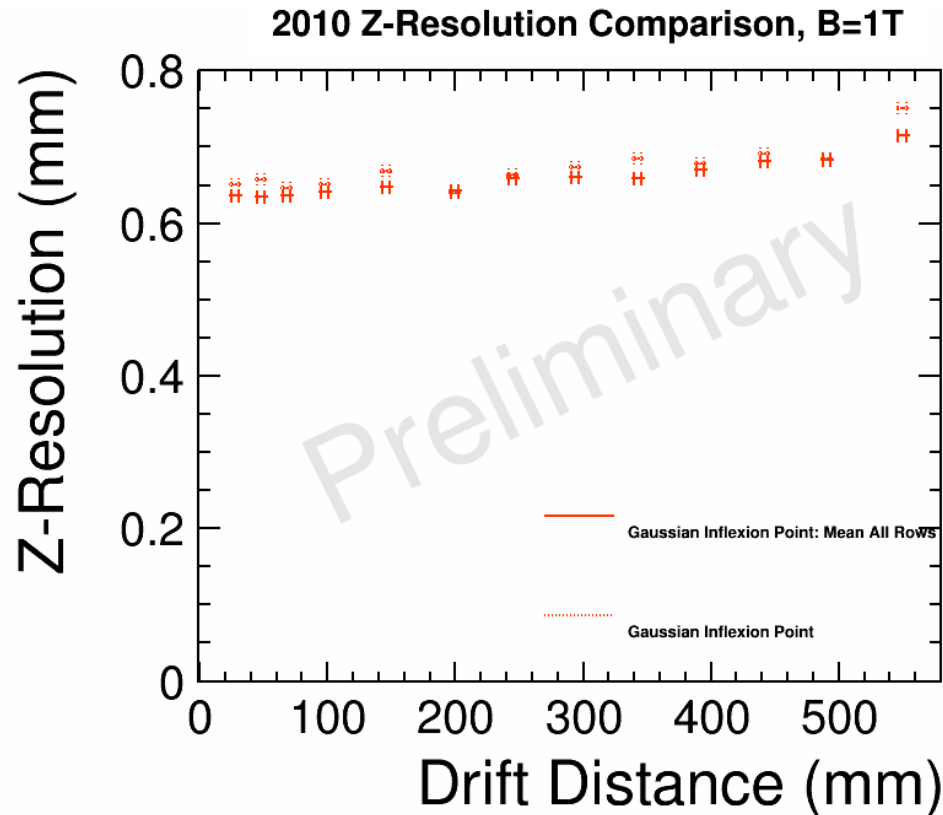
360V on MESH

380V on MESH
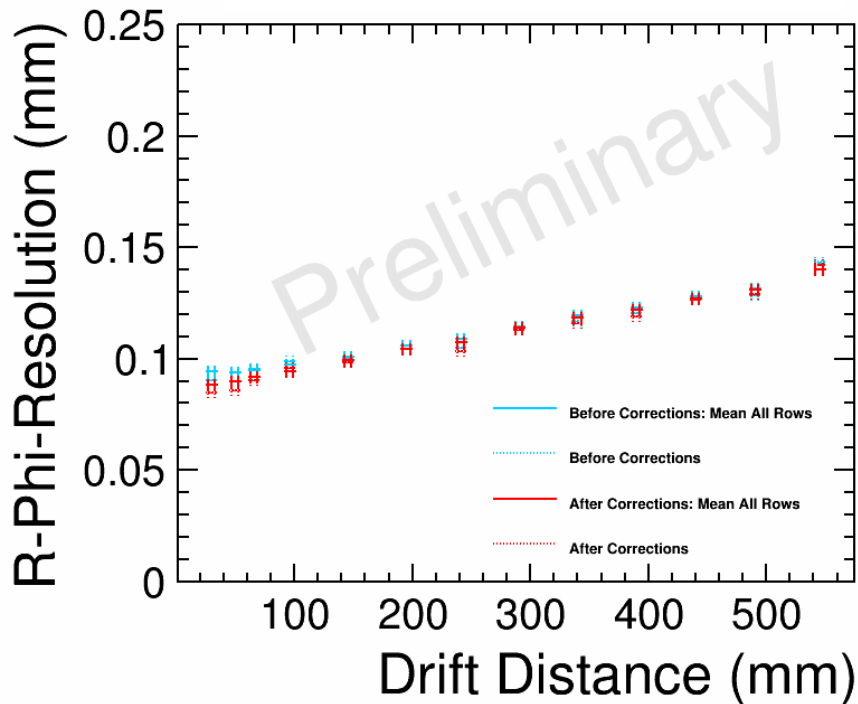
Resolution improves with larger filed.

Z- Resolution - 2010
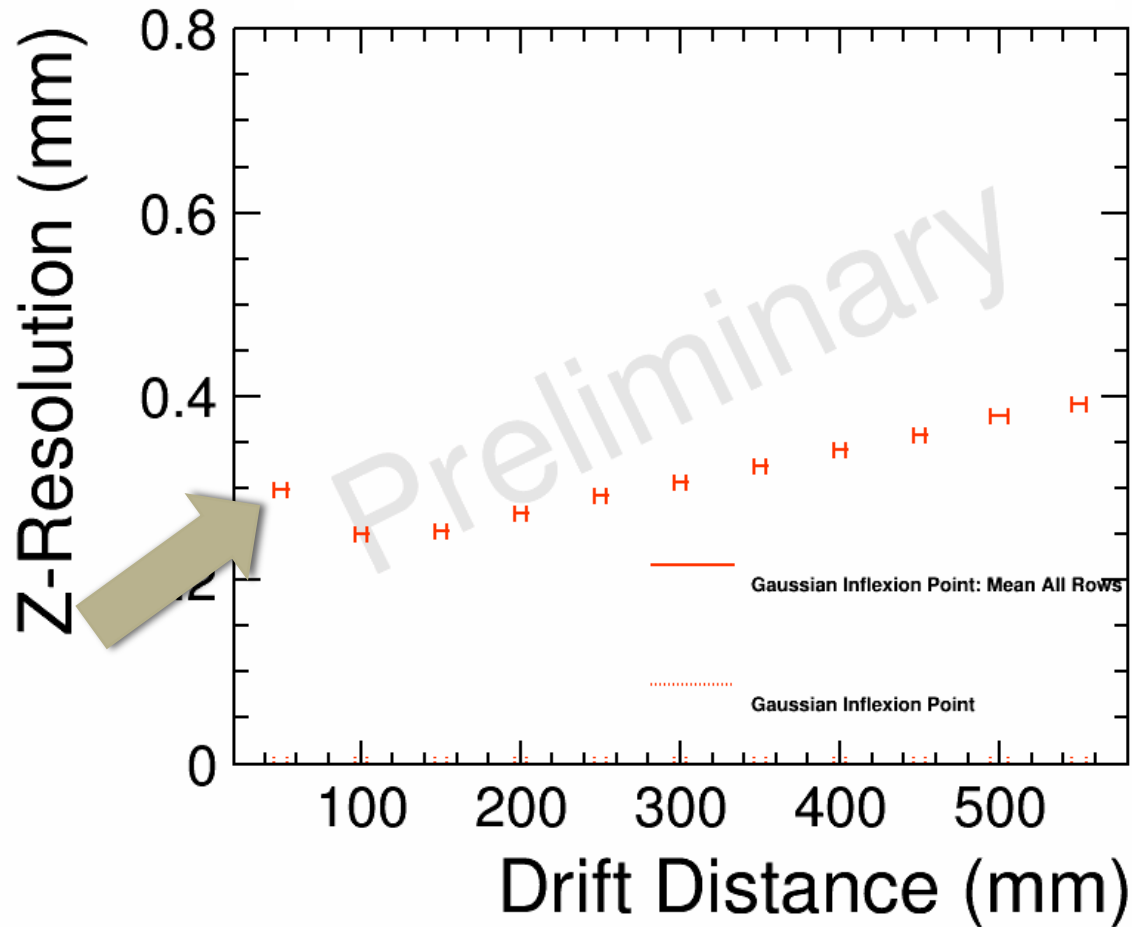
380V on MESH

Z- Resolution looks much worse than in 2014 data!

Few small issues to fix

Using new scripts, this point is a bit off, don't know yet why.
The same problems is with rphi-resolution low drift point…

Things to do

- Fix remaining issues and polish the analysis scripts
- Find some extra ways to improve resolution and stability of points.
- Run analysis over 2011 and 2013 data.
- Still a bit struggling to get the same 2014 transverse resolution performance plots as it was presented in the June LCTPC talk (see in the back up section). Able to get it only with "old calibration" method Peter used in the middle of summer. Getting close.
- Historic pads/hit issue
- More suggestions?

Back up

Rphi Res. With old calib method

2014 rphi Resolution Comparison, B=1T
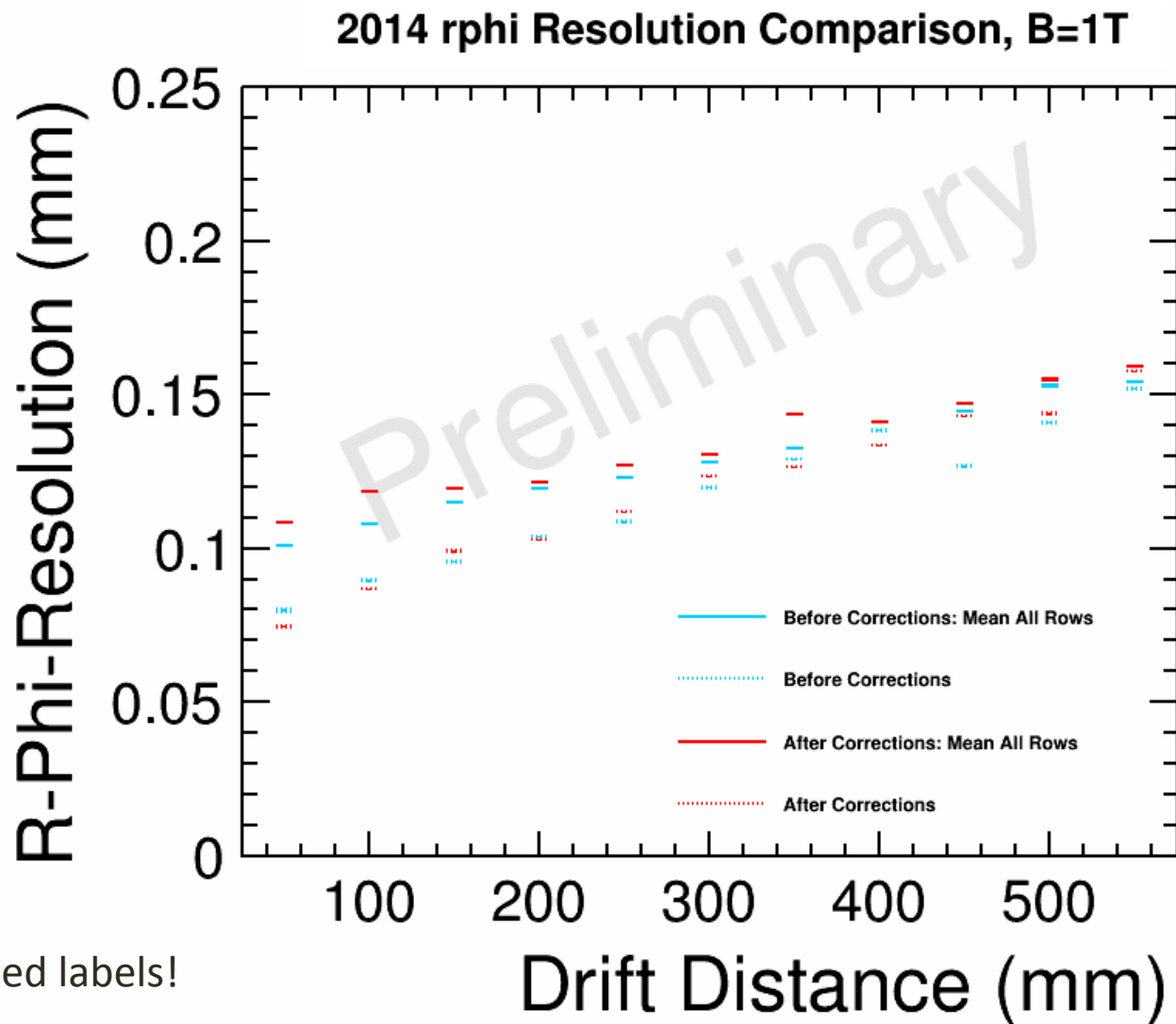
Misplaced labels!

Looks like almost the same plot in LCTPC talk, but with the "old Calib"