Micromegas LC-TPC Analysis Road Map at Carleton

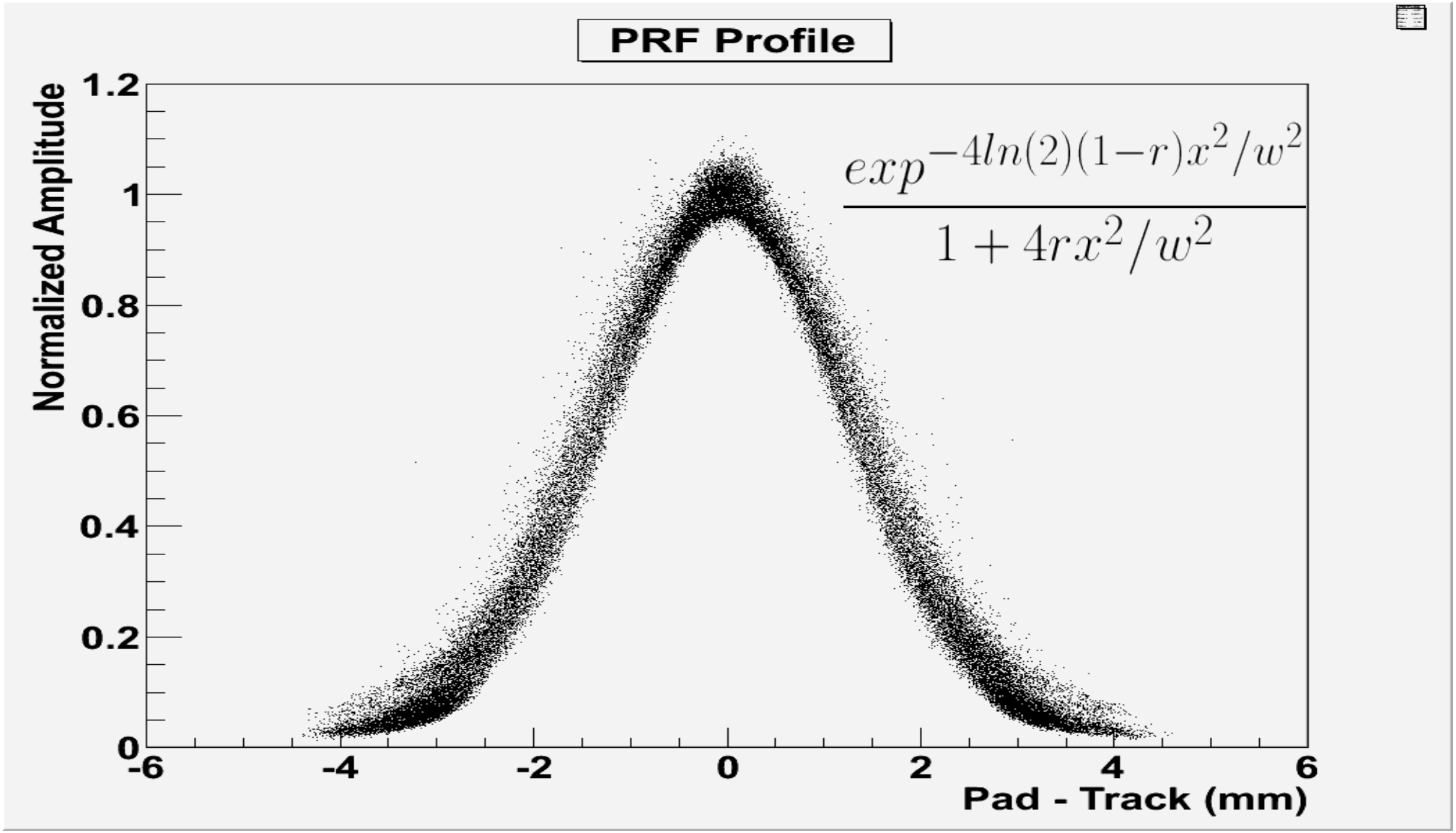
Presentation Outline

- Marlin/ROOT analysis
- Results from automate PRF determination
- Future Work

Marlin/ROOT Analysis

- Separate track fitting and analysis
  - Marlin does pulse finding, hit determination, and track fitting.
  - Root file create containing all relevant data in a TTree i.e. track parameters, pulses (amps and locations), row number, track location, etc.
  - Root scripts then run which analyze Marlin output.
- Completed for PRF determination.
- Single shell script used to determine PRF parameters.

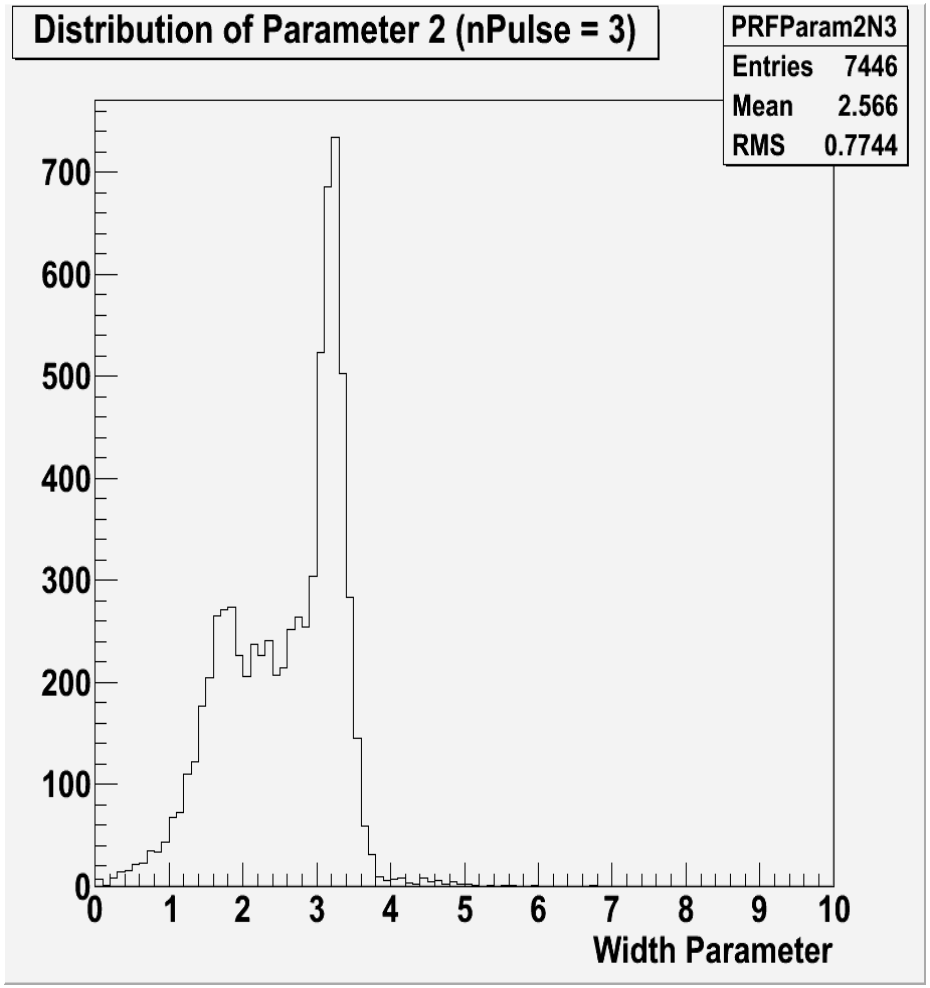
Automated PRF Results

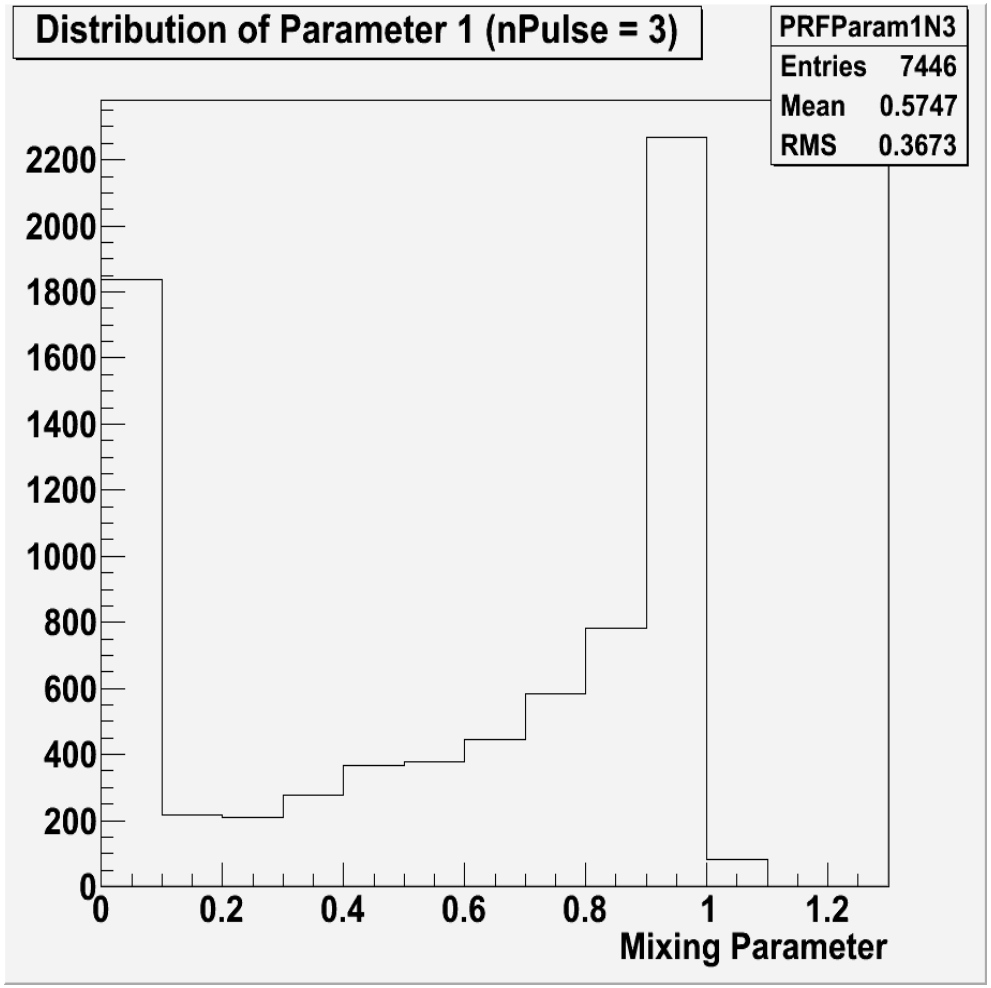


Run# 3047: 100ns Peaking time, 30cm drift, r = 0.762 w = 2.56.

Automated PRF Results

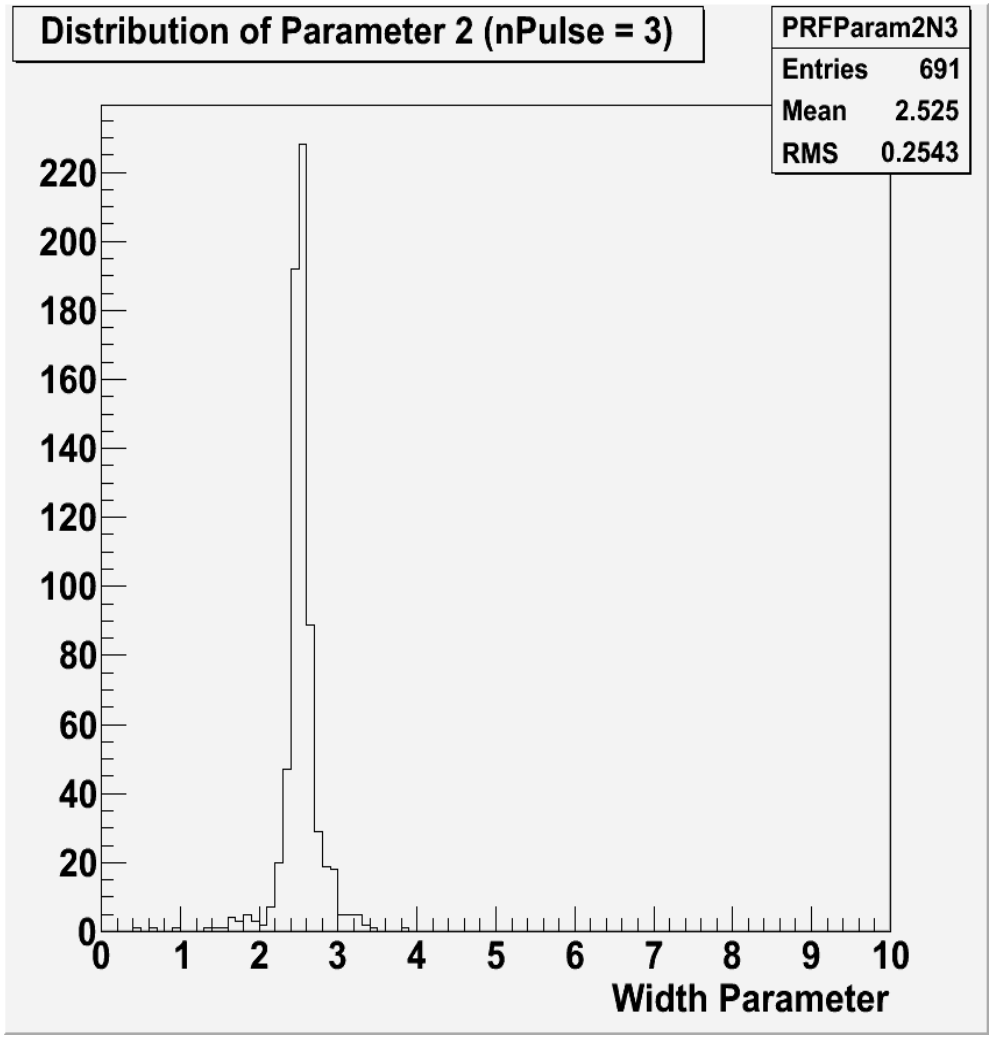
PRF centre fixed to track location:

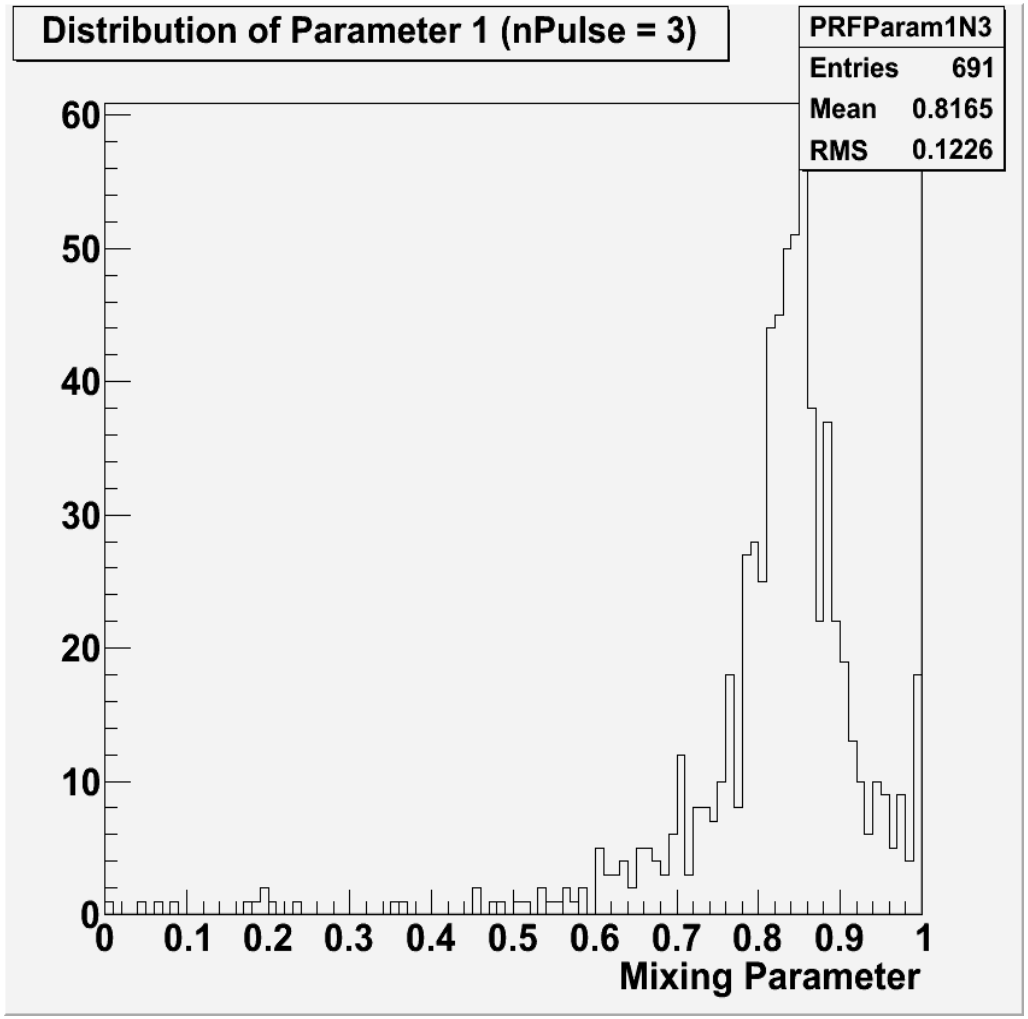




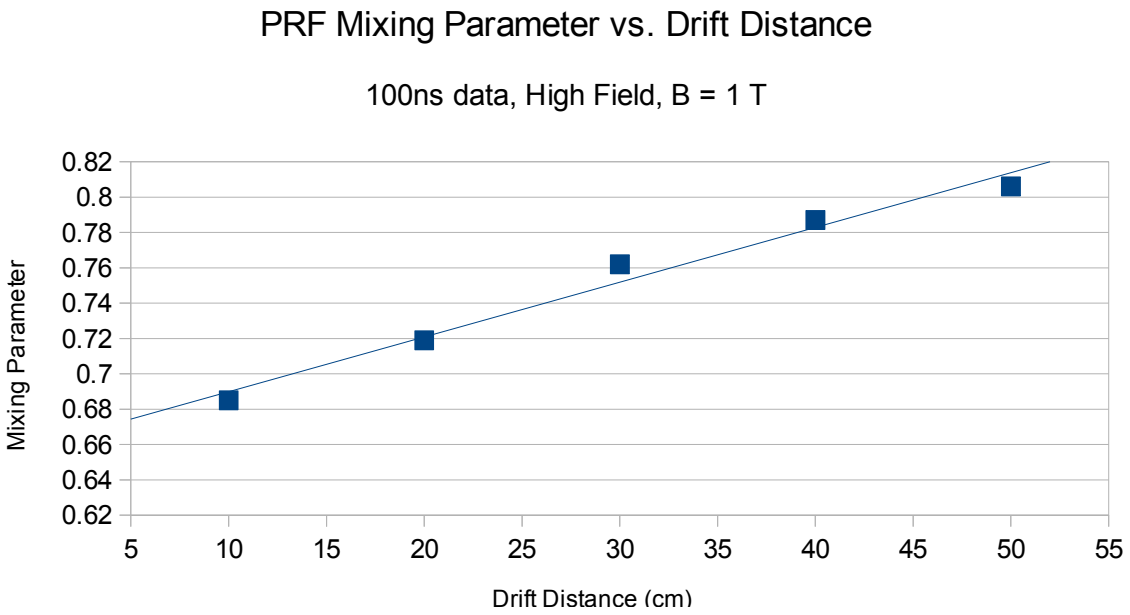
Automated PRF Results

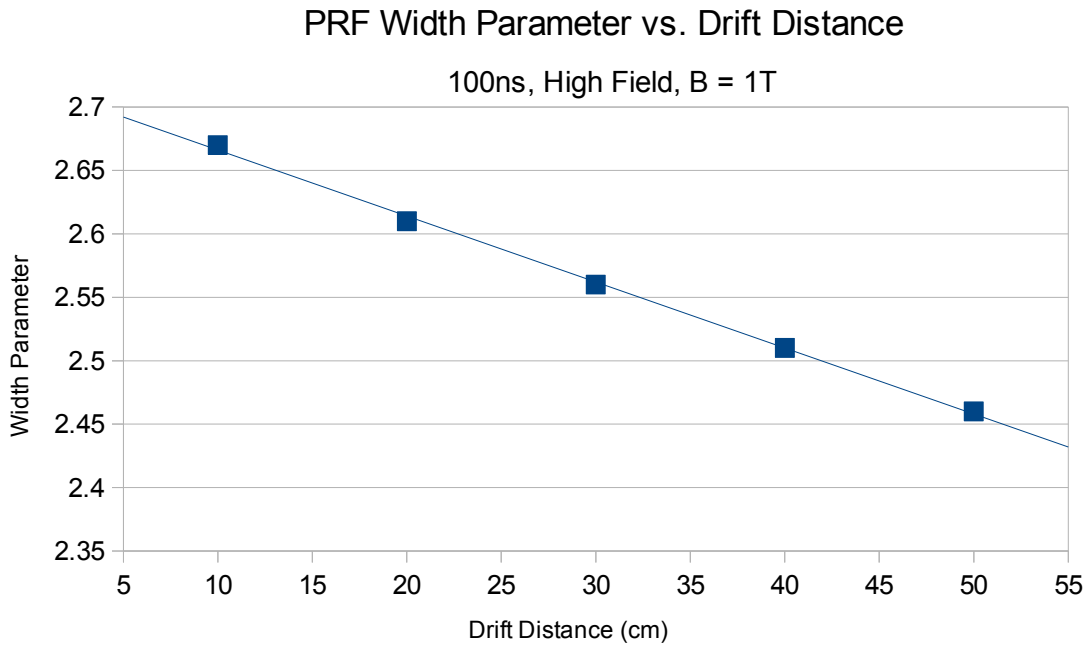
PRF centre allowed to change:





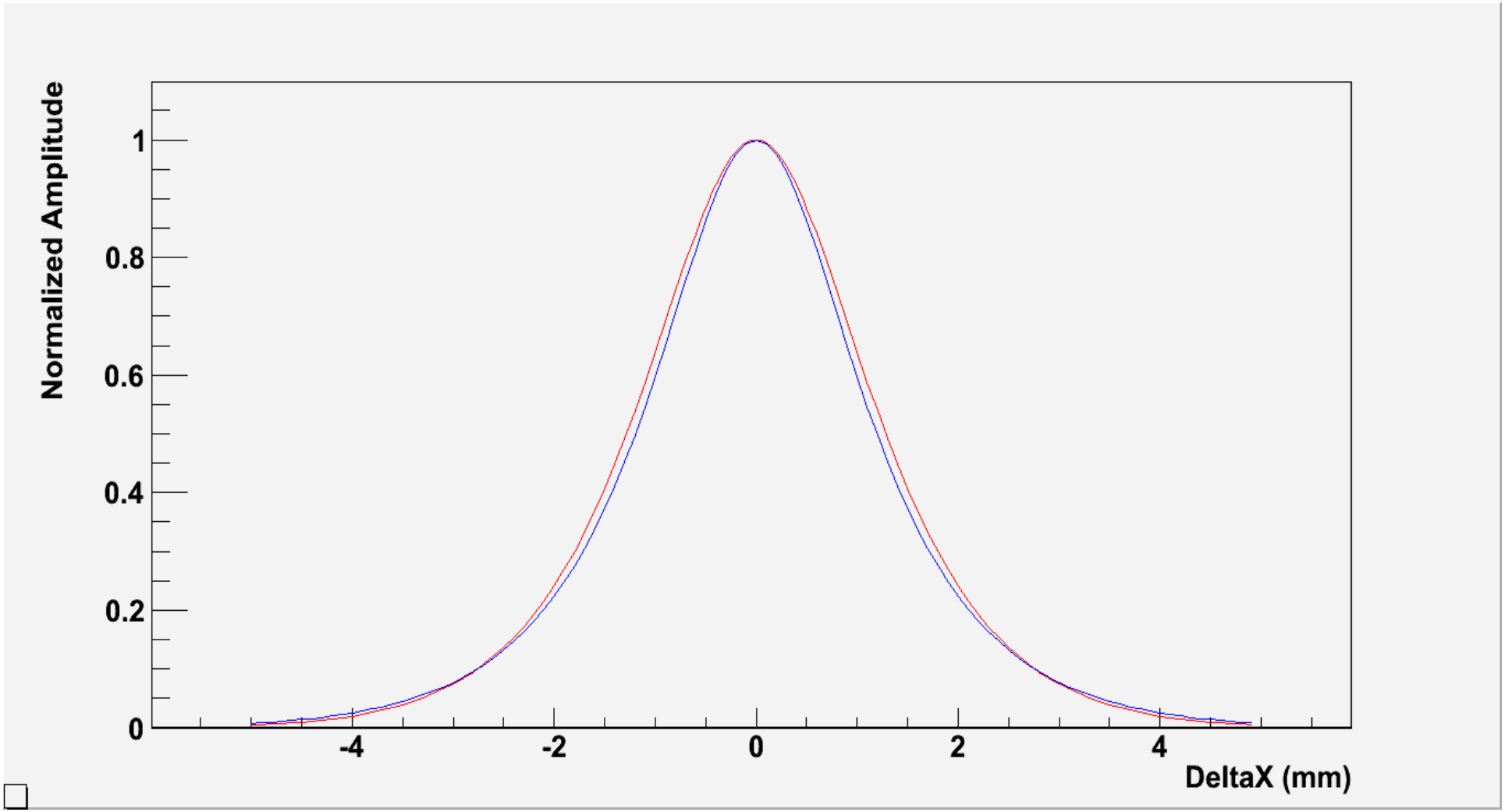
Automated PRF Results





- PRF parameters show linear monotonic behaviour as a function of drift distance.
- Odd behaviour of decreasing width parameter as function of drift distance
- PRF however becoming more Lorentzian. Means more wait on tails and thus a wider PRF.

Automated PRF Results



Comparison of z = 10[cm](red) and z = 50[cm](blue).

Future Work

- Complete TTree output for **bias** and **resolution**
- Complete transverse resolution studies
- Determine errors for X and Z position for use with the Kalman filter.
  - Currently using variance of weighted mean.
  - Use Minuit covariance as transverse and longitudinal hit position error.
- Measure Z resolution

Summary

- Stream line Marlin code for
  - PRF Determination (Done)
  - Bias Calculation (In Progress)
  - Resolution Calculation (In Progress)
- Error on hit position for use with Kalman Filter