Status Report Micromegas

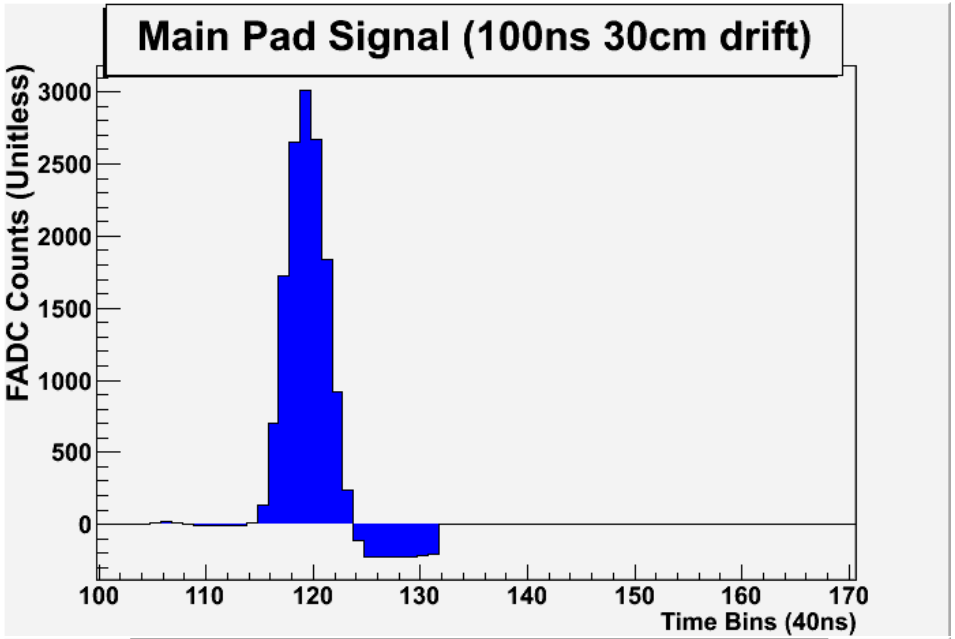
- Data analysis 2011
- PRF and MarlinTPC 2012
- Preparation for 2013

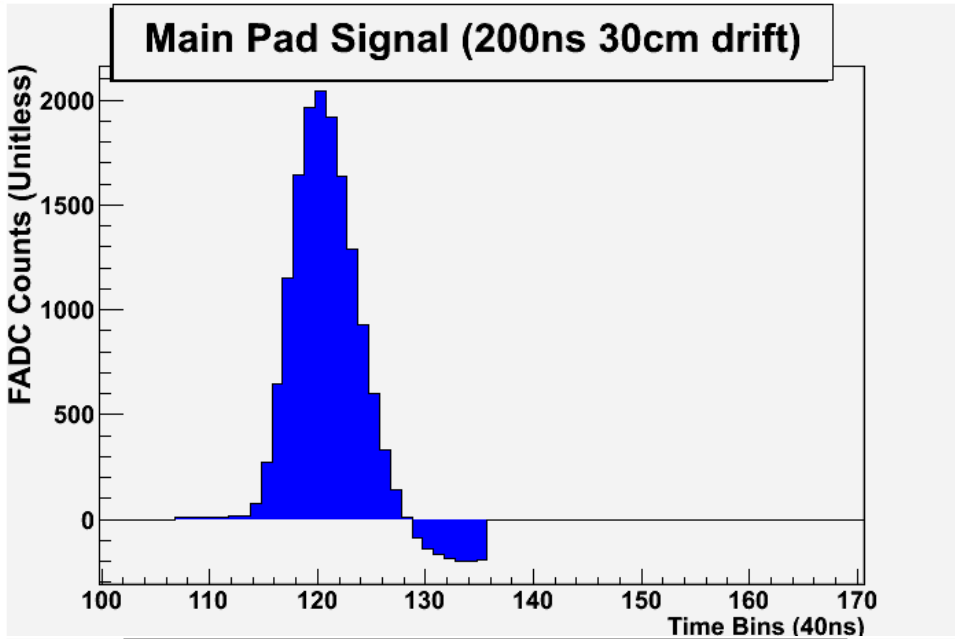
A. Bellerive - M. Dixit - P. Hayman - N. Shiell

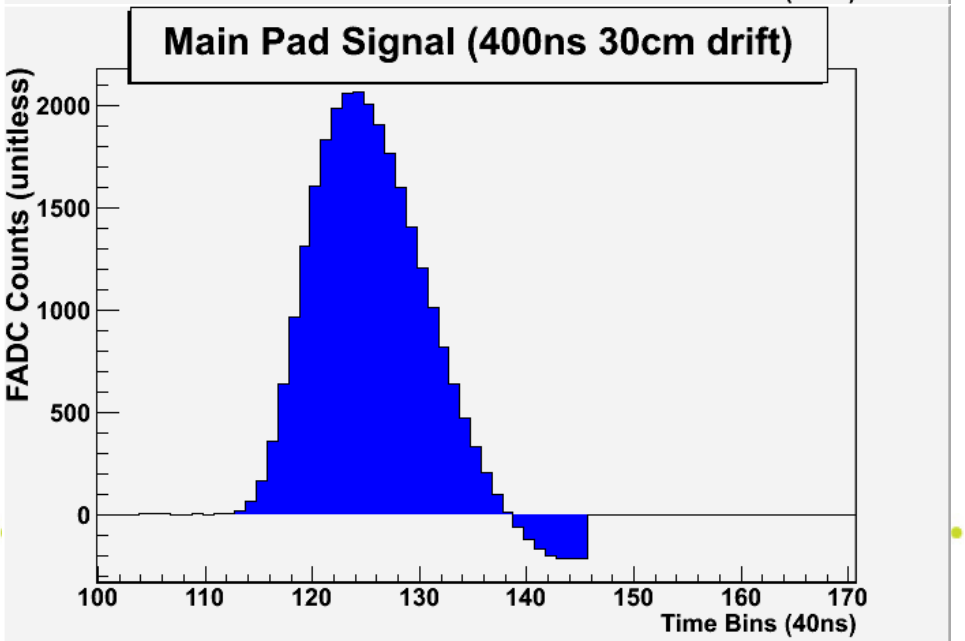
D. Attie - P. Colas - W. Wang

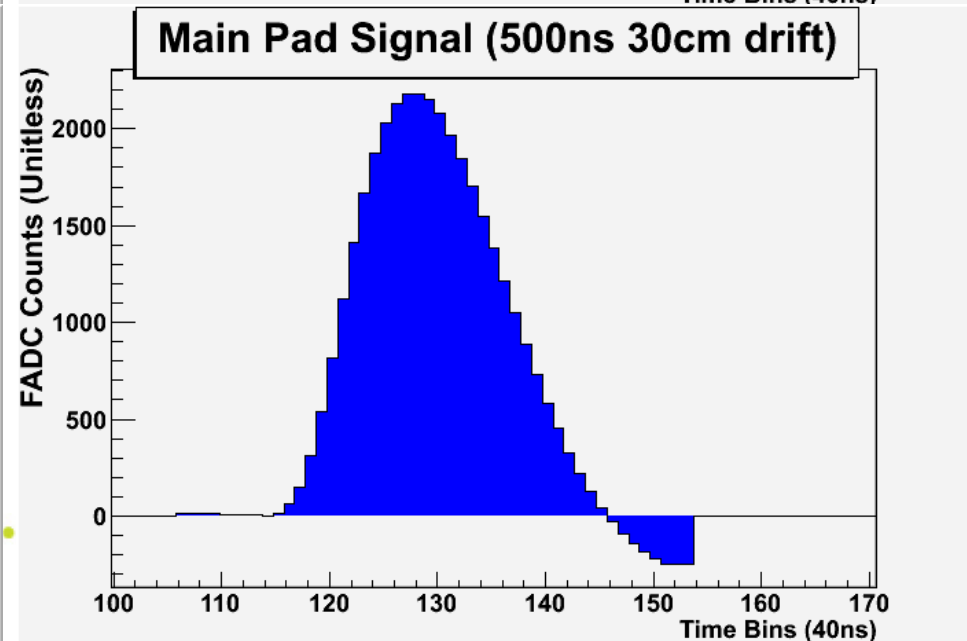
January 10, 2013

Shaped Pulse (for different shaping time)





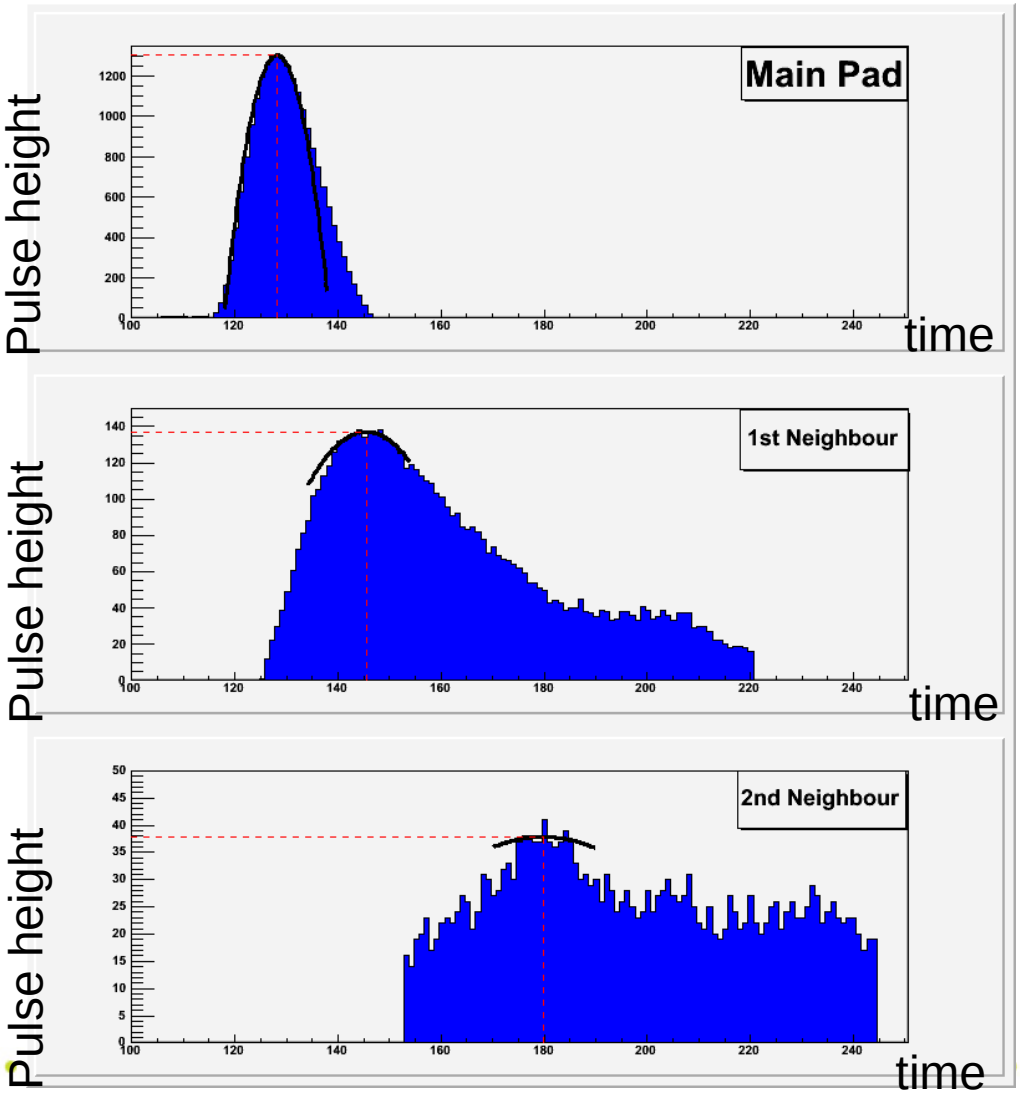




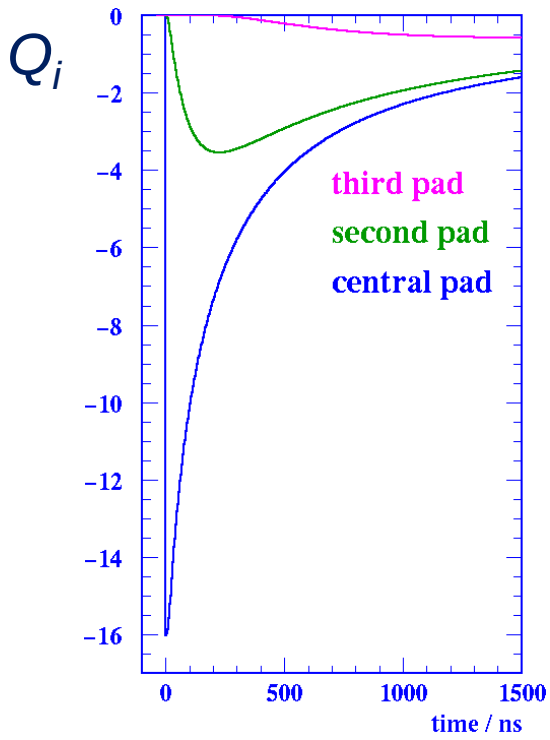
Pad Amplitude

Maximum of Parabola
Quadratic Fit Method (QFM)

A_i = max of parabola P(i)



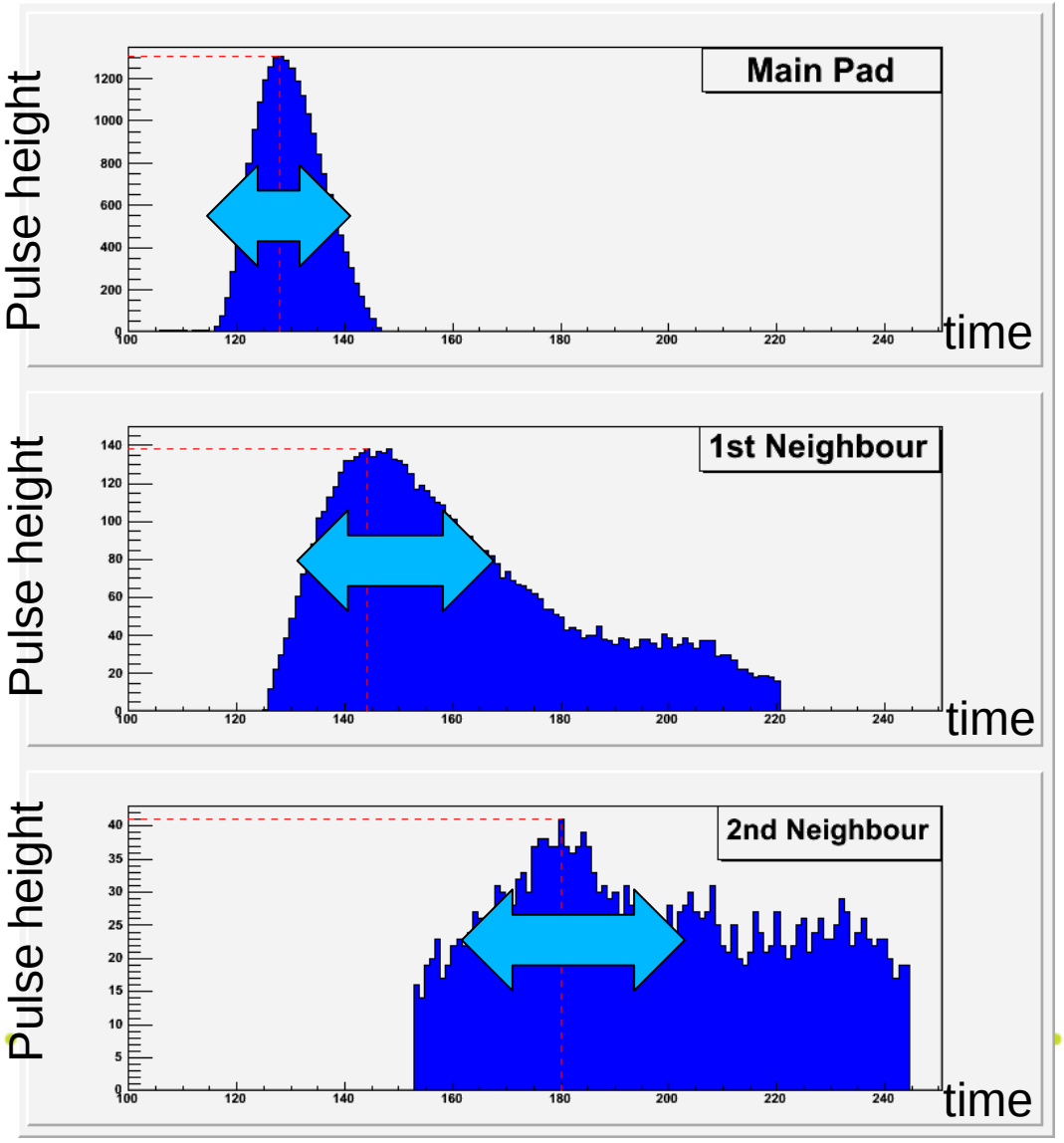
Method use pre-2011



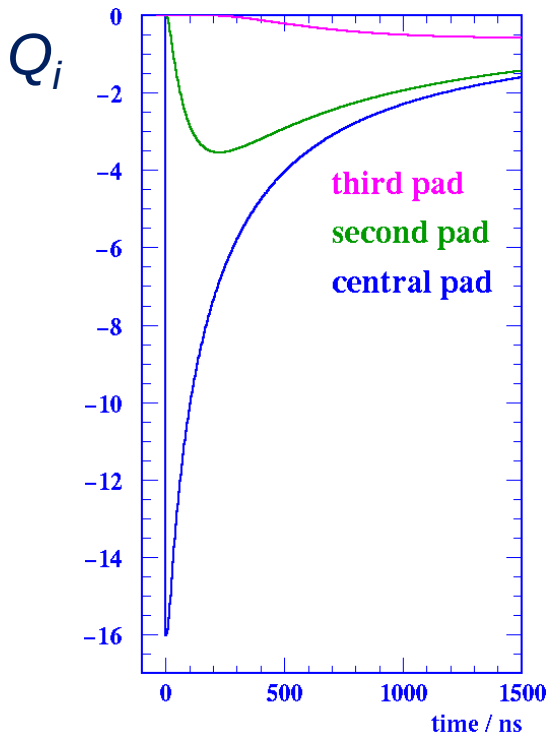
Pad Amplitude

Integrate above threshold
Re-integration method (RM)

A_i = Sum P(i)

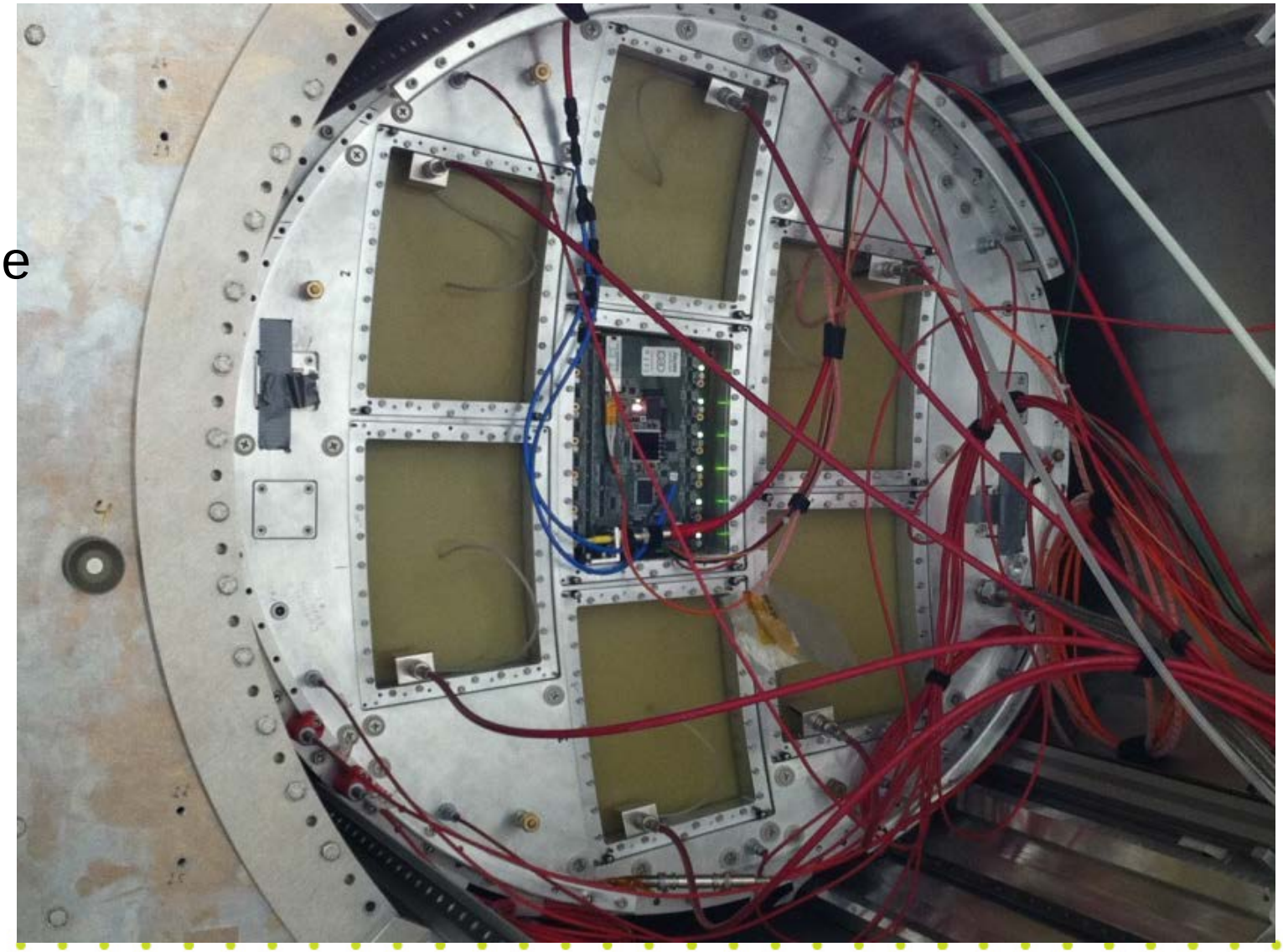


Method use in 2011



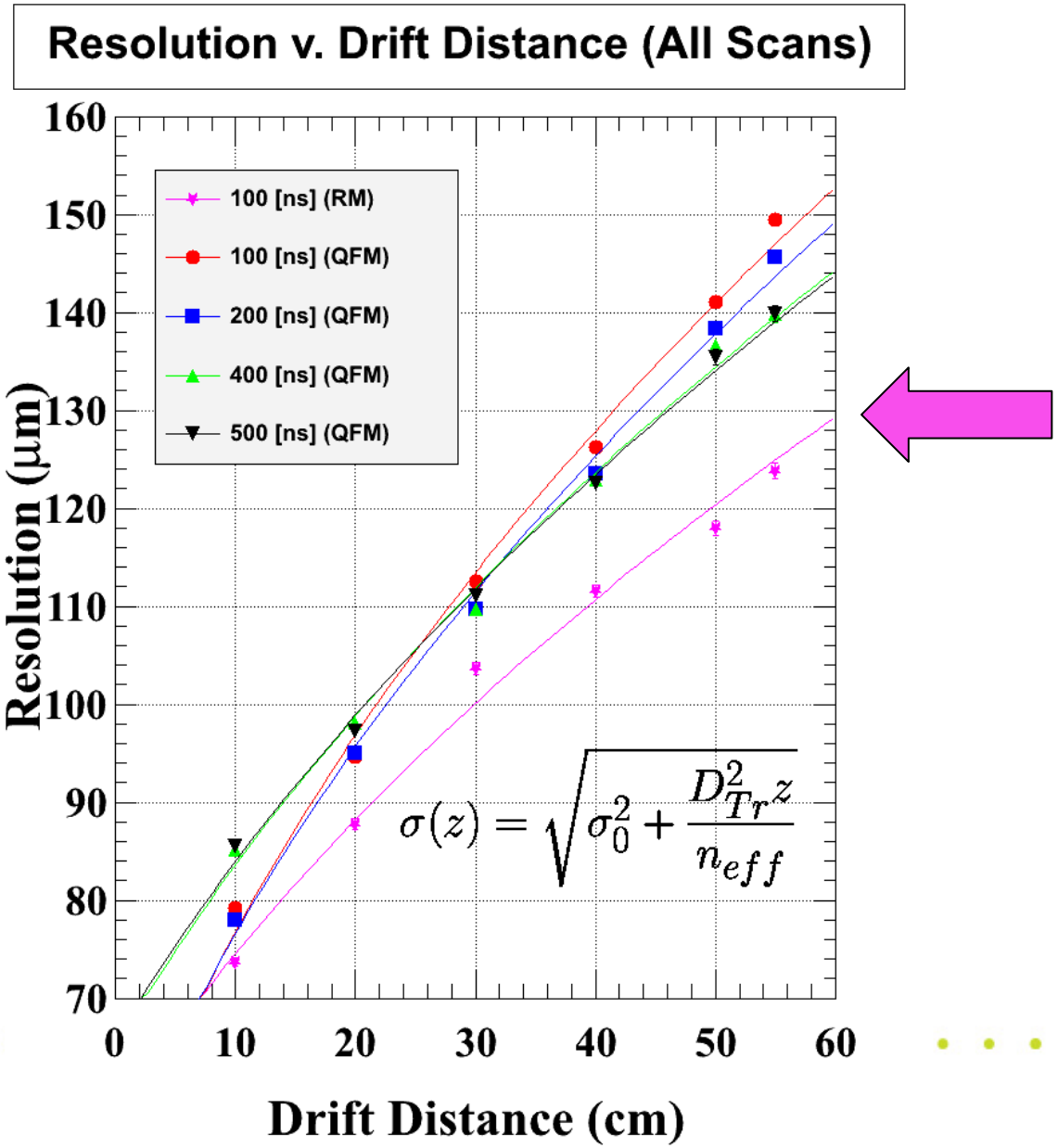
LCTPC Transverse Resolution

2011 data
Single module



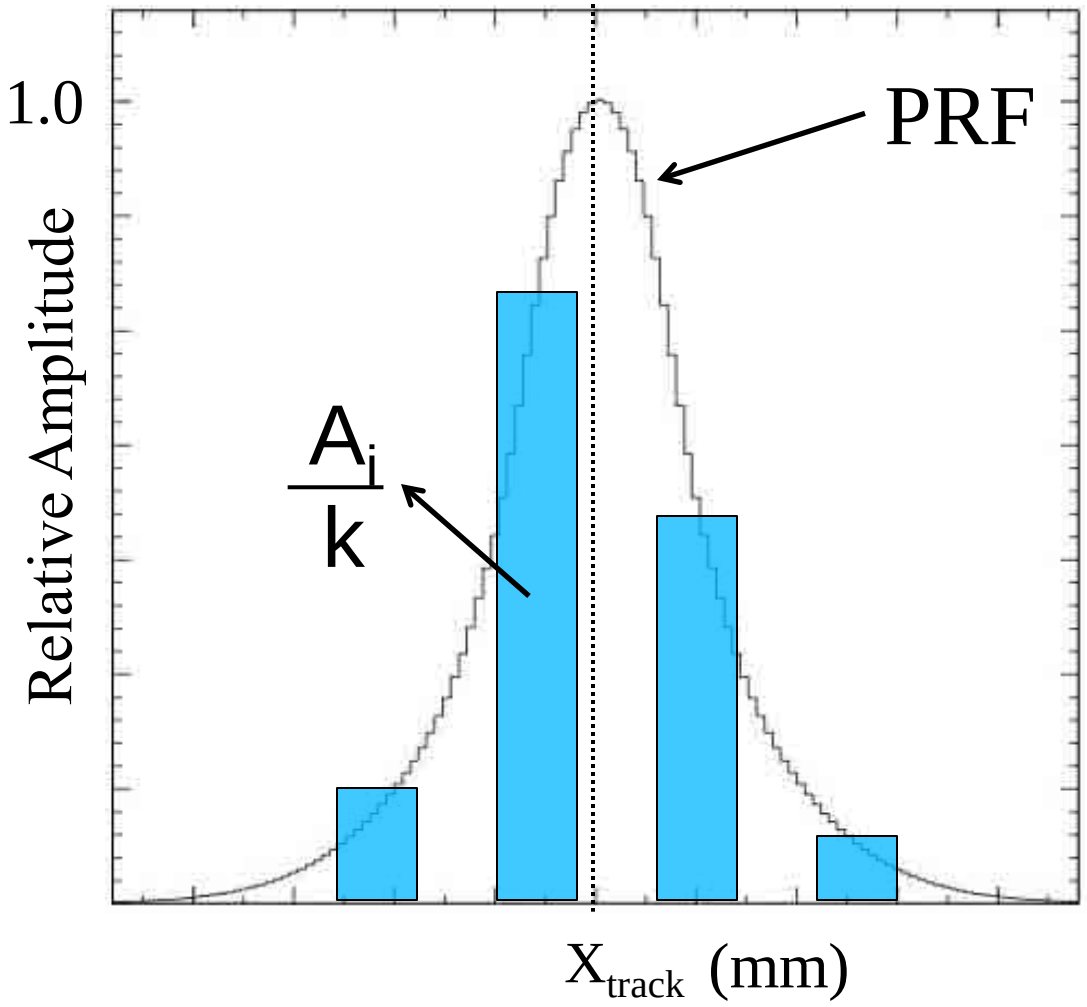
Transverse Resolution

2011 data
Single module



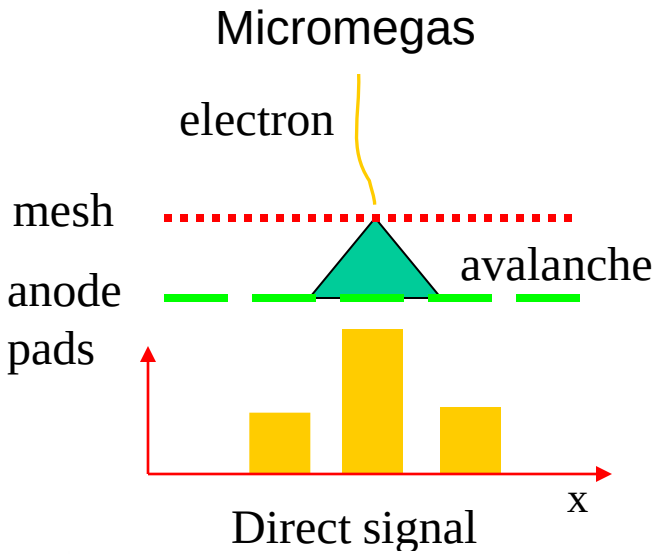
Source:
Nicholi Shiell
M.Sc. Thesis (2012)
Carleton University

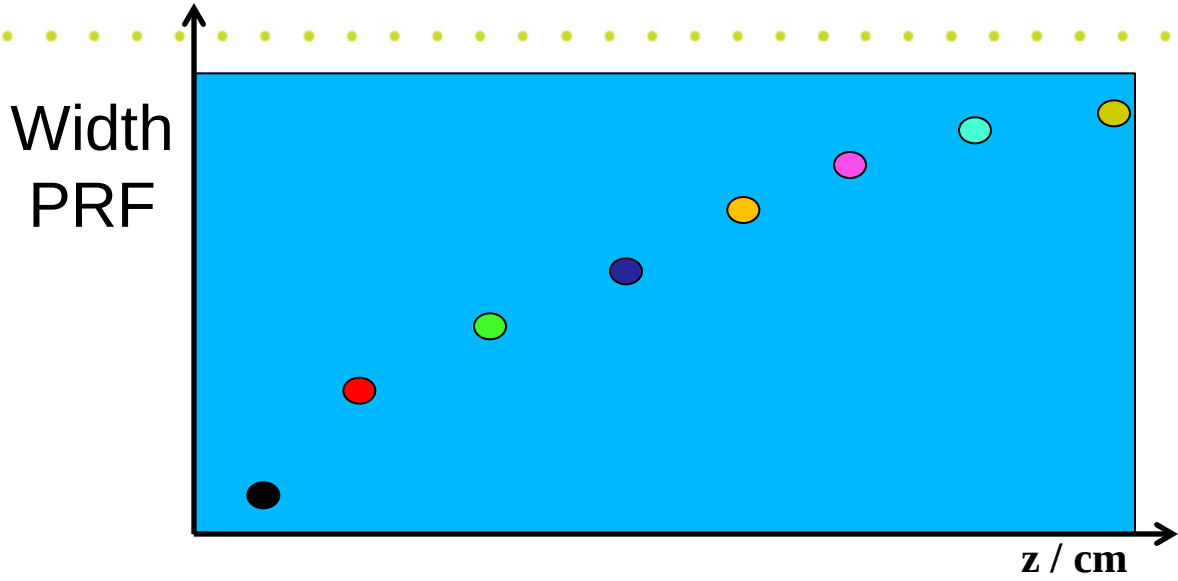
Pad Response Function (PRF)

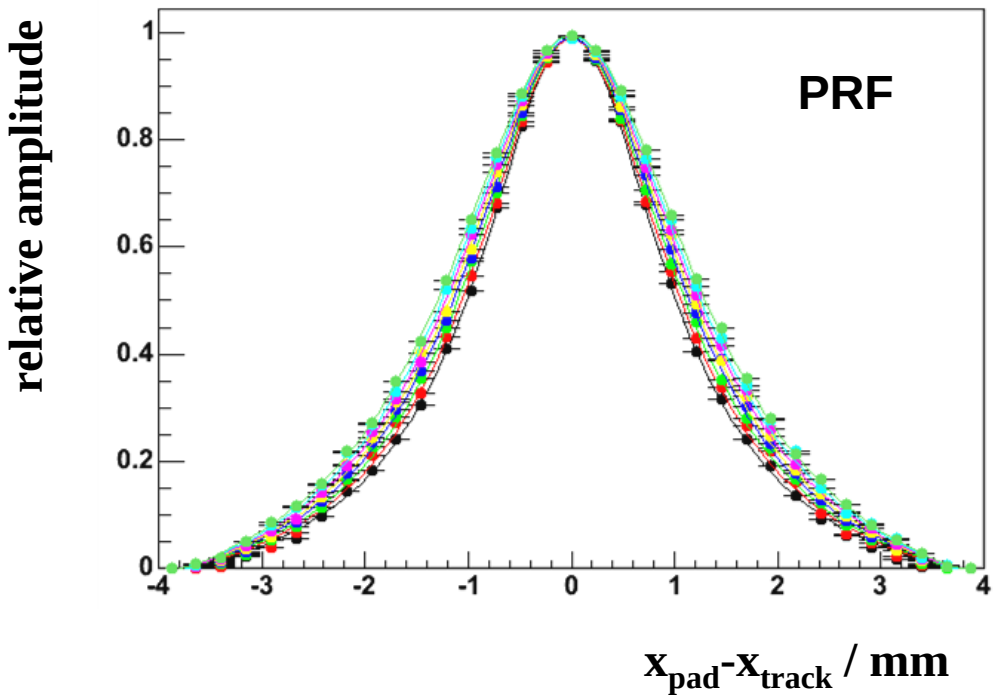


For a given X_{track} (known position) the PRF is defined to be unity

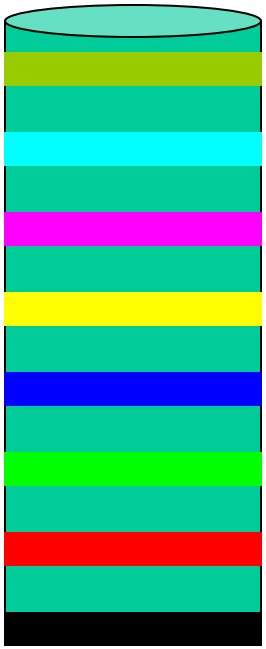
PRF versus Z





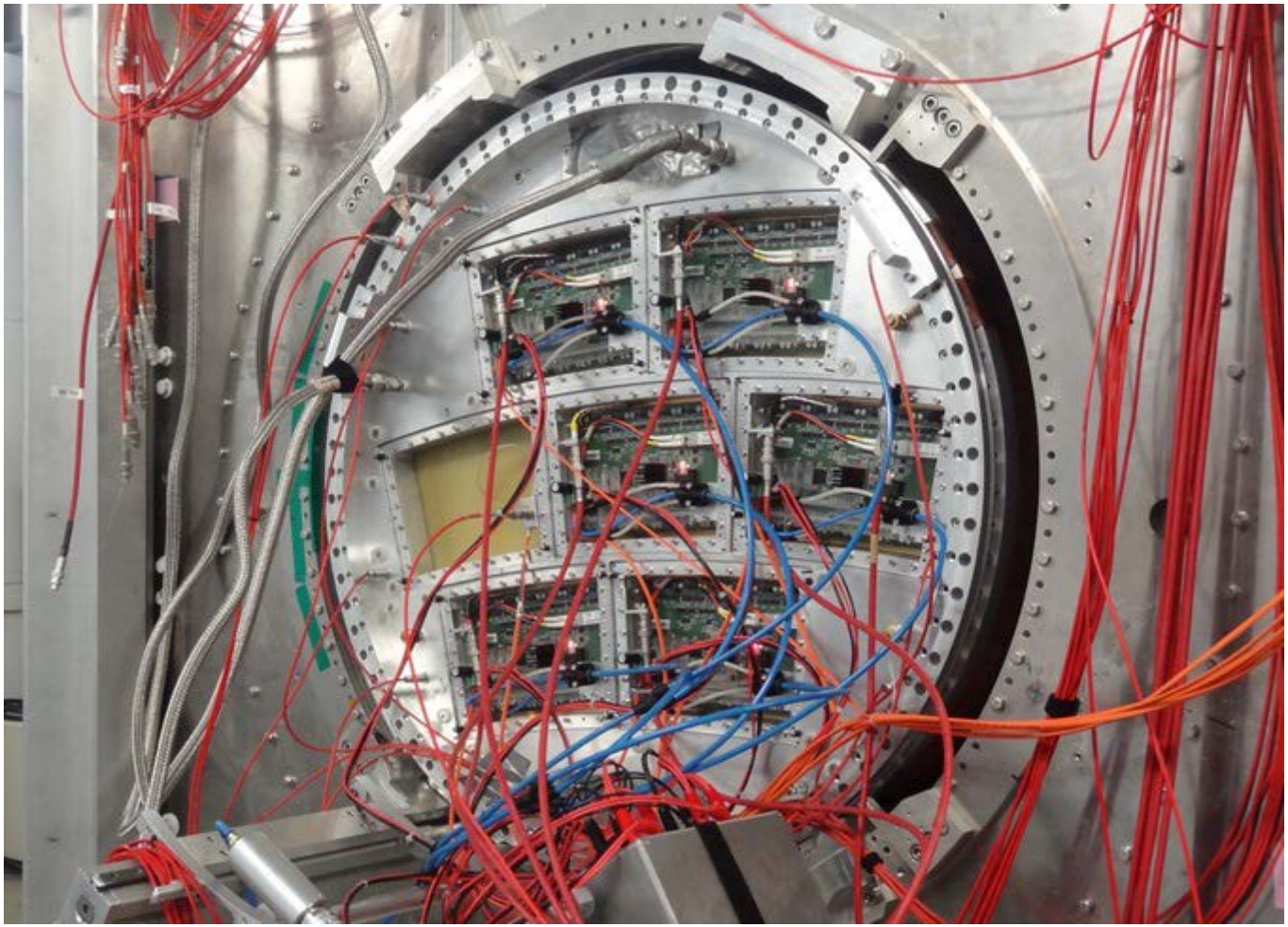


14 < z < 15cm
12 < z < 13cm
10< z < 11cm
8 < z < 9cm
6 < z < 7cm
4 < z < 5cm
2 < z < 3cm
0 < z < 1cm



7-module LCTPC

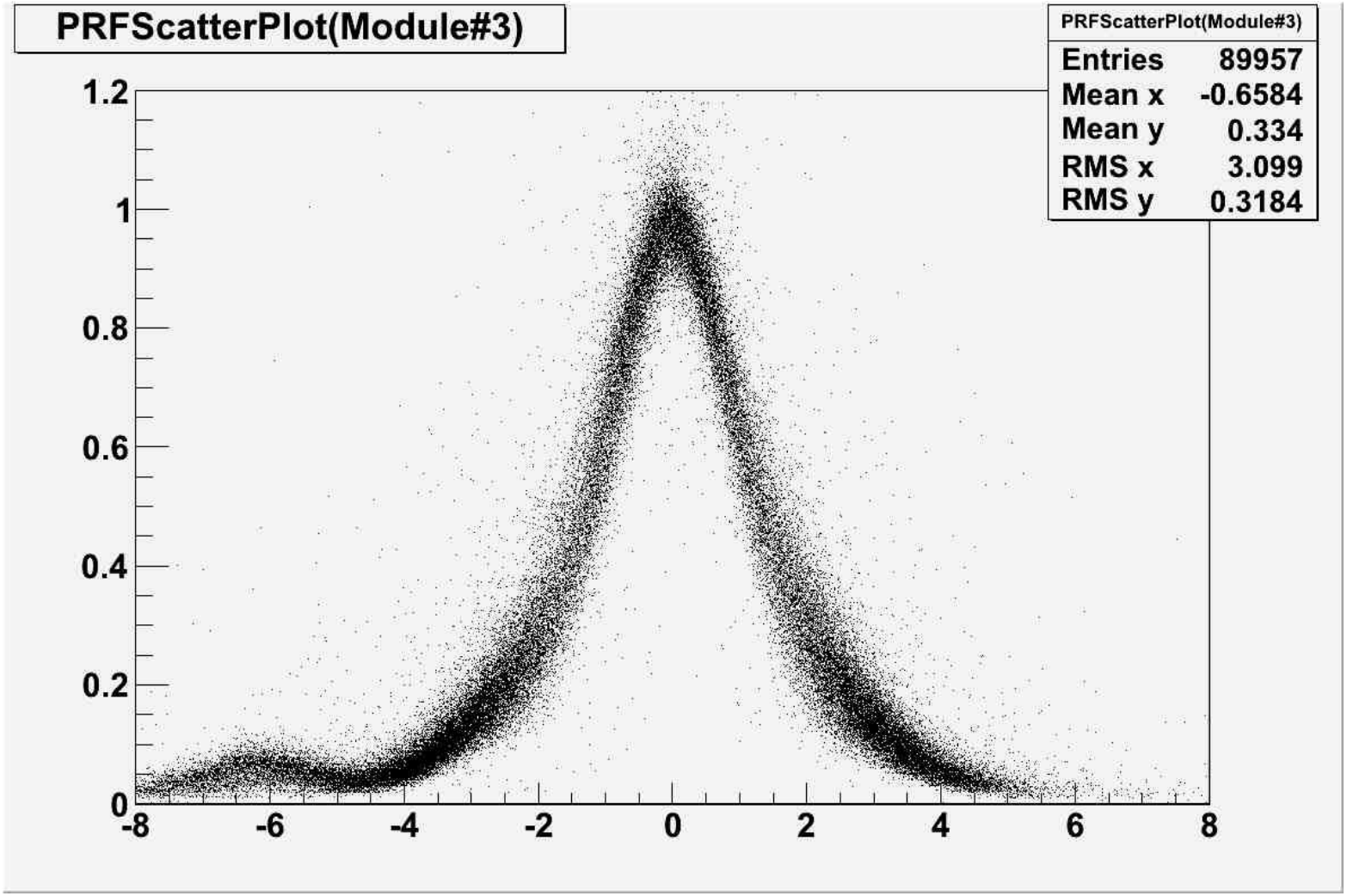
2012 data
7-module



MarlinTPC

- **NativeToLCIO**
  - Converts data from the native file format of the detector hardware to the LCIO standard
- **Main Code (i.e. Processor)**
  - DD: creates dense data files from LCIO
  - Need a seed track
  - **PRF: determines track parameters and/or pad response function (PRF)**
  - BIAS: calculates and saves values used for bias and reso ROOT scripts
- **ROOT Scripts:**
  - BIAS: calculates and corrects for signal bias inherent to the detector
  - RESO: calculates the resolution

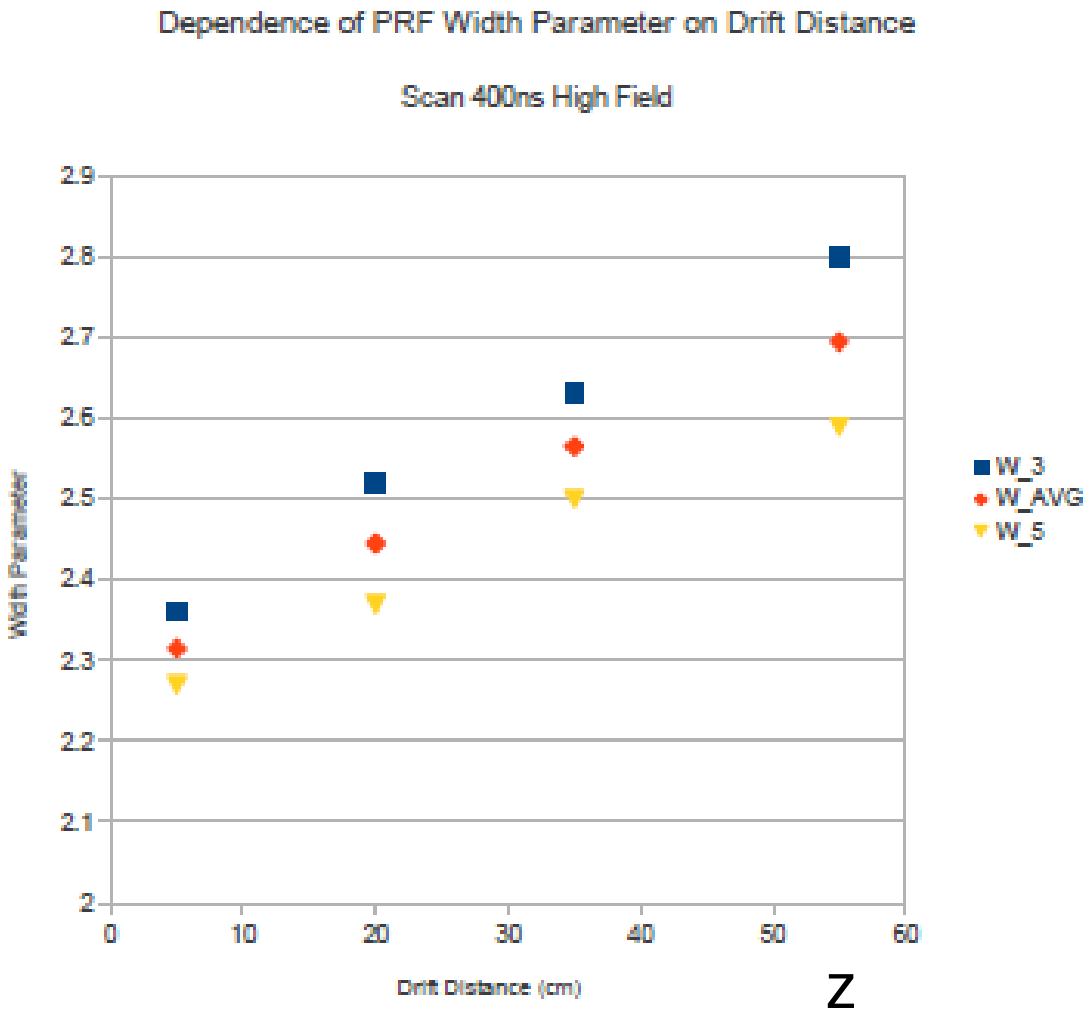
PRF first look (2012)



X (mm)

PRF width parameters

Run #	Drift Distance (cm)	W_3	W_5	W_AVG
2180	5	2.36	2.27	2.315
2182	20	2.52	2.37	2.445
2186	35	2.63	2.5	2.565
2188	55	2.799	2.59	2.6945



"width"

z

OVERVIEW MarlinTPC Analysis

- Look at 2012 data
  - **Resolution acceptable (c.f. Wenxin's analysis)**
  - **MarlinTPC used for data analysis of 7-module data**
  - **Now can fit PRF and/or tracks**
- Diagnostics 2011 vs 2012:
  - **More noise so higher threshold**
  - **It leads to less hit per row (4.5 → 2.1)**
  - **Narrower PRF**
  - **Other effects to be investigated and corrected**
    - Cross talk
    - Alignment
    - Field non-uniformity
- Ready for 9-module testbeam (end of January 2013)