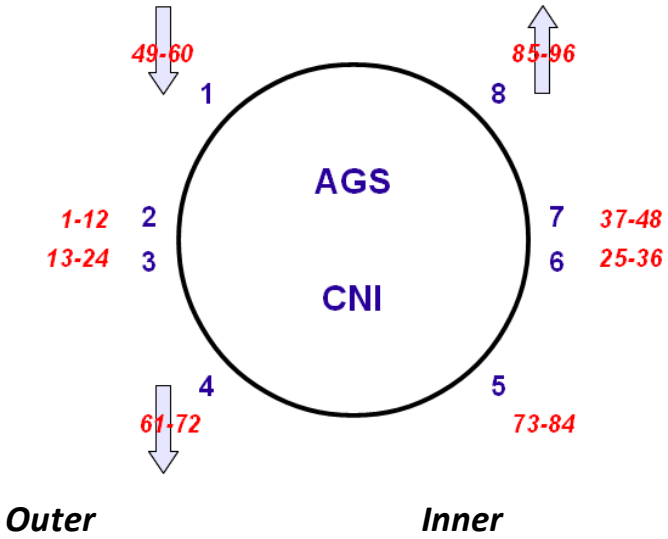
A. Poblaguev

AGS pC measurements

AGS CNI Polarimeter 2011

3 different detector types:



1,8 - Hamamatsu, slow preamplifiers

2,3,6,7 - BNL, fast preamplifiers

4,5 - Hamamatsu, fast preamplifiers

Run 2009: BNL, slow preamplifiers

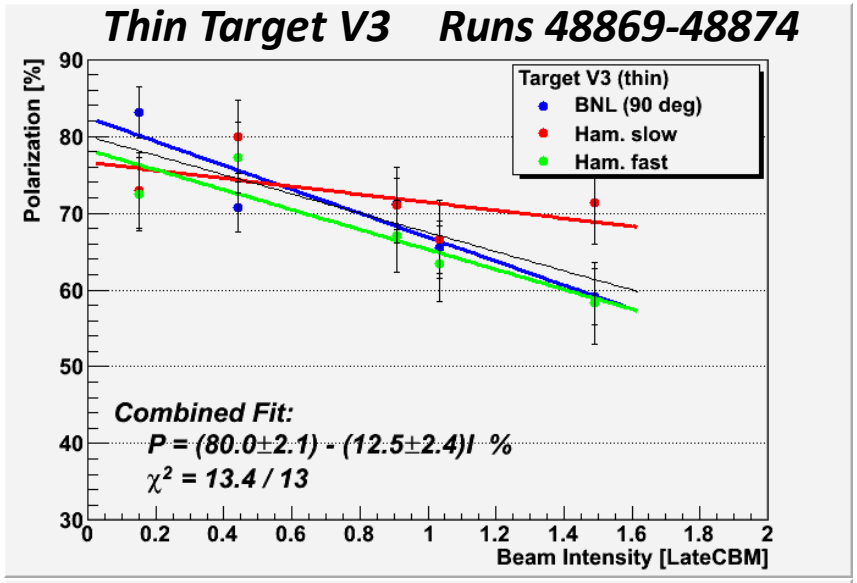
Larger length (50 cm)

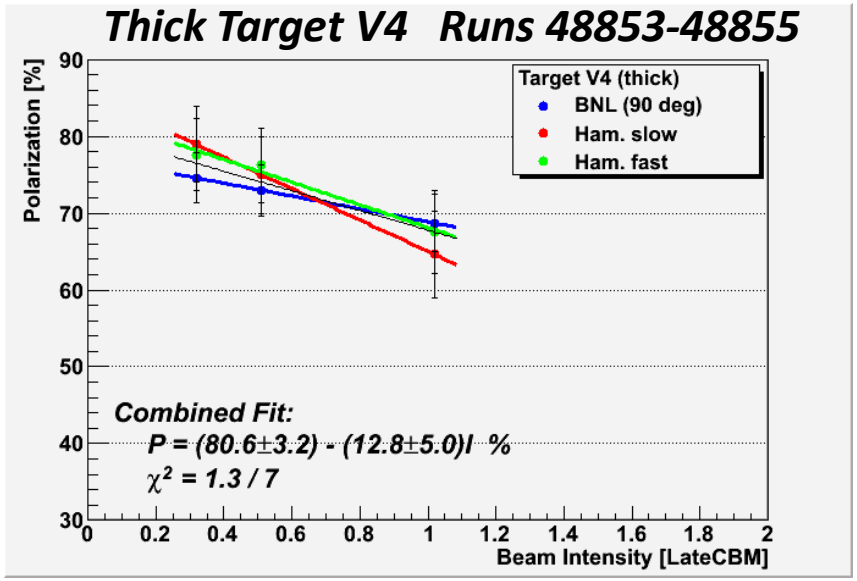
Regular length (30 cm)

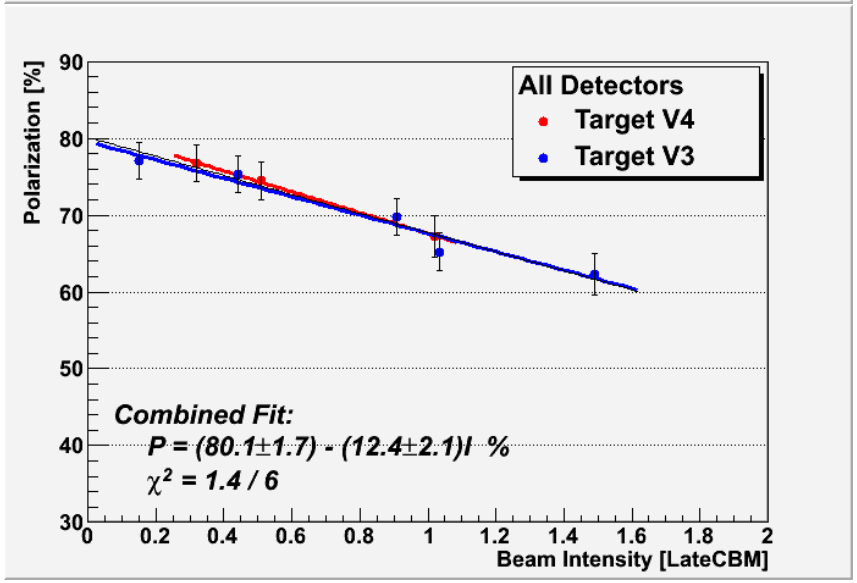
The main goal of the offline analysis: *Study systematics in polarization measurements (dependence on calibration, rates, intensity, etc)*

- The work in progress
- New software for data analysis. Processing time for standard run ~ 3 sec.

Polarization vs Beam Intensity



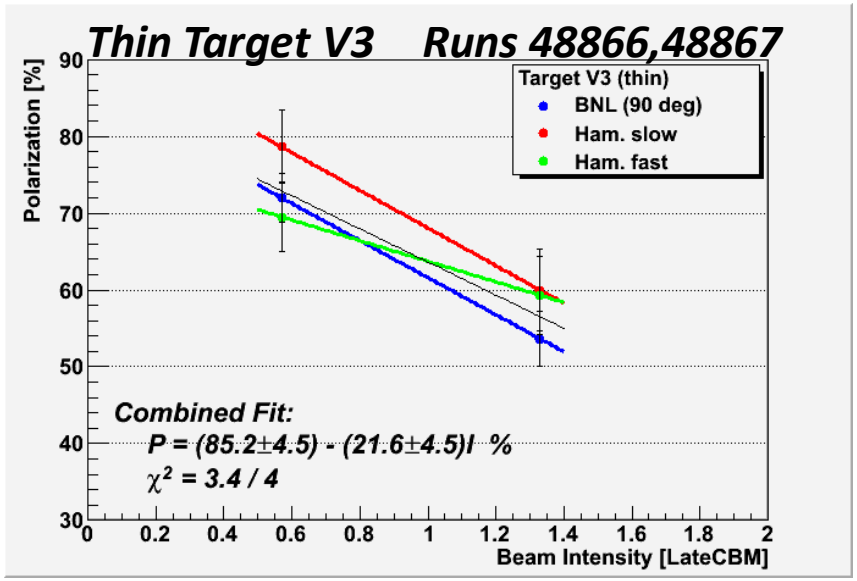


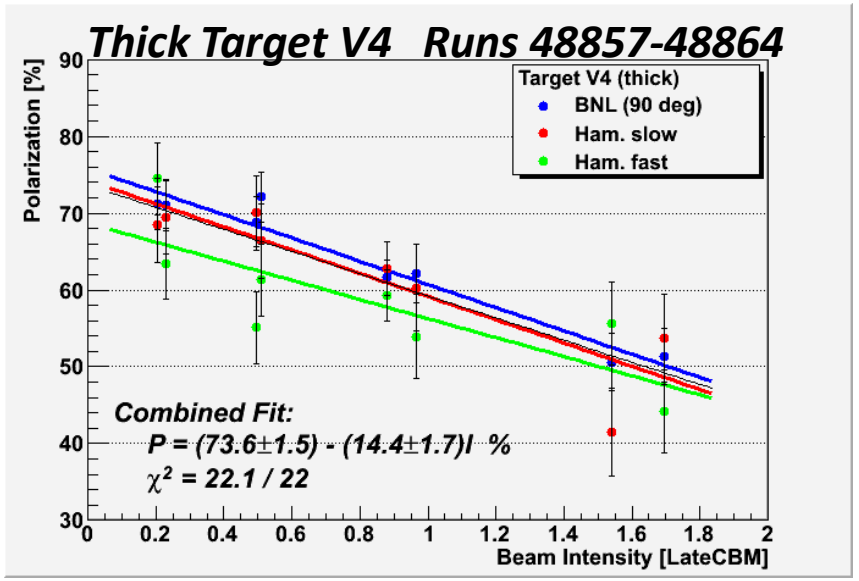


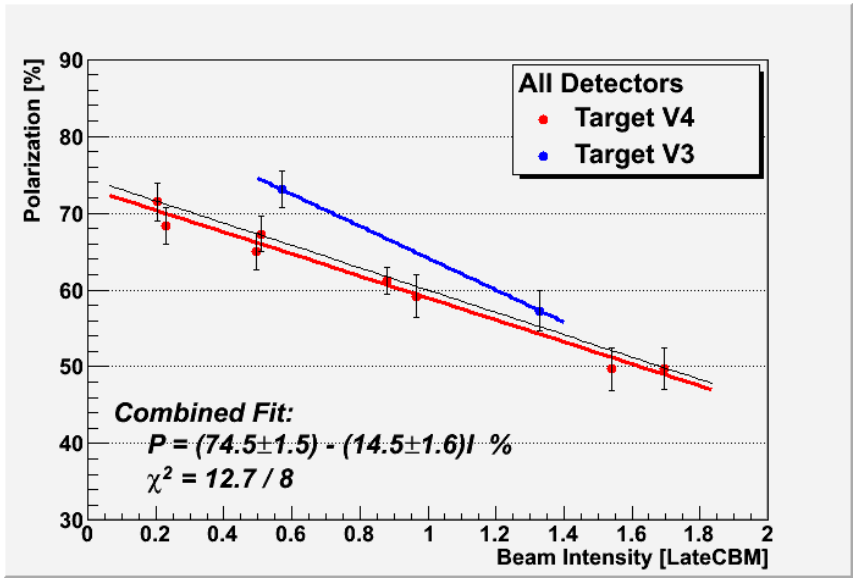
Booster Scrapping On

- ***Consistent results from all detectors.***
- ***Too big dependence on beam intensity***
- ***No visible polarization dependence on target width(rate in detector)***

Polarization vs Beam Intensity







No Booster Scrapping

- ***Consistent results from all detectors.***
- ***Too big dependence on beam intensity***
- ***Is there polarization dependence on target width(rate in detector) ?***
- ***Polarization depends on Booster Scrapping***

Plans

- We have thick and thin targets, both Veritical and Horizontal

➢ Detailed study of the polarization dependence on intensity for all targets under the same conditions.

- No proved evidence of results dependence on polarimeter performance was found yet.

➢ Continue this study to isolate such a dependence or to set limits on it.

➢ Continue to study polarimeter (calibrations, noise, *e.t.c.*)

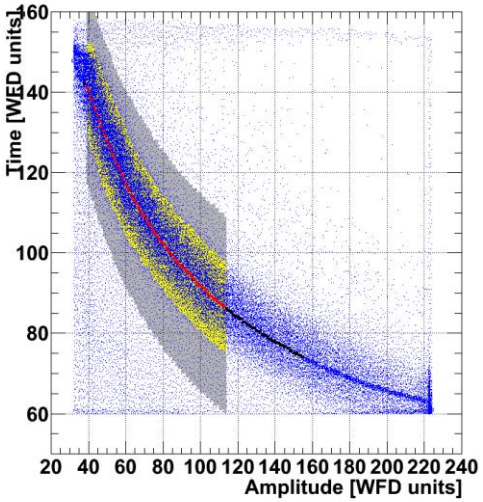
Offline Analysis

WFD

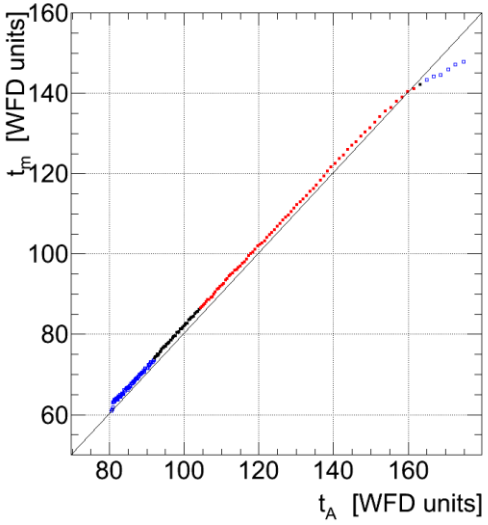
$$A \Rightarrow E_{\mathrm{det}} = \alpha A \Rightarrow E_A(E_{\mathrm{det}}, x_{\mathrm{DL}}) \Rightarrow t_A = \sqrt{\frac{M}{2}}\frac{L}{\sqrt{E_A}}$$

$$t \Rightarrow t_{\mathrm{TOF}} = t - t_0 \Rightarrow E_t = \frac{M}{2}\left(\frac{L}{t - t0}\right)^2$$

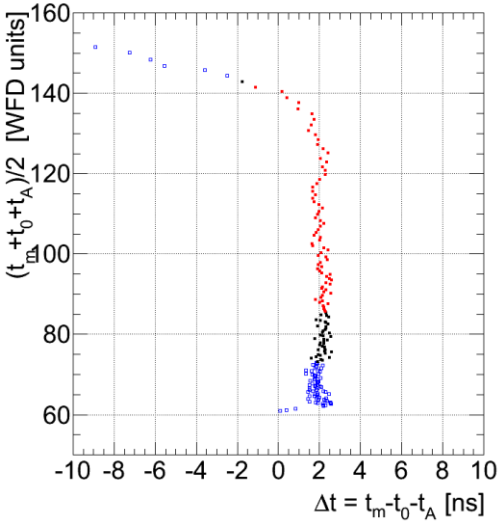
Banana: t vs E_A

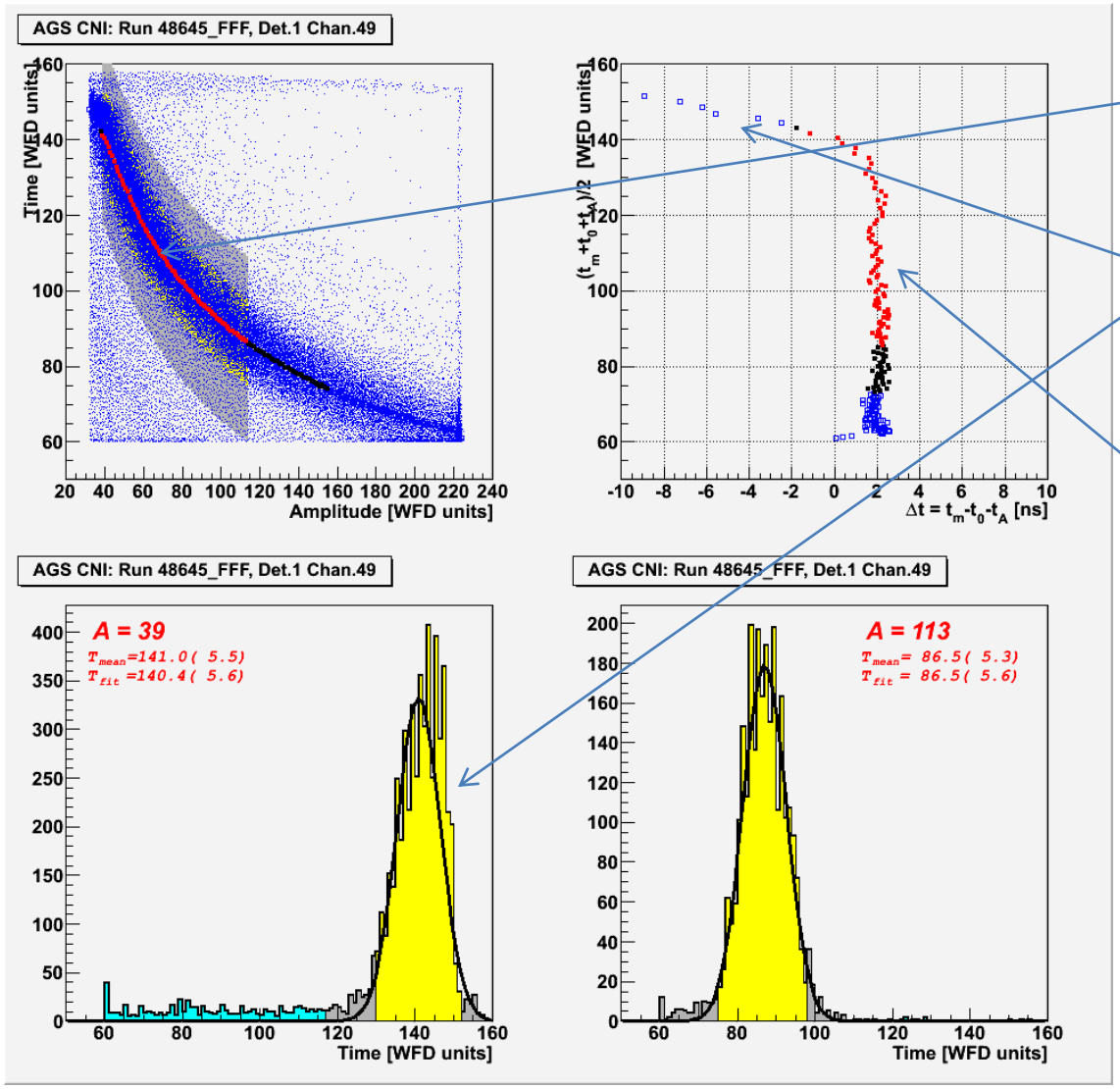


$$t = t_0 + t_A$$



$$t - t_0 - t_A = 0$$



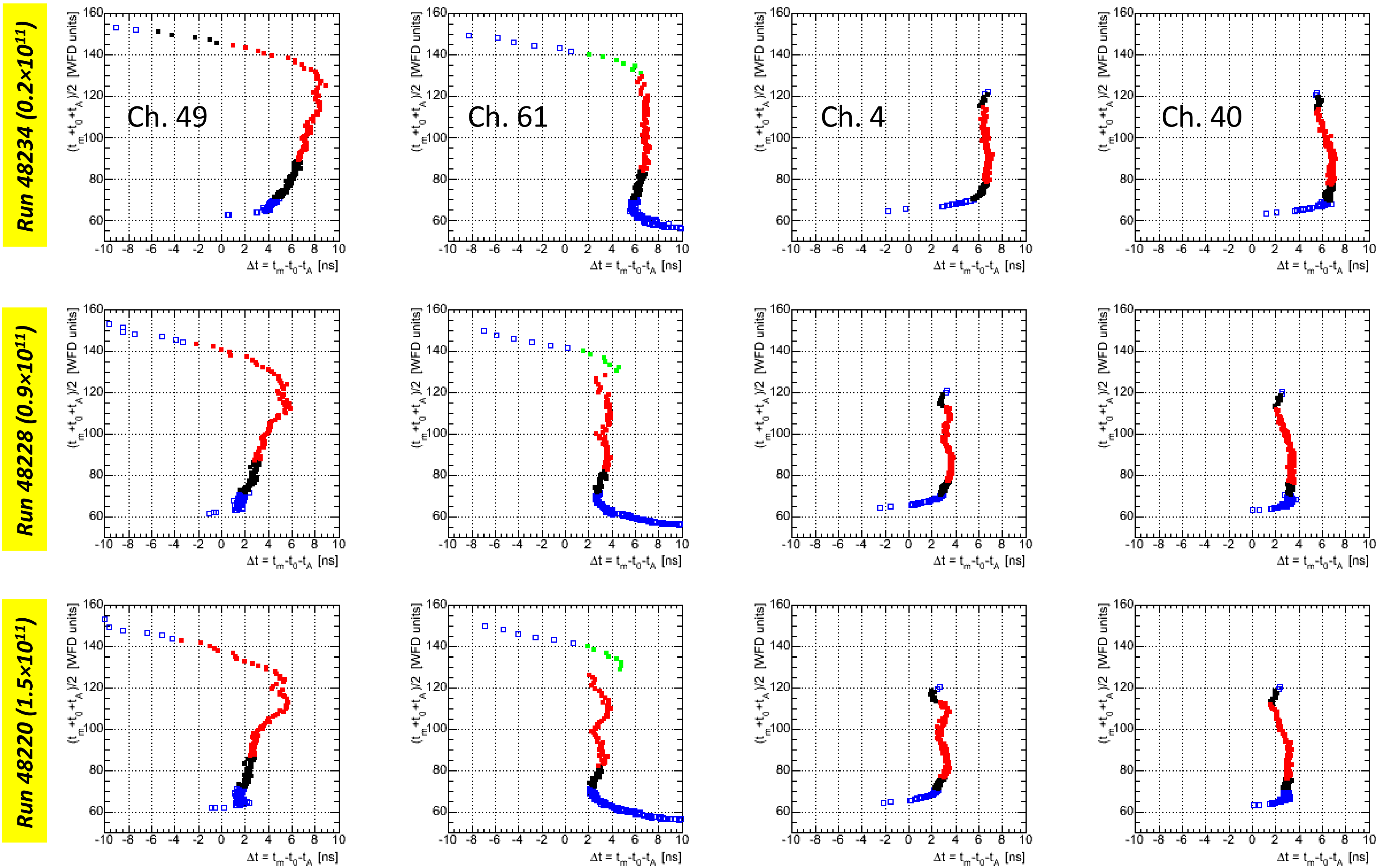


If t_0 is known, a model independent calibration can be done

Wrong determination of mean time

Picture can be rotated if
$\alpha \rightarrow k\alpha$
$x_{DL} \rightarrow kx_{DL}$

Beam Intensity Dependence

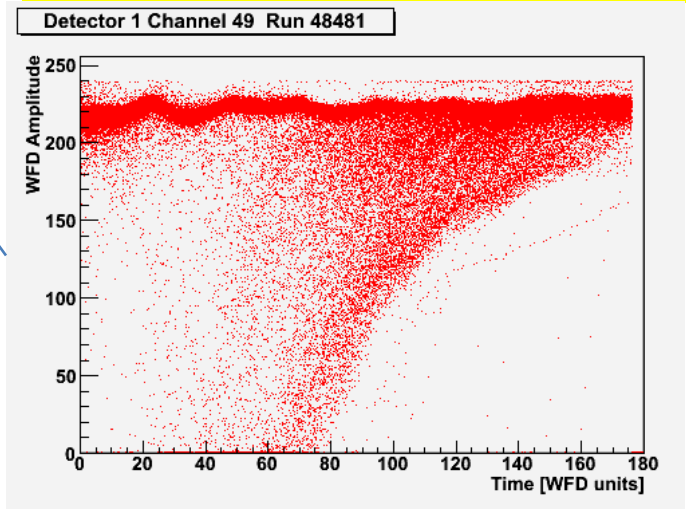


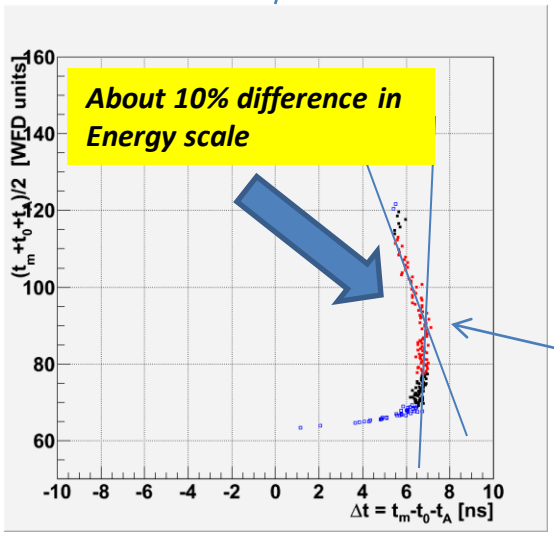
Conclusions from previous slide

- t_0 is intensity dependent
- data is affected by "beam correlated noise"
- standard t_0/x_{DL} calibration may give biased estimate of t_0 (wrong Energy scale)
- *do we really see that energy scale depends on energy?*

Must not affect Polarization measurement

May corrupt the t0/xDL calibration





If YES then it gives us an explanation why results of measurements may depend on intensity.

The <u>effective</u> dE/dx is not the same as ionization losses dE/dx

Dependence on energy scale

Results of the polarization measurements depend on the selected energy range

$-t = 2ME_{kin}$	All Detectors	90 deg	45 deg slow	45 deg fast
0.009-0.022	67.3 ± 1.4	64.0 ± 1.9	70.0 ± 2.9	69.1 ± 2.7
0.009-0.012	60.2 ± 1.9	57.3 ± 2.5	58.6 ± 3.9	66.0 ± 3.7
0.012-0.016	69.1 ± 2.3	65.2 ± 3.2	72.2 ± 4.6	71.6 ± 4.5
0.016-0.022	76.2 ± 3.5	74.1 ± 4.9	83.7 ± 7.0	71.8 ± 6.6

Run 48786, V3 (120 M)

Analysing Power mismatches energy calibration.

A→0.9A → P → P-5%

Energy scale dependence on rate must be studied.

Summary

- The work is in progress
- All 3 AGS CNI detectors show similar results.
- New fast software for offline data analysis
- t_0 is unstable and intensity dependent, but this must not be a problem
- "Noise" correlated with beam
- Many questions to the t_0/x_{DL} calibration. Independent measurement of t_0 should be developed.
- Does energy scale depend on rates ?