Report on JGEM analysis 1

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Yesterday, our analysis program was updated on tracking method. So I have to re-analyze the data, but for today I haven't yet obtain any new results. I'd like to just report on our present problems.

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Our situation

Where were we?

Developing and using local analysis program, we have become to be able to

- unpack raw data (This part is strongly dependent on the Lund monitor program.)
- find hits
- find tracks (for a single module)
- fit tracks (for a single module)

Where are we?

For multi-module analysis, we are developing

- track-finder which uses global coordinate
- track-fitter which can cross over to another modules

Pad-alignment have not yet corrected.
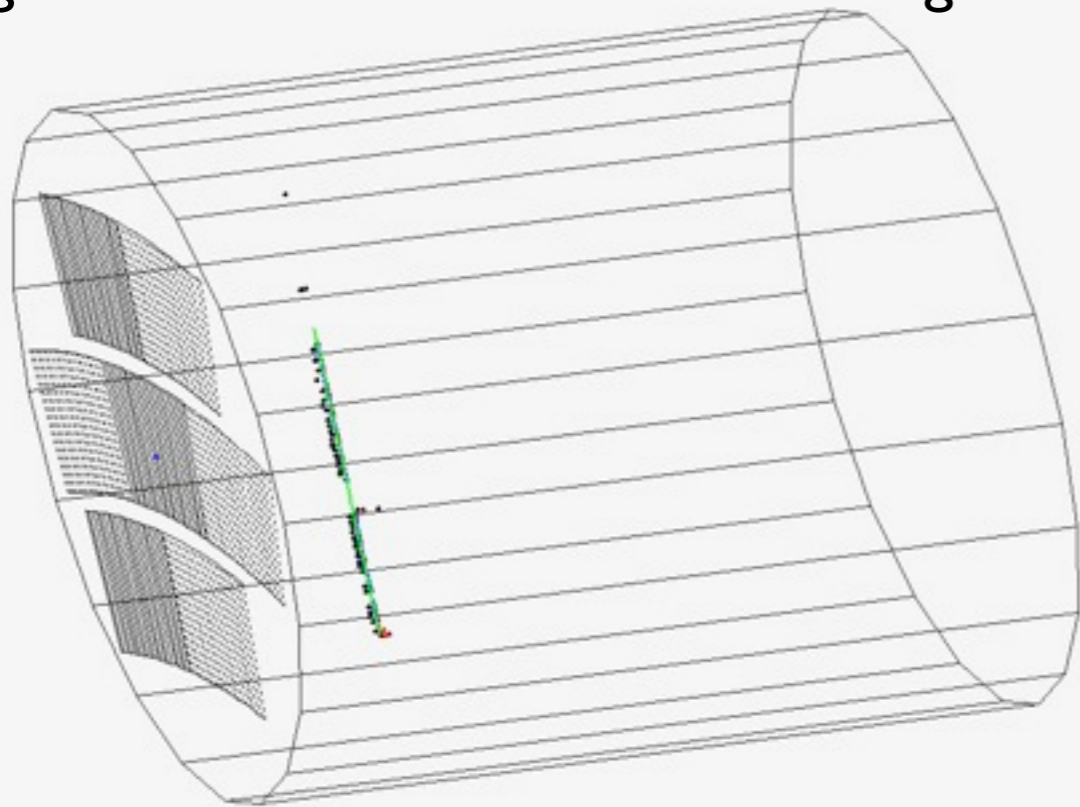
Where are we going?

- To use Marlin TPC in order to share data and analysis

  (At this moment, we need outputs from the data of previous beam test as soon as possible in order to develop GEM modules for next beam test.)
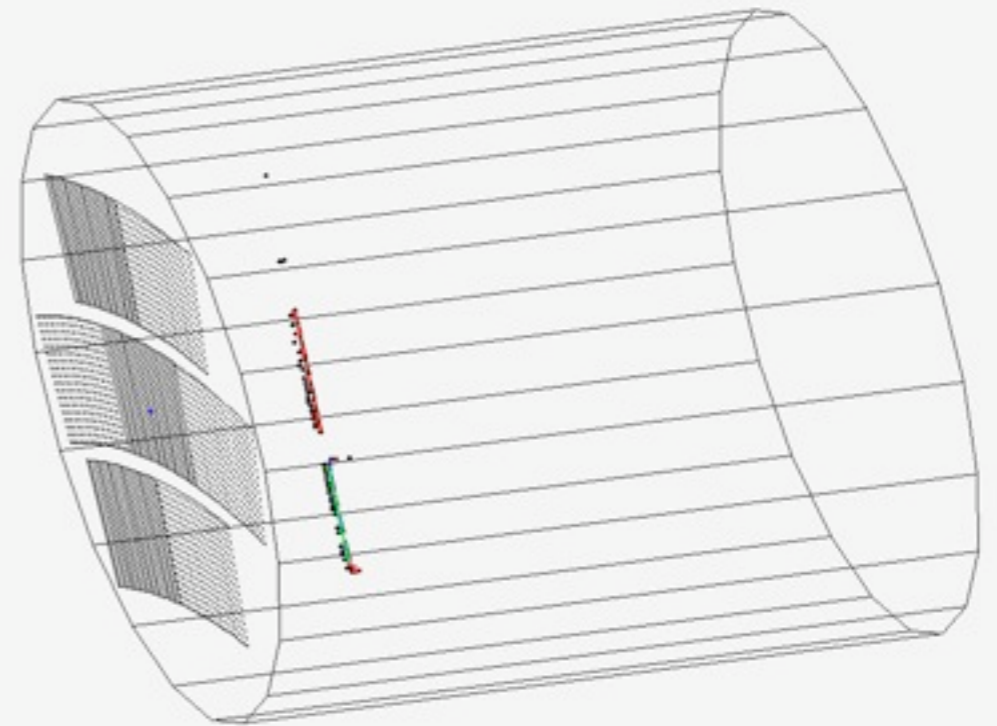
Event Display Samples

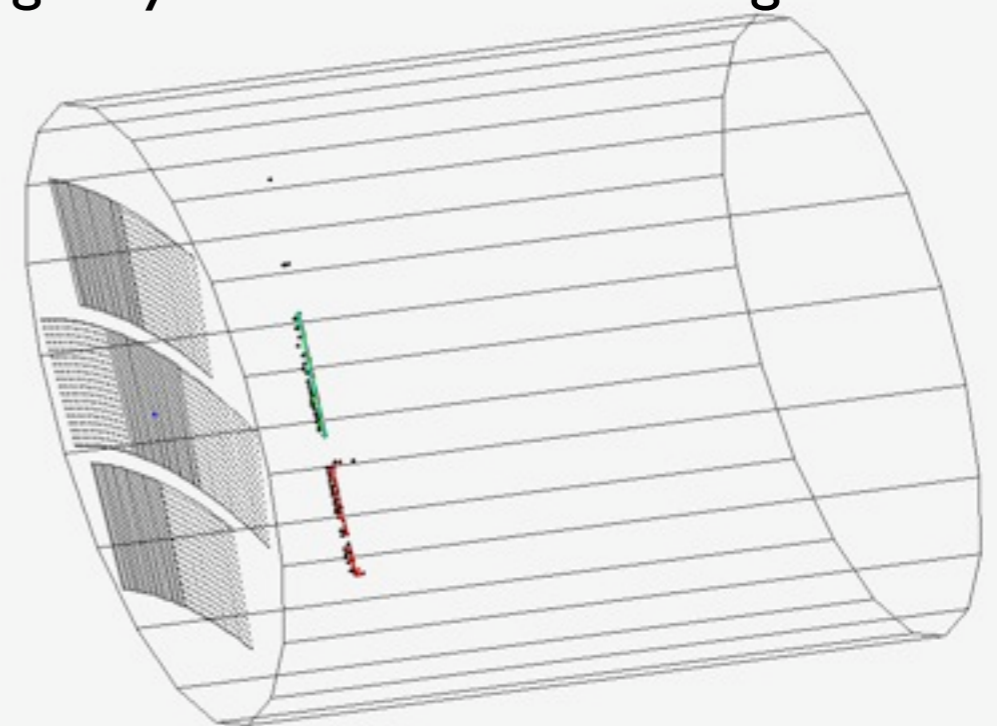We use this event display in order to check fit result.

using only module-1 for tracking

using both module-1 and -3 for tracking
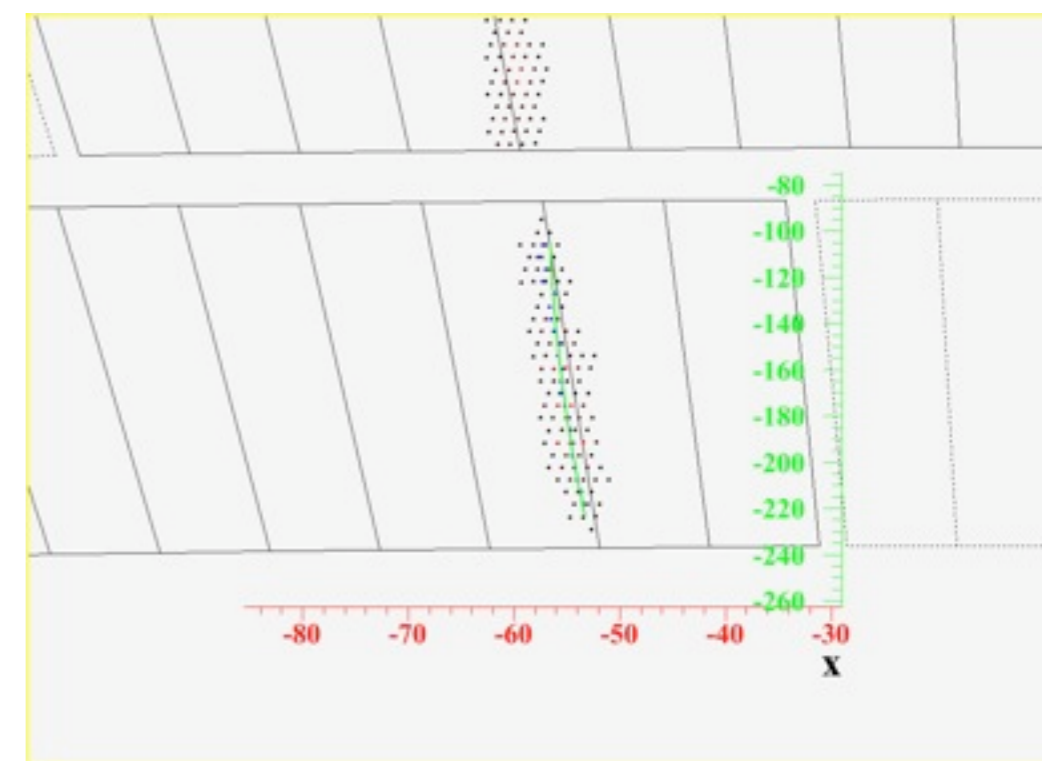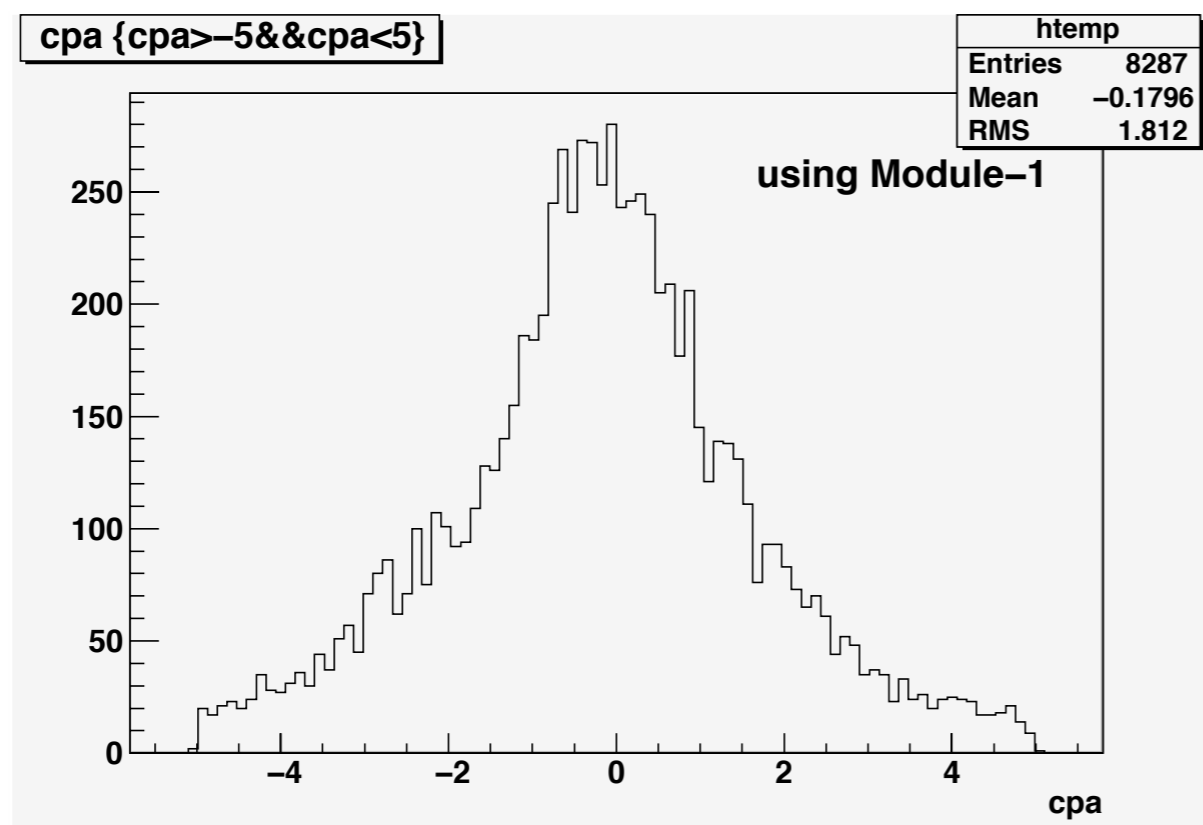

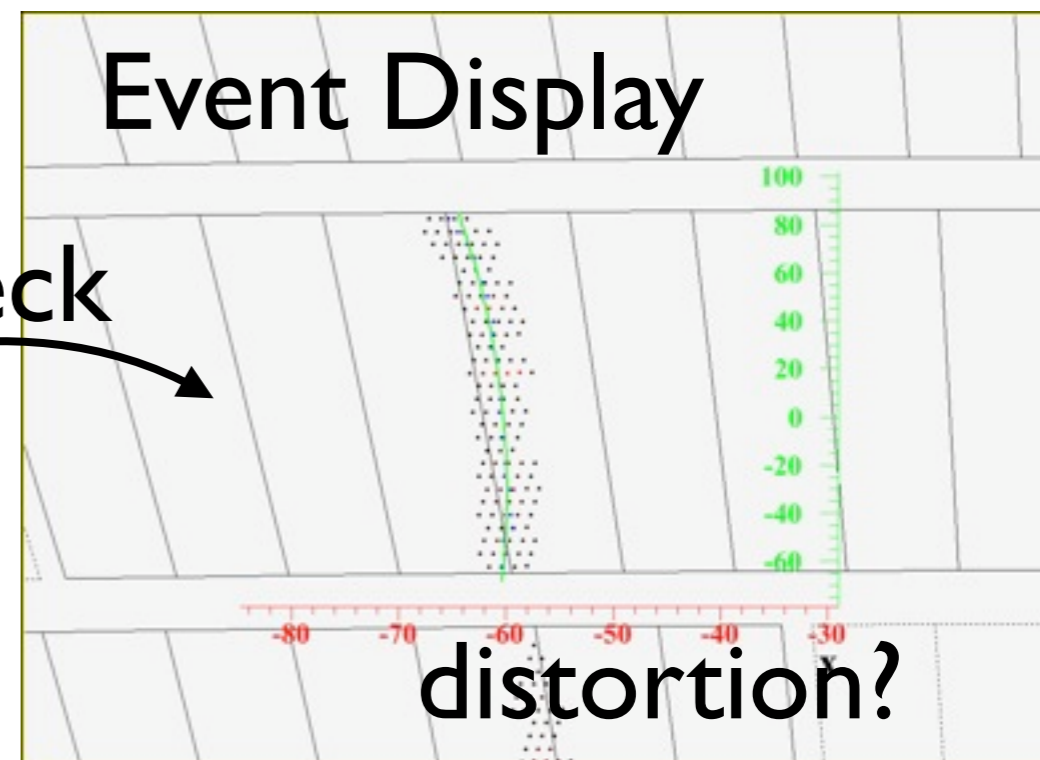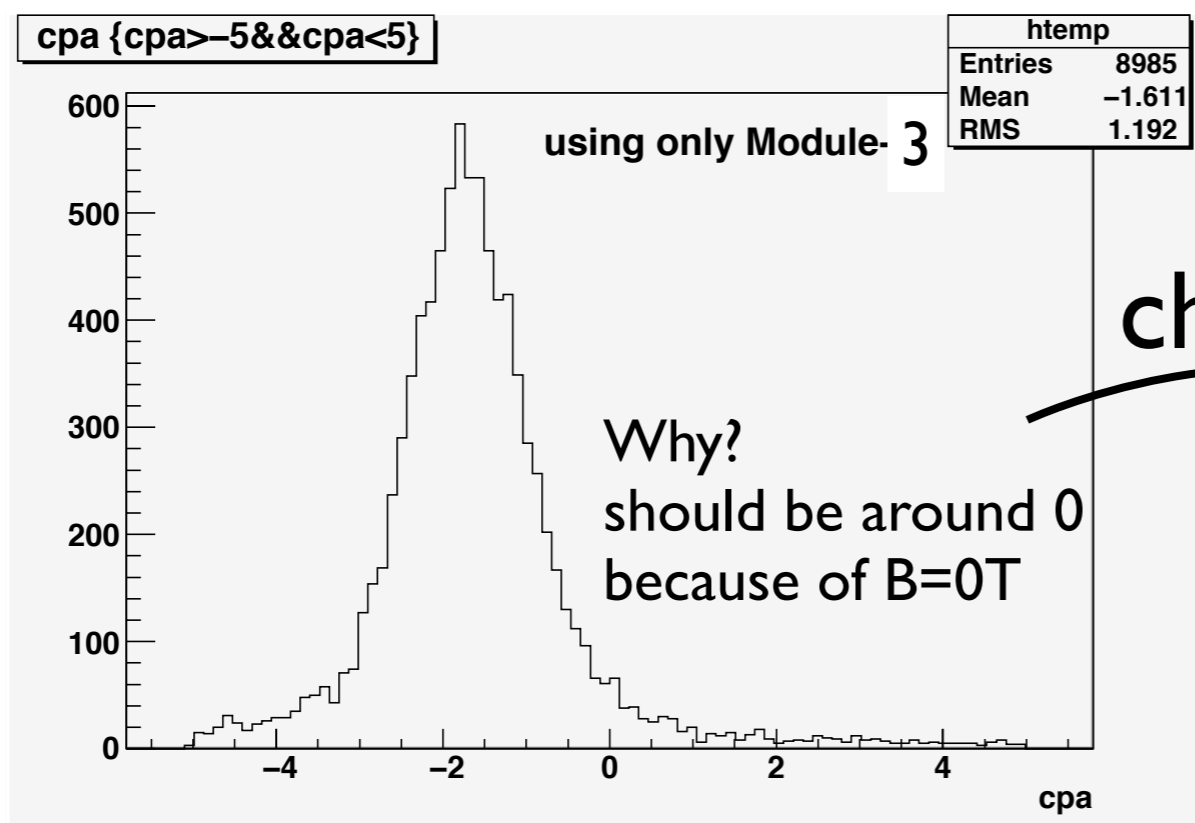using only module-3 for tracking

Present Problems

1. Kappa(0T) problem

2. Pad Response problem(displacement at long drift distance)

3. Diffusion constant (0T) problem (disagreement with garfield)

1. Kappa(1/P) Problem

B=0T

cpa {cpa>−5&&cpa<5}

htemp	
Entries	8985
Mean	−1.611
RMS	1.192

using only Module-3

Why?
should be around 0
because of B=0T

check

Event Display

distortion?

cpa {cpa>−5&&cpa<5}

htemp	
Entries	8287
Mean	−0.1796
RMS	1.812

using Module−1

B=0T

cpa {cpa>−1&&cpa<1}

htemp	
Entries	16516
Mean	0.1204
RMS	0.2704

using Module−1 & Module−3

get better than using only a single module

2. Pad Response Problem
B=1T

Pad Response (Row19)

$\sigma_{PR}(0) = 441.3 \pm 0.41$ [μm]

$C_D = 94.56 \pm 0.09$ [μm/$\sqrt{cm}$]

?

y-axis: $\sigma_{PR}(0)^2$ [mm²]

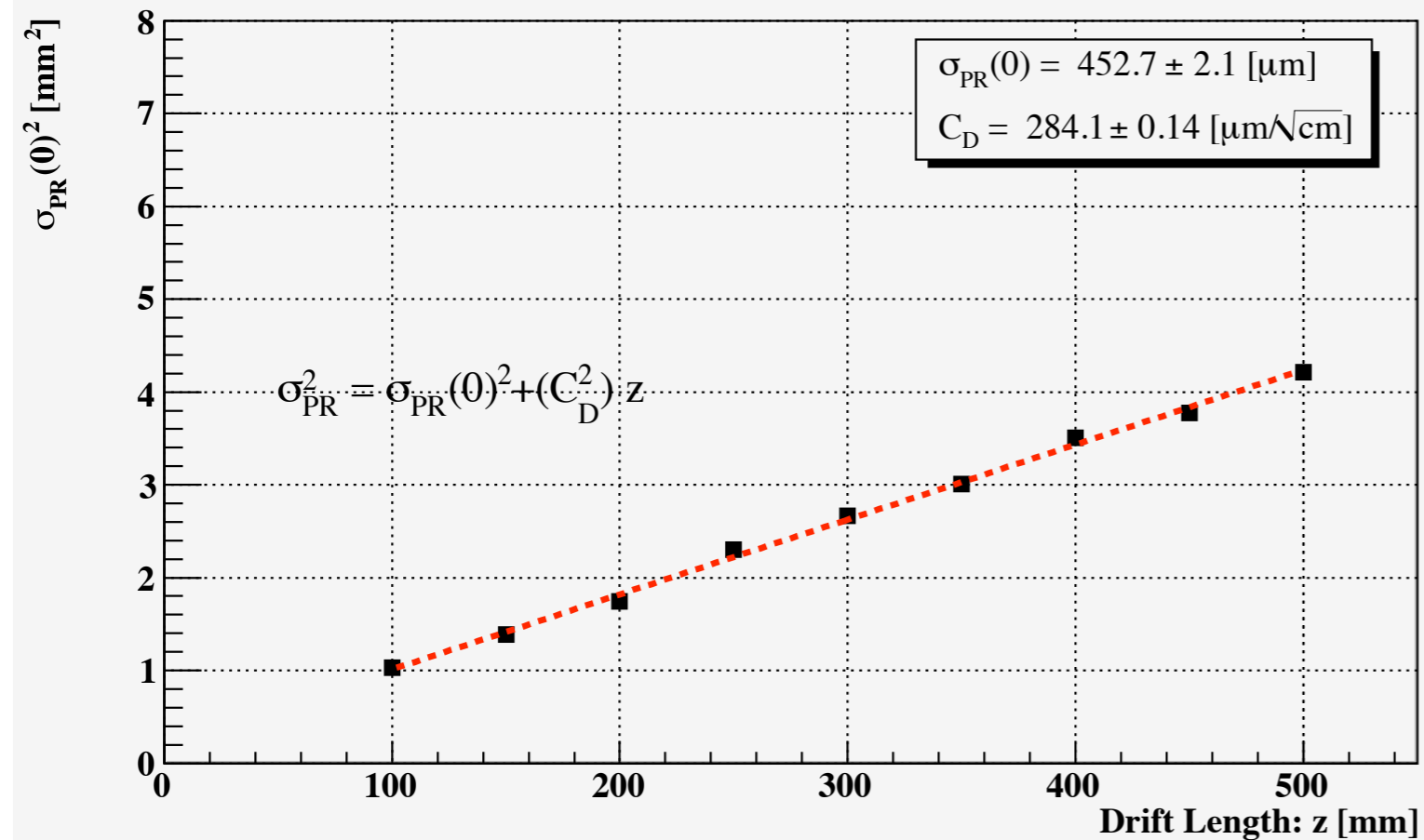x-axis: Drift Length: z [mm]
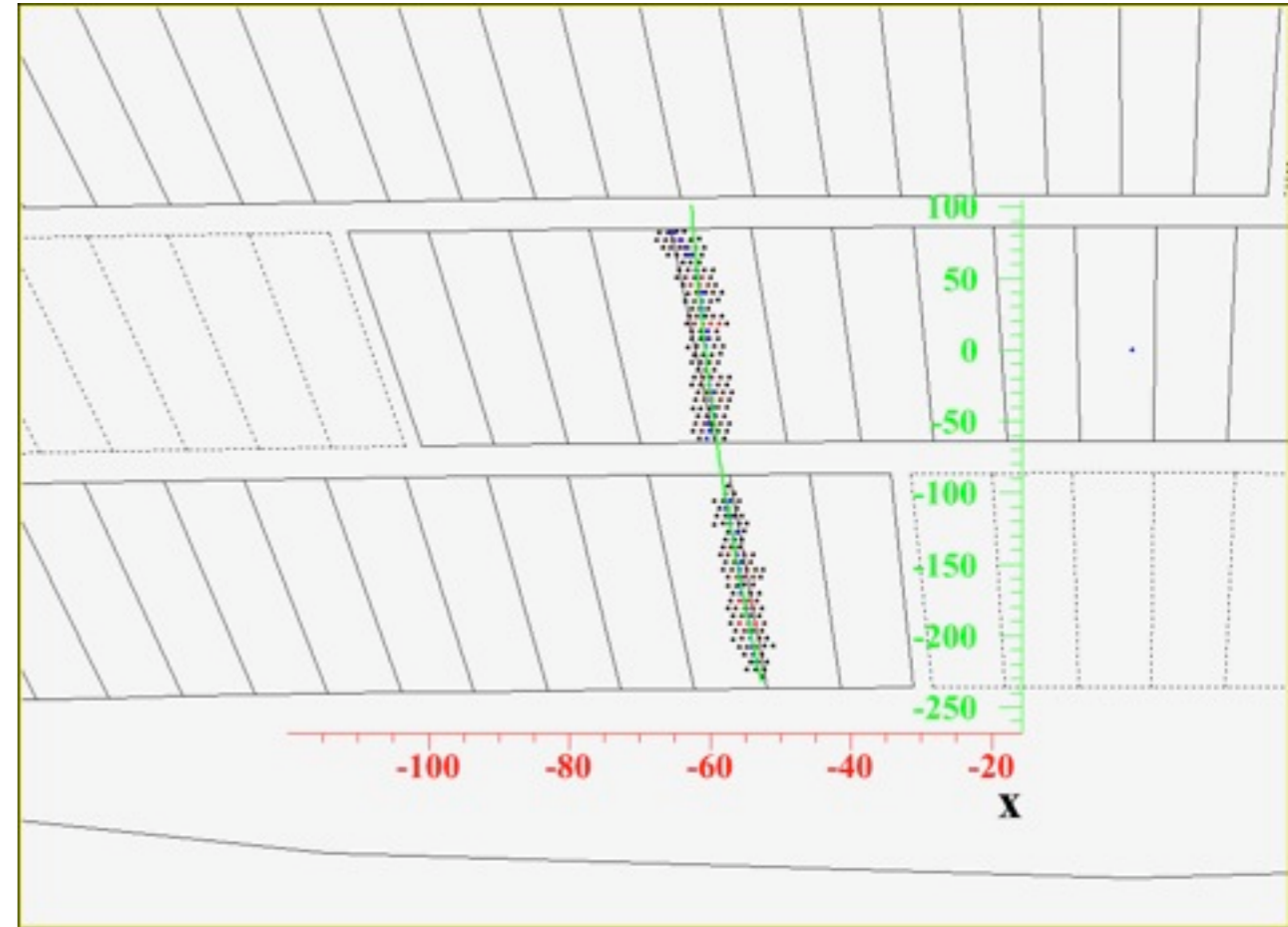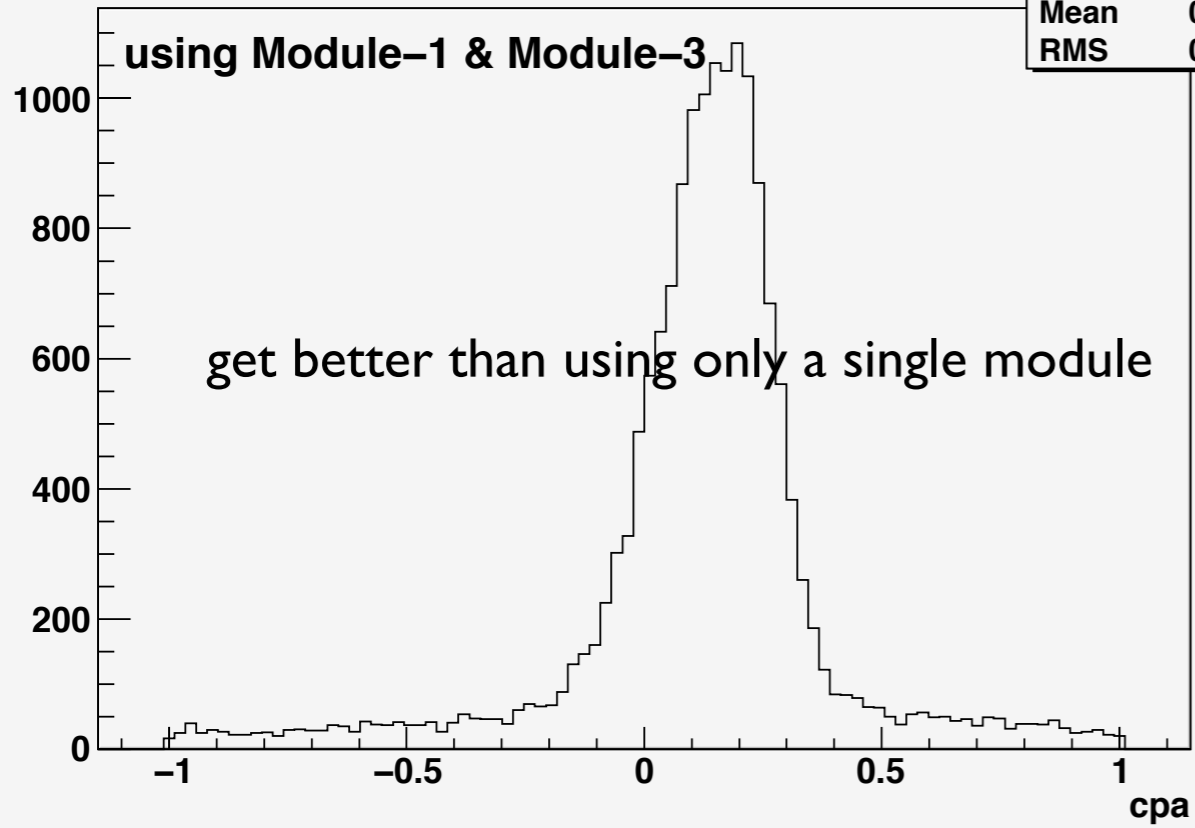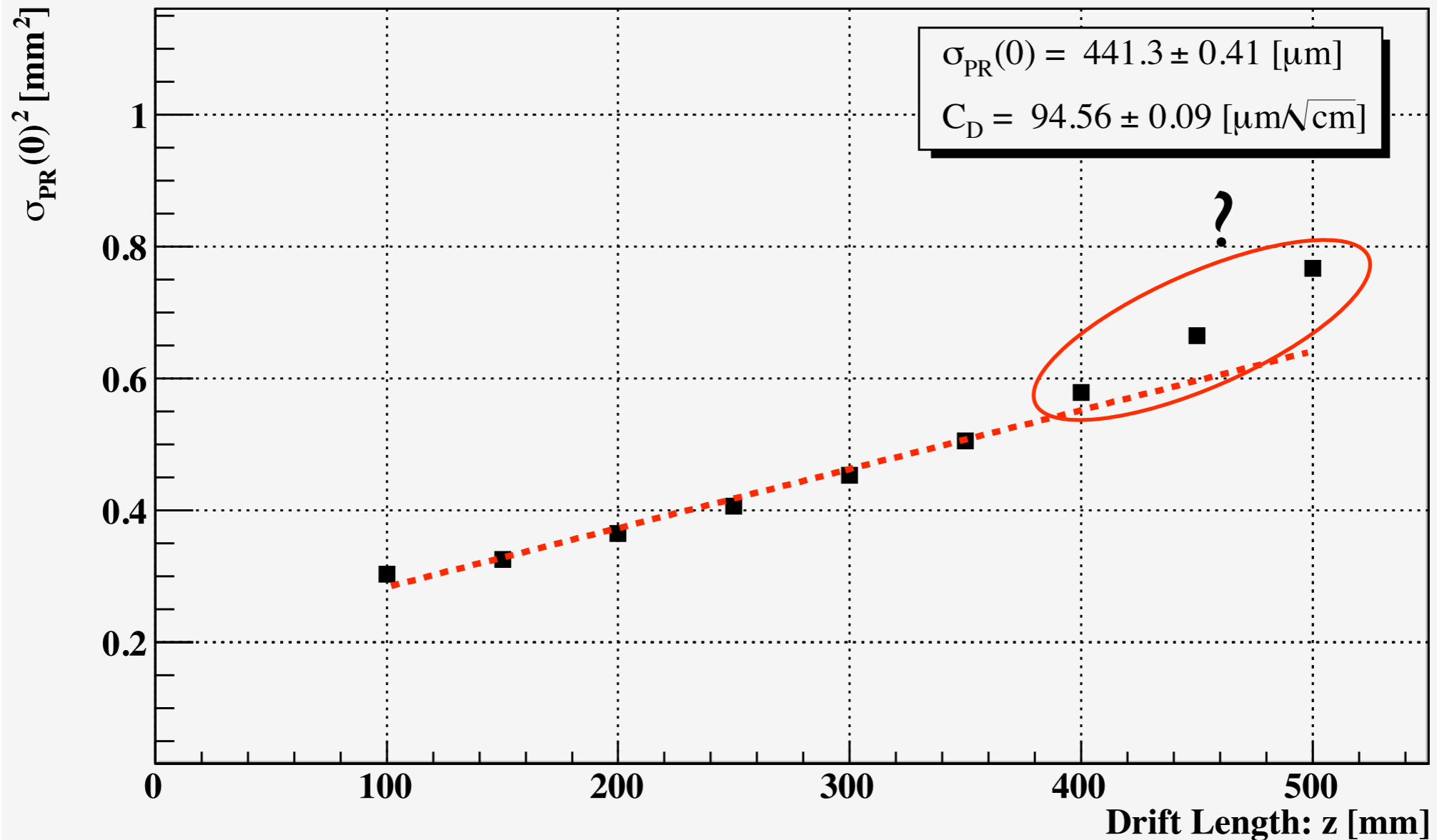
Still unclear where this displacement comes from.

According to H. Yamaguchi's report, we can't explain by only decreasing of B.

3. Diffusion constant (0T) problem

B=0T

Pad Response (Row19)

Plot axes: $\sigma_{PR}(0)^2$ [mm^2] vs Drift Length: z [mm]

$\sigma_{PR}(0) = 452.7 \pm 2.1$ [μm]

$C_D = 284.1 \pm 0.14$ [μm/$\sqrt{cm}$]

$$\sigma_{PR}^2 = \sigma_{PR}(0)^2 + (C_D^2)\, z$$

Measured value ~ 284.1 +- 0.1

garfield ~ 312 [um/$\sqrt{cm}$]

disagreement?

Plan

To correct the pad alignment