

Raster Calibration Introduction

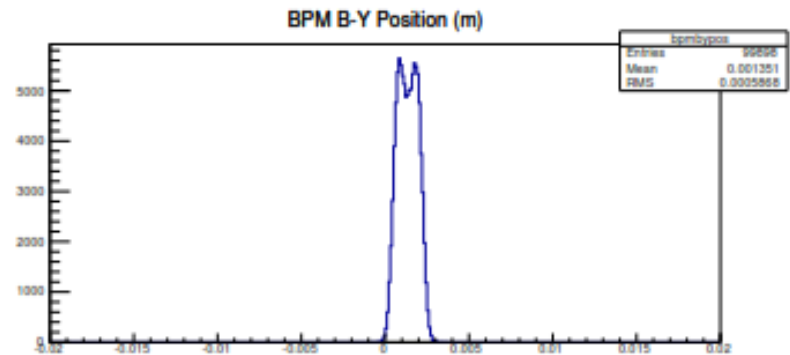
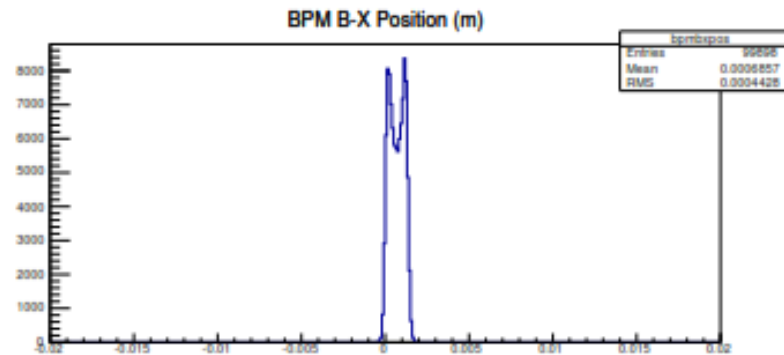
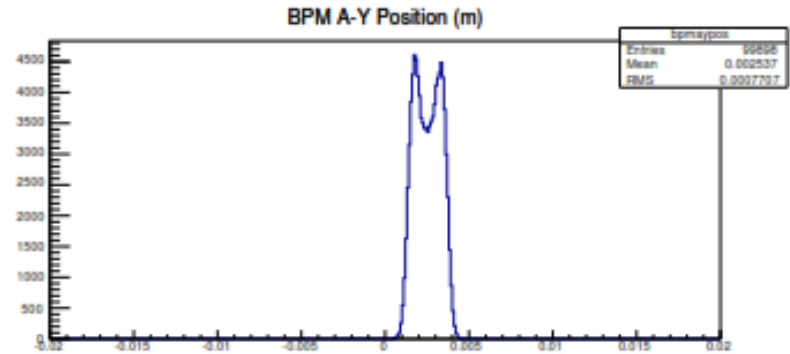
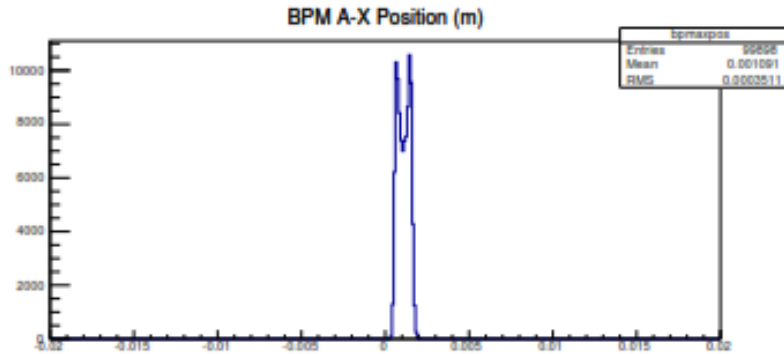
Tyler Hague

13 Dec 2016

What is the purpose of calibrating the raster?

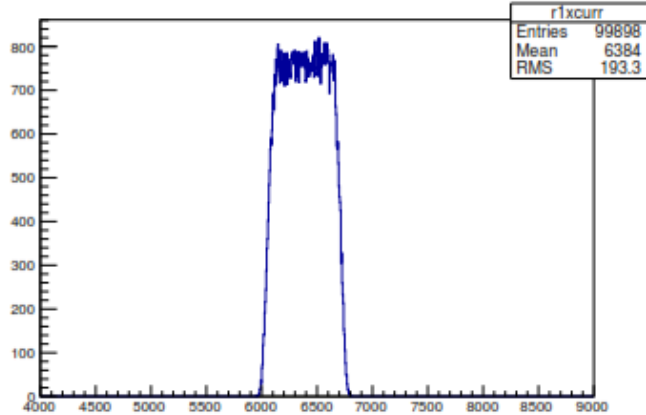
- Determine the instantaneous beam position
- What about BPMs?
 - There is a phase lag
 - Gives accurate positions, but we can't determine when the beam was at that position. The readout is slow.
- Then why use the BPMs at all?
 - The readout of the raster current coil is quick
 - Current is correlated to position, but not a direct measurement
 - We can find the transformation from raster current to actual position by mapping the currents to the positions read out by the BPMs

A look at some plots

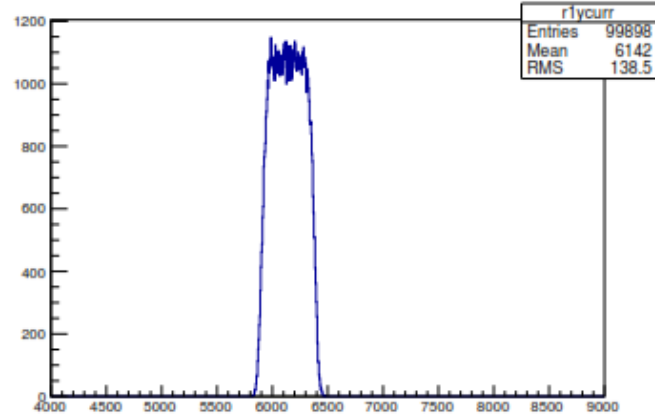


A look at some plots

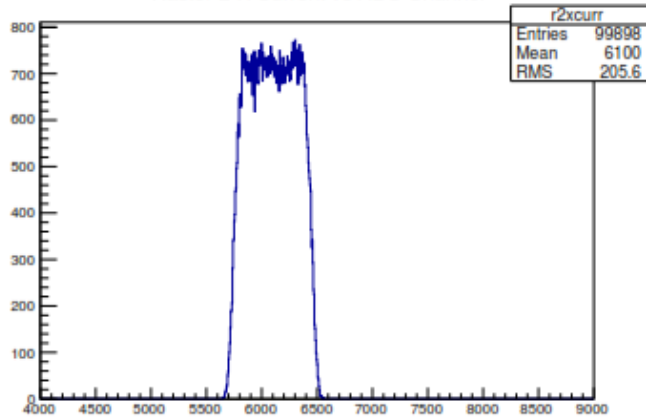
Raster 1-X Current vs ADC Channel



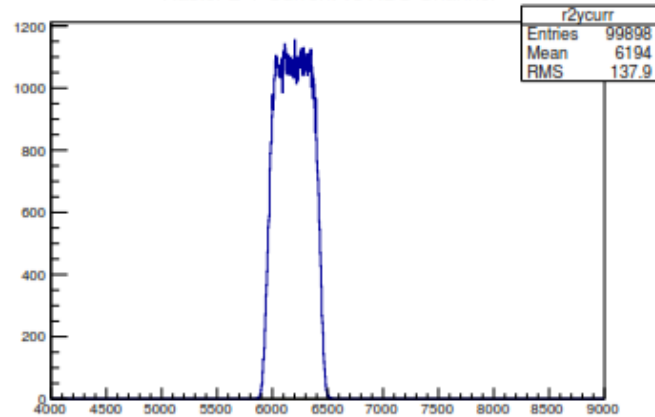
Raster 1-Y Current vs ADC Channel



Raster 2-X Current vs ADC Channel



Raster 2-Y Current vs ADC Channel



Script Output

```
*****
*
*           W E L C O M E to the           *
*         H A L L A  C++  A N A L Y Z E R   *
*
*       Release      1.5.31           Oct 20 2016 *
* Based on ROOT     5.34/13           Nov 30 2013 *
*
*           For information visit           *
*         http://halloweb.jlab.org/root/    *
*
*****

CINT/ROOT C/C++ Interpreter version 5.18.00, July 2, 2010
Type ? for help. Commands must be C++ statements.
Enclose multiple statements between { }.
analyzer [0] .x raster_calib_R.C(22775)
Raster Coefficients: (BPMA, BPMB, Target)
-0.010506 -0.0316439 1.81656e-06 5.5647e-06 0.0 0.0
-0.0139431 -0.0246712 2.29143e-06 4.23639e-06 0.0 0.0
-0.0159112 -0.0224941 2.57232e-06 3.79861e-06 0.0 0.0
Info in <TCanvas::Print>: pdf file plots/raster_plots_right.pdf has been created
Info in <TCanvas::Print>: Current canvas added to pdf file plots/raster_plots_right.pdf
Info in <TCanvas::Print>: Current canvas added to pdf file plots/raster_plots_right.pdf
Info in <TCanvas::Print>: Current canvas added to pdf file plots/raster_plots_right.pdf
analyzer [1] █
```

What does it do?

- Currently uses the same method as Gmp, difference over sum, to transform the raster readout into position measurements at the BPMs and target.
- There are ideas (not mine) to improve this method. The next step is to look into these and work on implementation.
- The transformations are printed to screen and are then manually added to the DB.