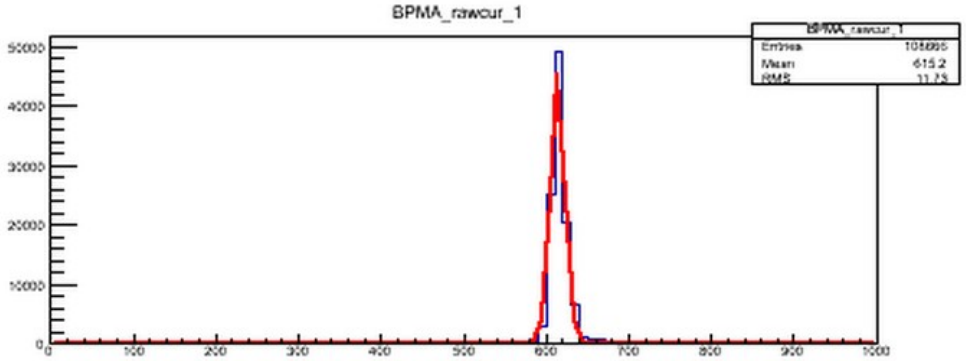
BPM Calibration

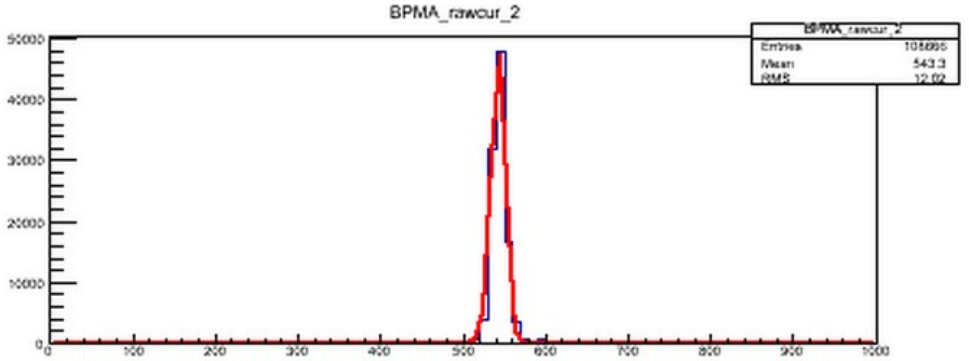
: The step by step process by E08-010 ~ N-Delta group

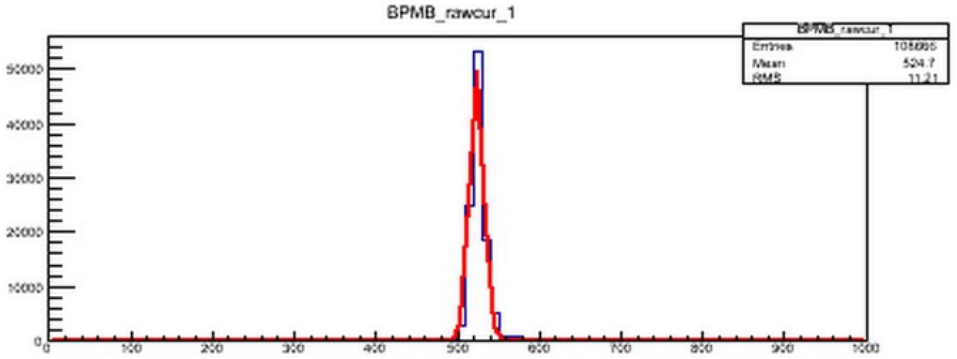
The following images are taken directly from the E08_010 website.

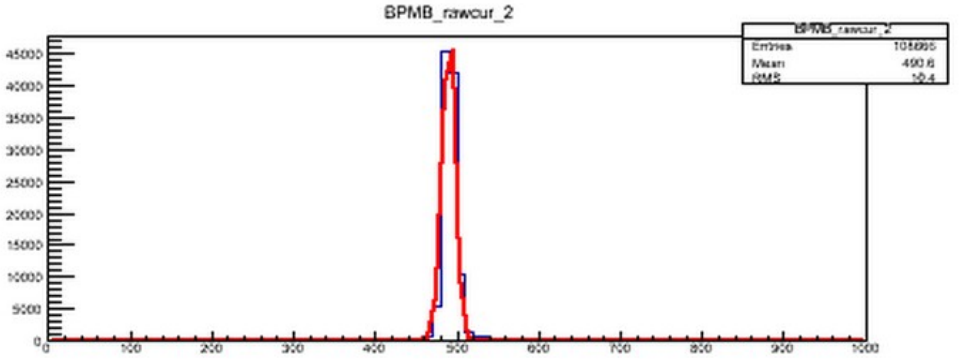
BPM calibration

First step: Same as usual find the pedestal.
Using exp E02_013/E08_010 run 1184

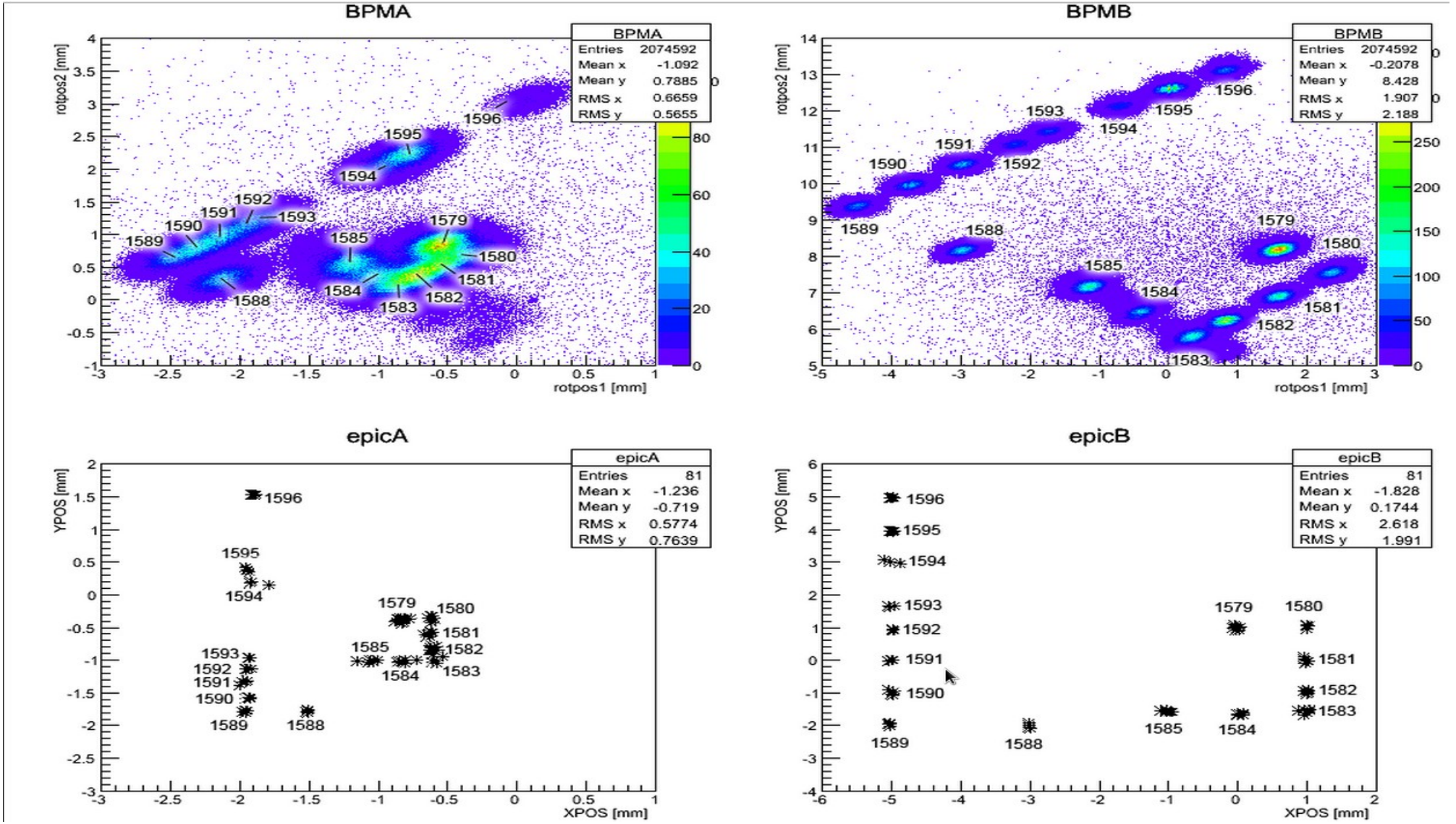








Second: Plot BPM and EPICs variables and look for problems?



The third step is to go through and obtain the mean values for the different variables from each of the runs. Luckily, there is a handy piece of code that does this for us.

run	BPM Ax	BPM Ay	BPM Bx	BPM By	EPICs Ax	EPICs Ay	EPICs Bx	EPICs By
1579	-0.561586	0.850785	1.596633	8.194353	-0.827109	-0.388912	-0.003434	1.002758
1580	-0.397594	0.698628	2.366723	7.557691	-0.610690	-0.370730	1.001853	1.013879
1581	-0.555399	0.546521	1.601628	6.903813	-0.623646	-0.590907	0.994877	0.000803
1582	-0.718051	0.392983	0.830907	6.229023	-0.606302	-0.803576	1.003993	-0.996245
1583	-0.862797	0.264154	0.359163	5.804437	-0.611667	-0.970429	0.987928	-1.586360
1584	-1.030695	0.393319	-0.392843	6.477560	-0.842902	-1.010848	0.011837	-1.618592

These means are then processed into a matrix, which is then inverted and used to produce a set of beam position transformation coefficients used to transform the coordinates from the BPM frame to the lab frame.

C(0,0)	C(0,1)	C(1,0)	C(1,1)	Offset(0)	Offset(1)
0.662394	-0.679424	0.662499	0.676307	0.126509	-0.589413
0.629603	-0.860538	0.684910	0.859816	5.897721	-6.984258

$$\begin{pmatrix} x \\ y \end{pmatrix}_{Lab} = \begin{pmatrix} C(0,0) & C(0,1) \\ C(1,0) & C(1,1) \end{pmatrix} \times \begin{pmatrix} x \\ y \end{pmatrix}_{BPM} + \begin{pmatrix} Offset(0) \\ Offset(1) \end{pmatrix}$$

It's necessary to check these coefficients against the EPICs variables.