PREx Parity Analysis

Zafar Ahmed

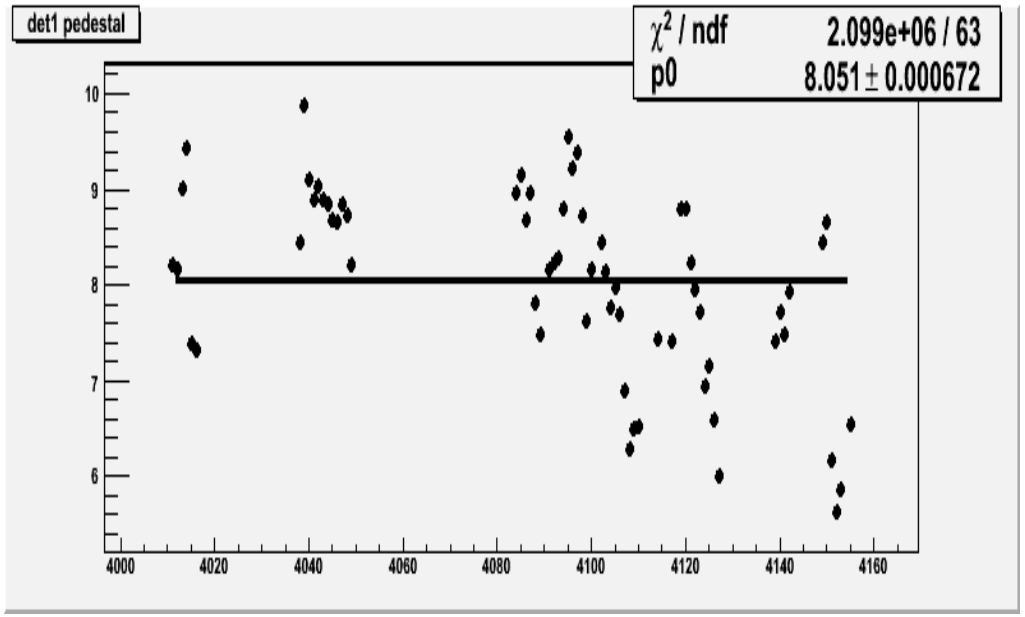
Analysis Results

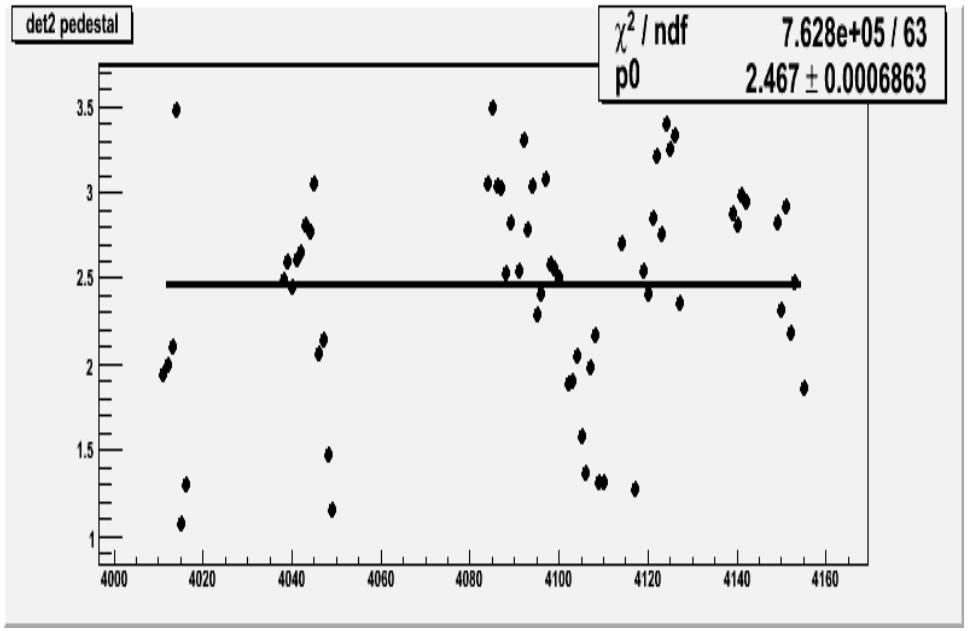
- **Detector pedestals and helicity correlated pedestal difference of detectors.**
- **Lead asymmetry.**
- **Change in RMS of detectors asymmetry after regression.**
- **Helicity correlated charge asymmetry and position differences.**
- **Double differences of detector asymmetry, charge asymmetry and position differences.**
- **List of cuts.**

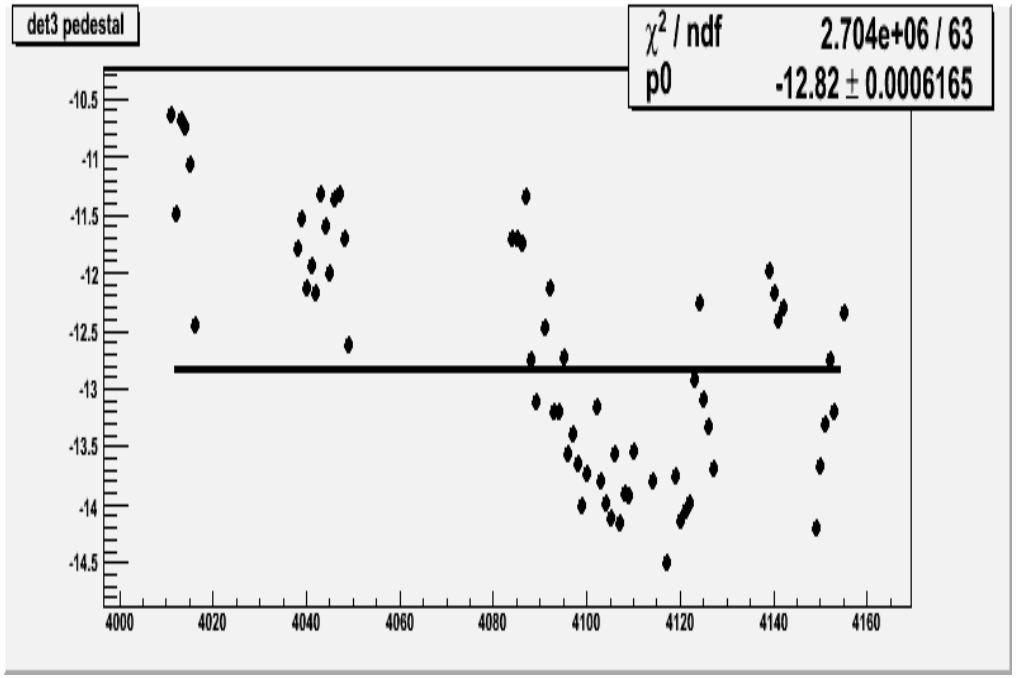
A quick time line of PREx

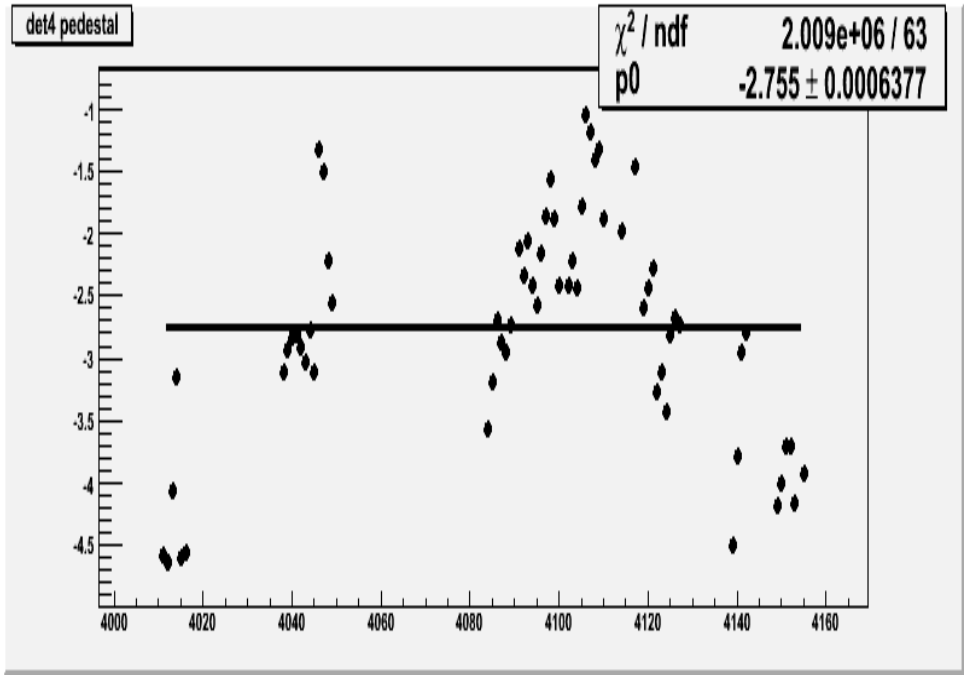
- PREx ran from March 19 to June 20, 2010.
- First 30 % of the data has large systematics and requires substantial corrections.
- Slug 16 to slug 40 is good Lead production data.
- Slug 27 is pedestal slug and slug 21 has large charge asymmetry.
- We got 20% of the required statistics.
- Pedestal are same as used by WAC. Each time we changed the beam condition(change of gain or integration time or current) we calibrated our pedestals.

Detectors Pedestals Slug 27

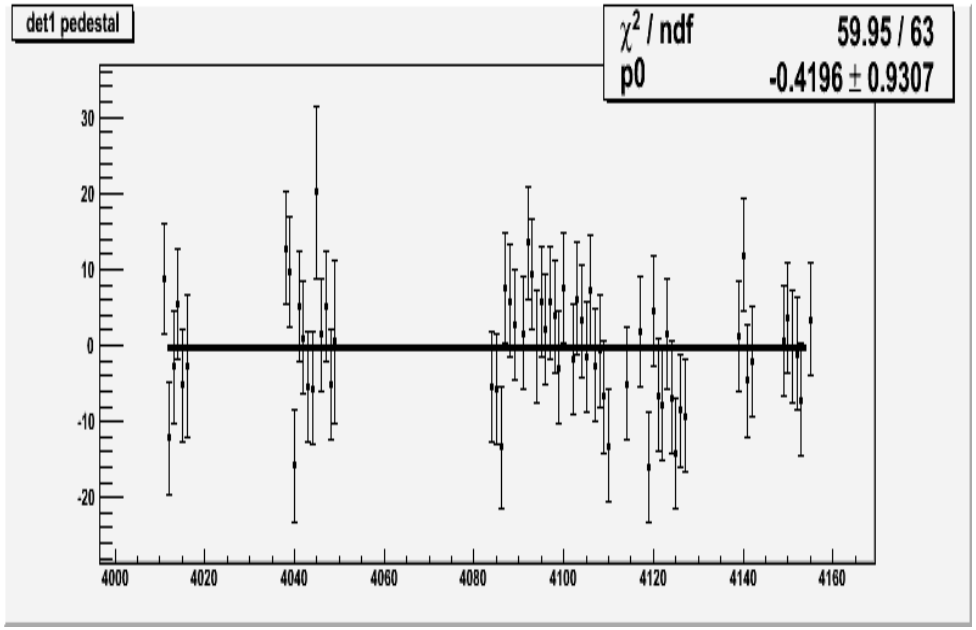


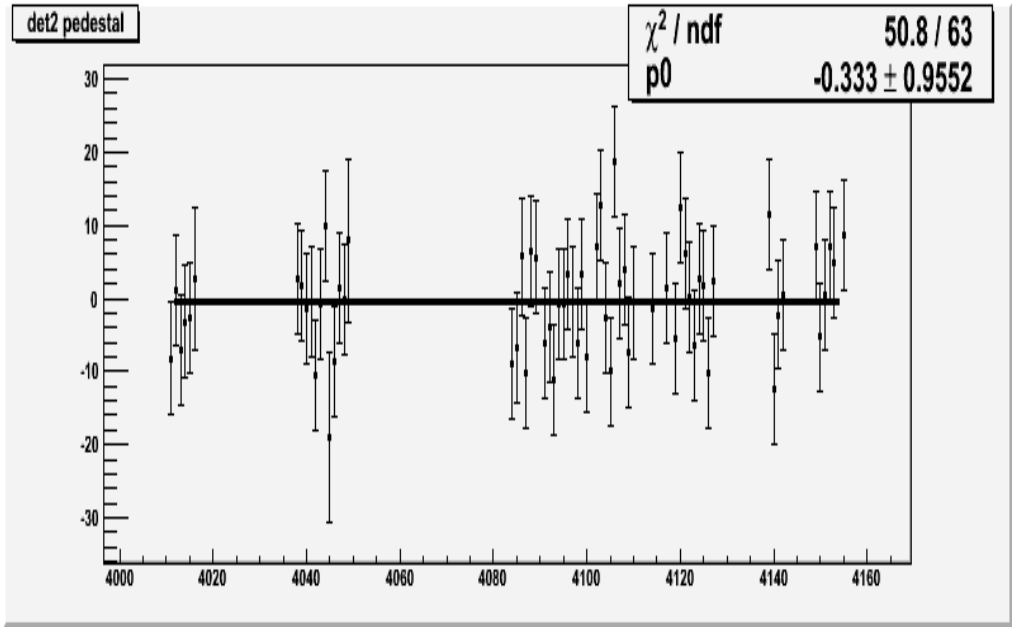


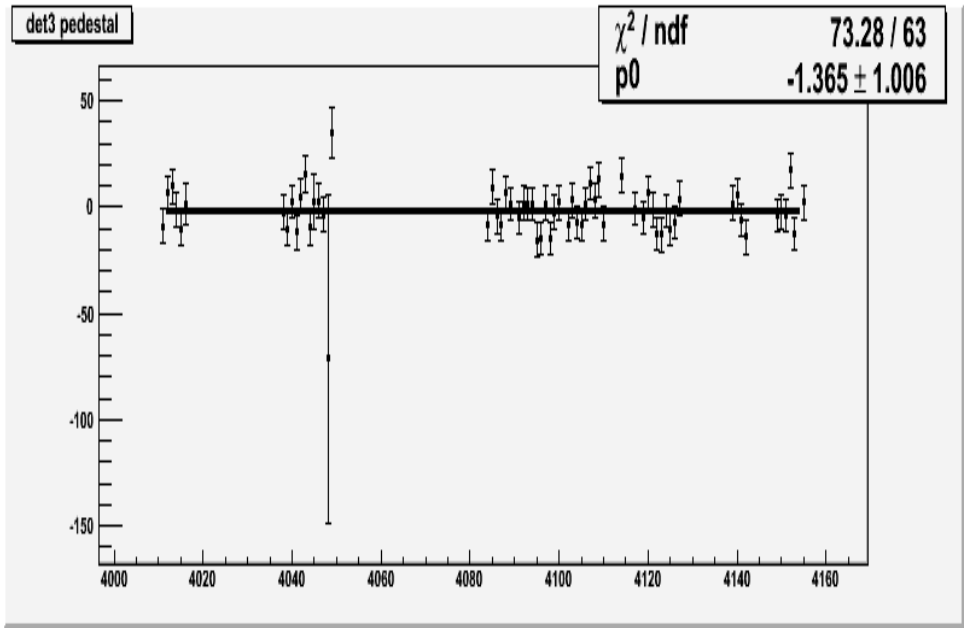


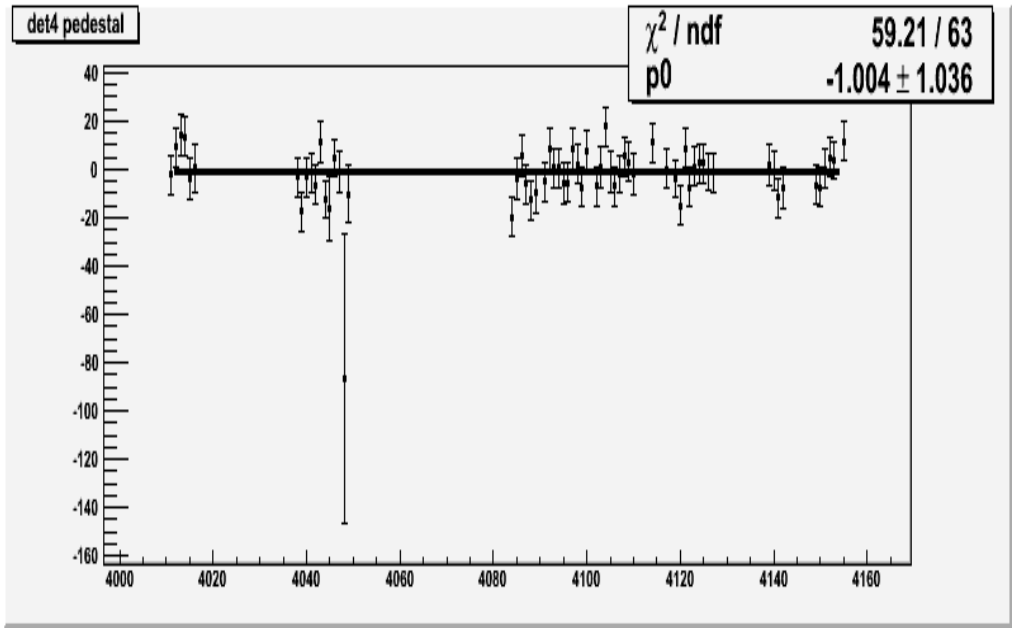


Helicity correlated pedestal difference of detectors unblinded

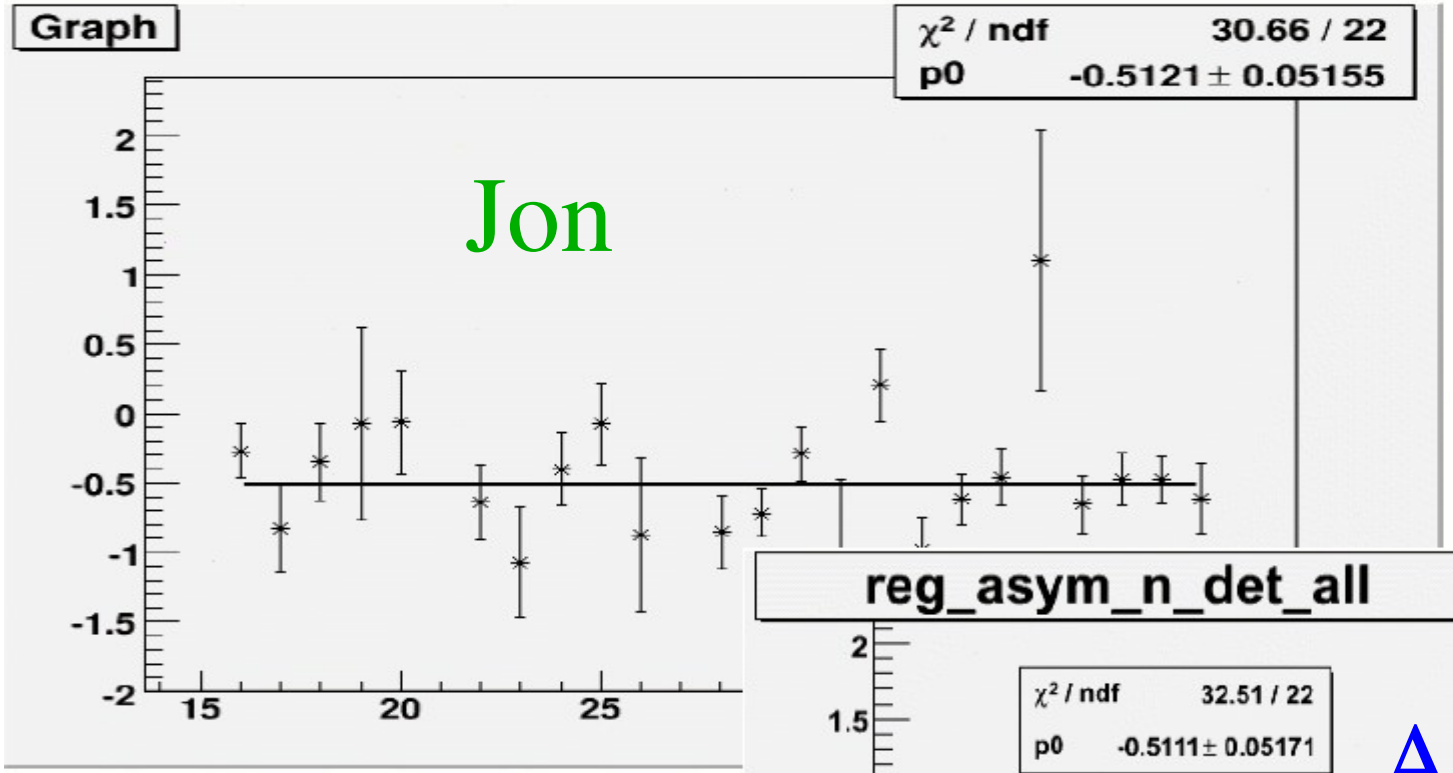


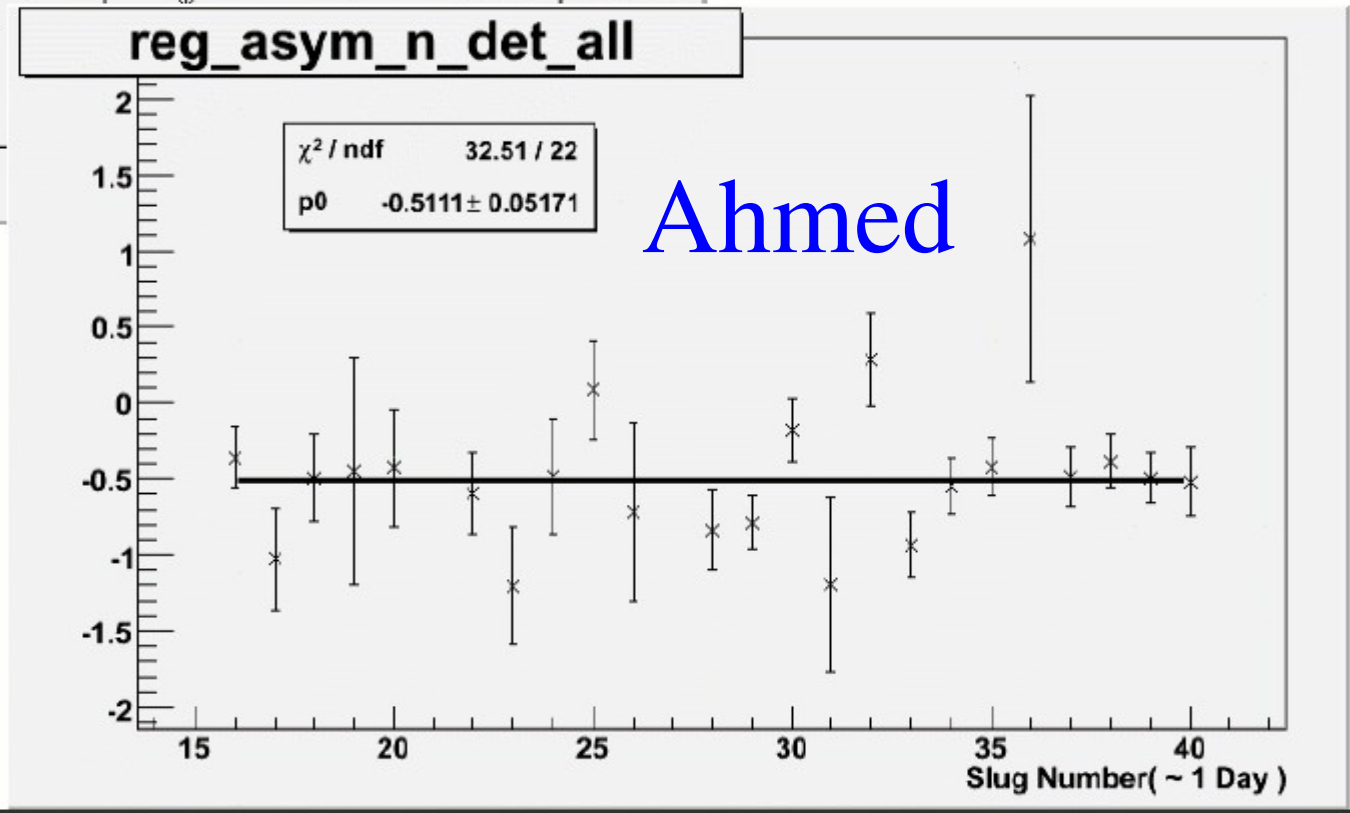




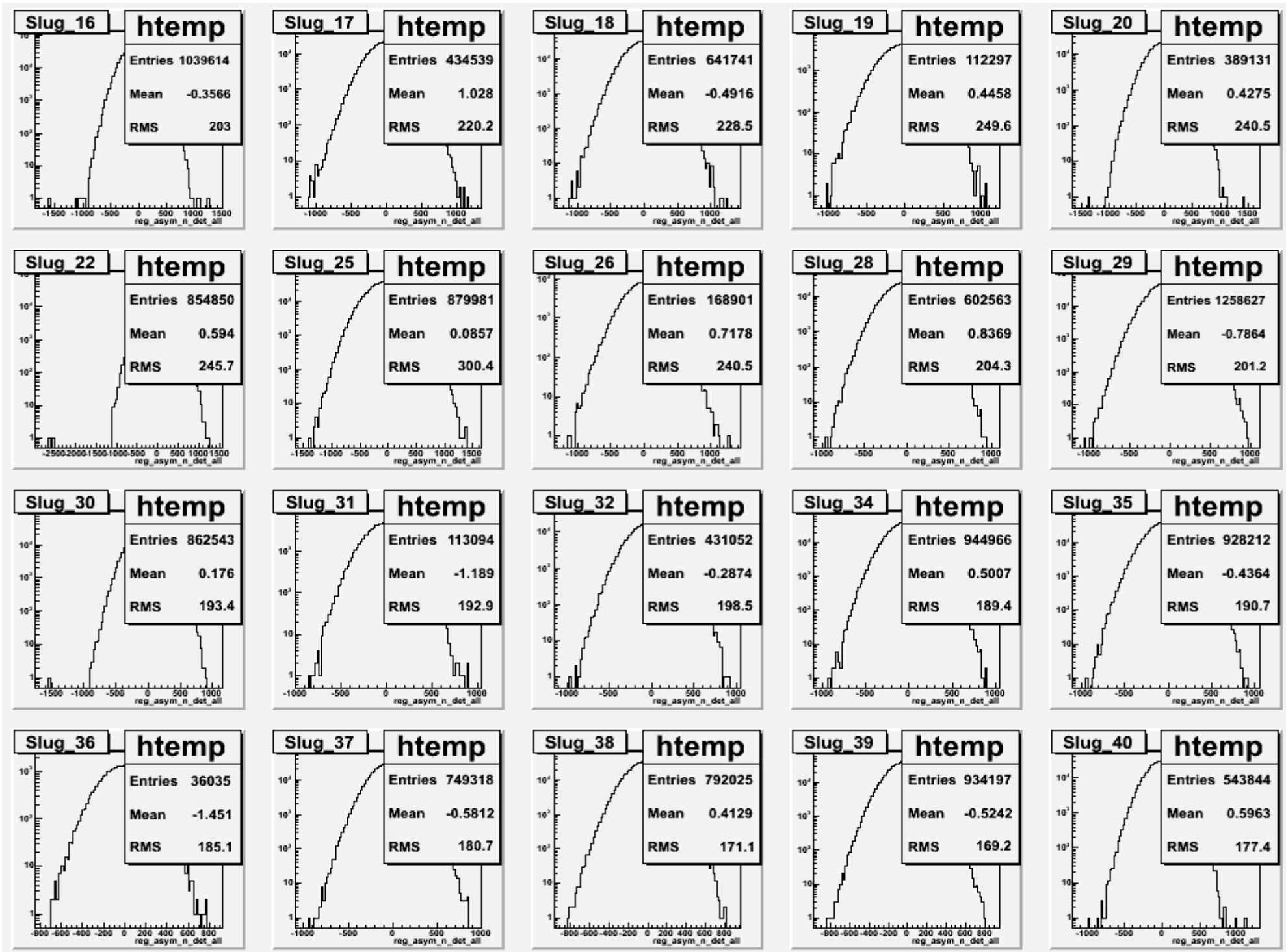


Blinded Asymmetry (Top Wexler, Bottom Ahmed)

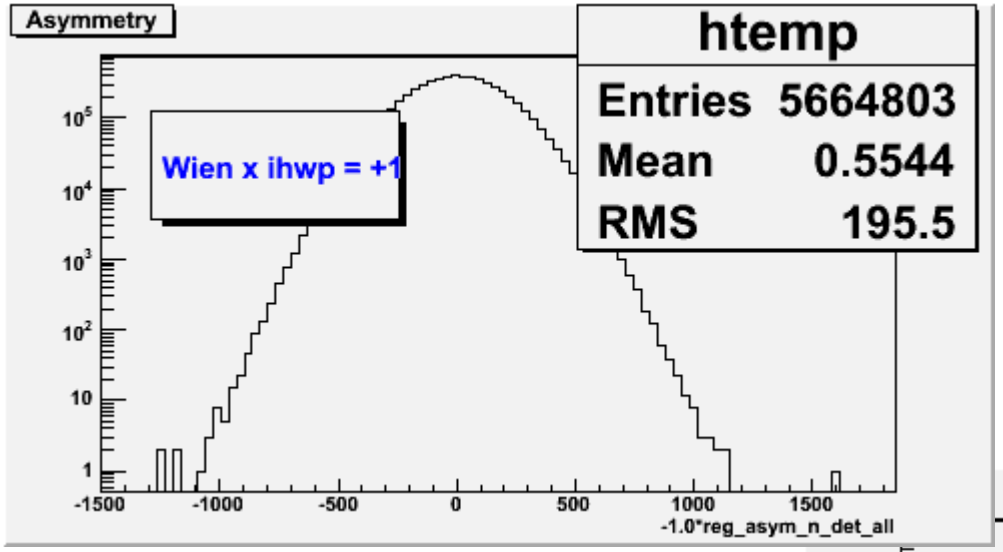


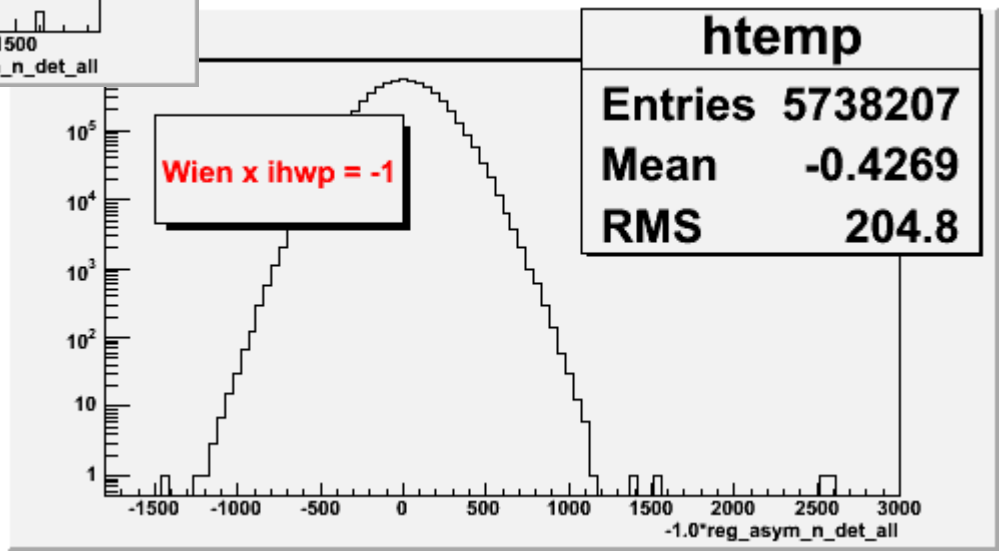


Current Normalized Regressed Asymmetry

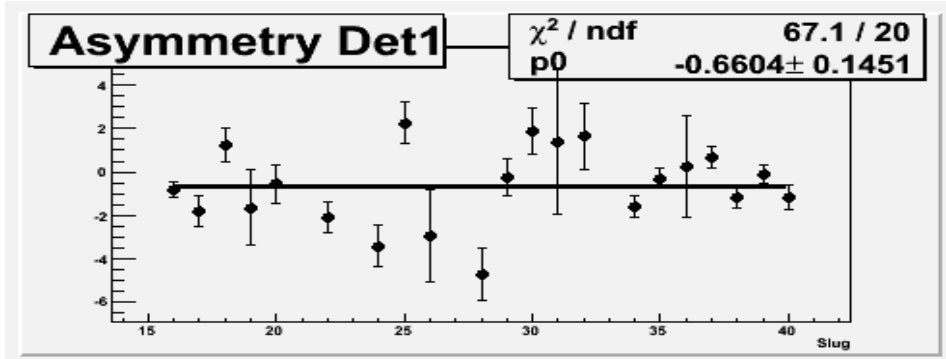


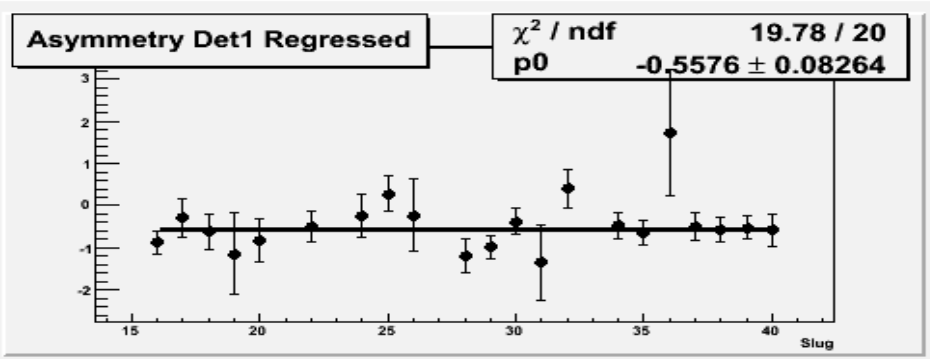
Raw asymmetry for wien × ihwp = ±1

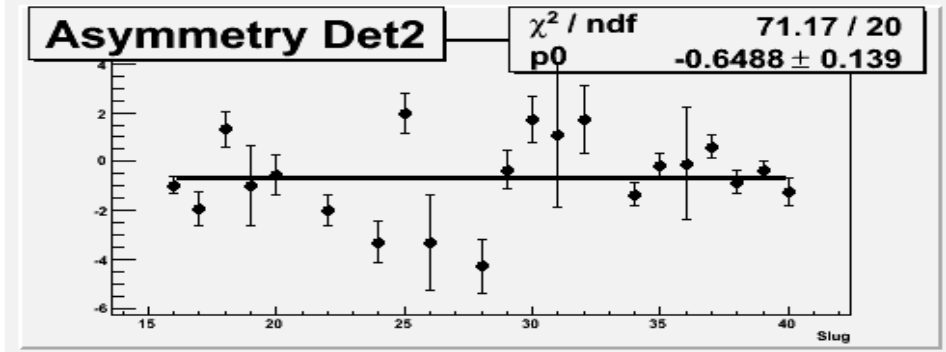


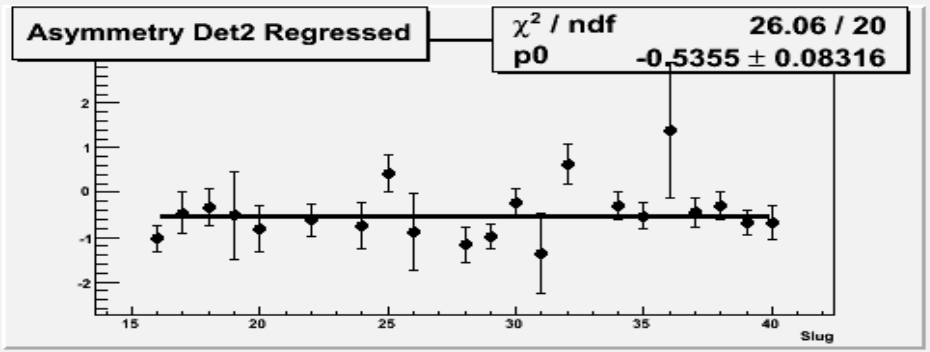


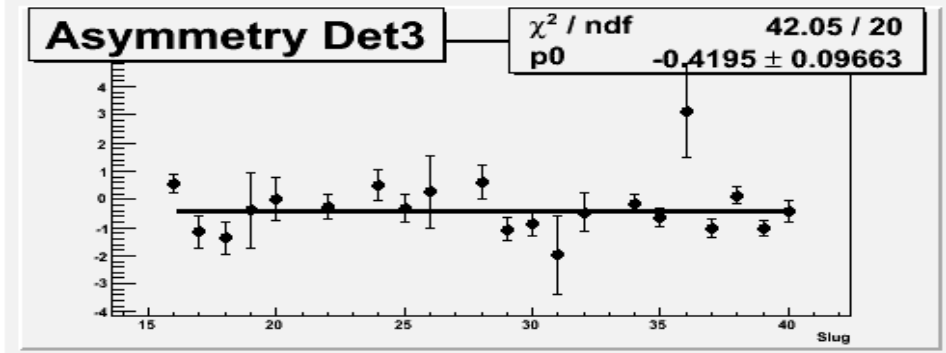
Detectors Asymmetries with and without regression

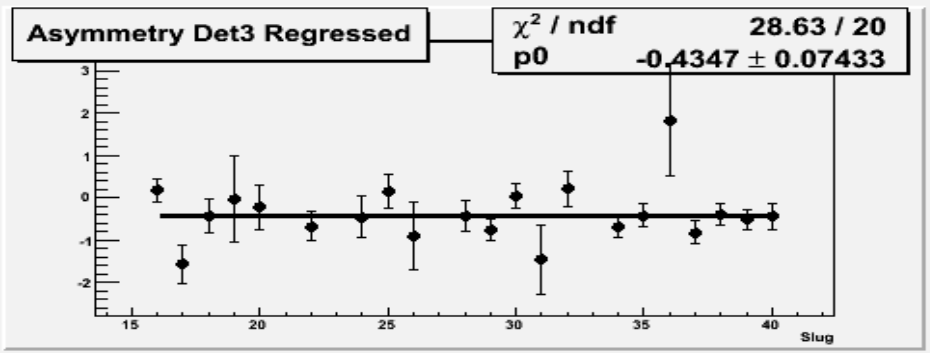


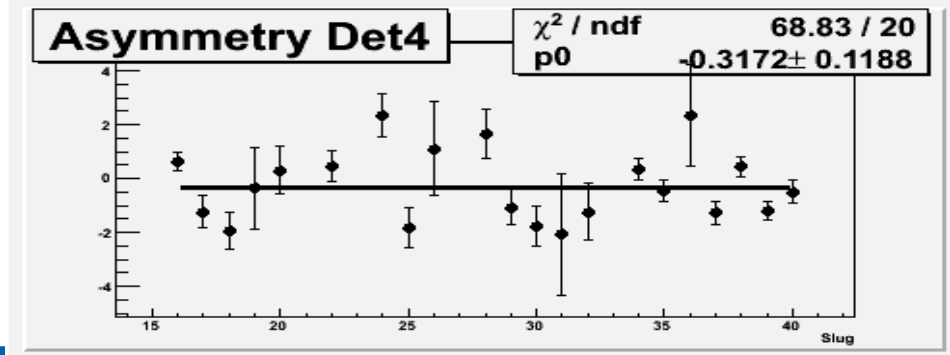


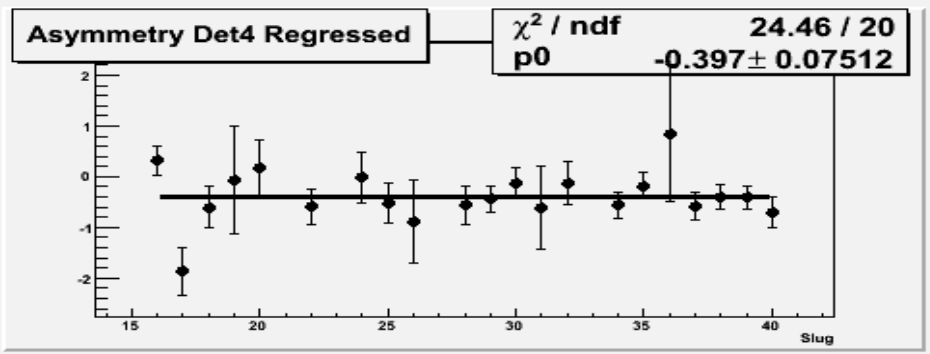




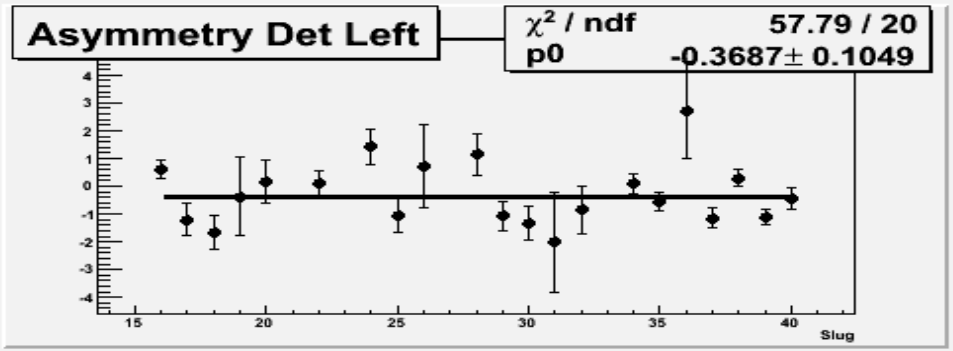


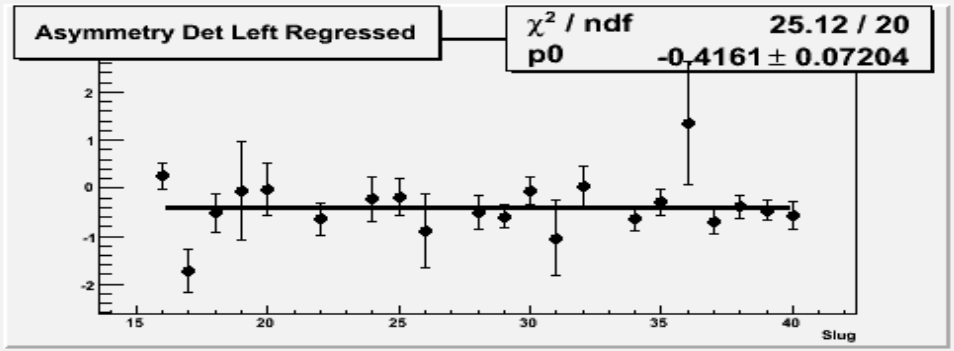


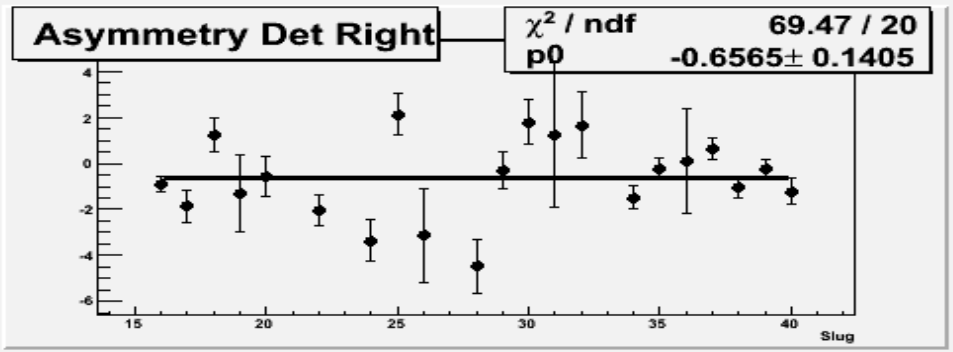


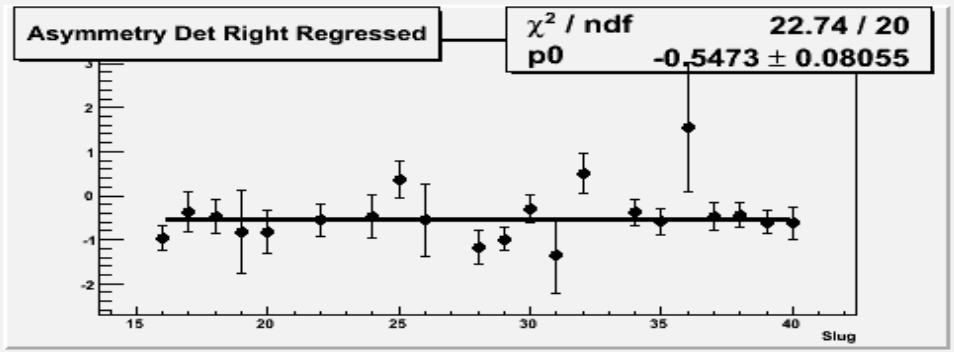


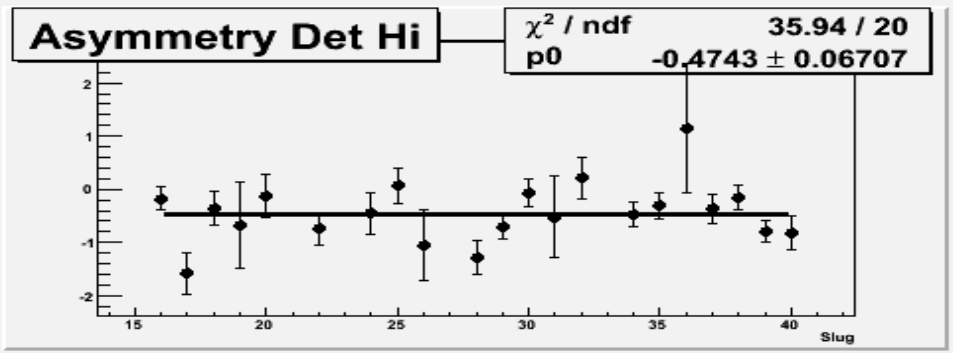
Detectors Asymmetries with and without regression

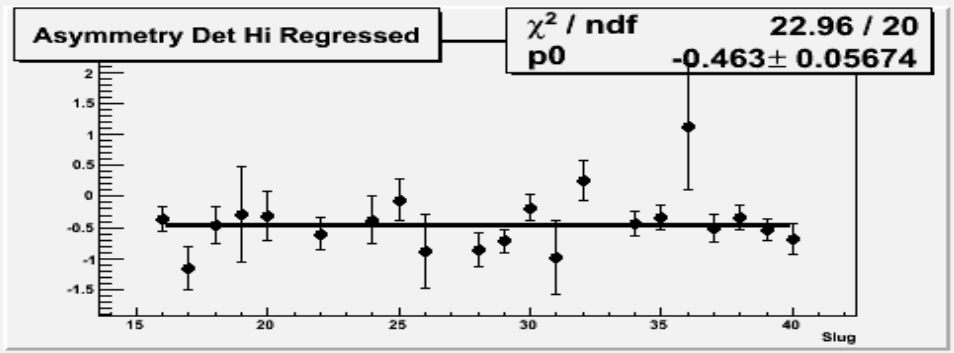


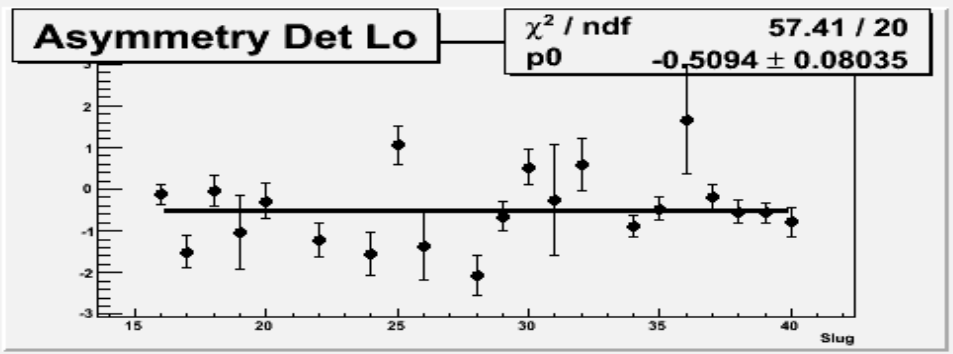


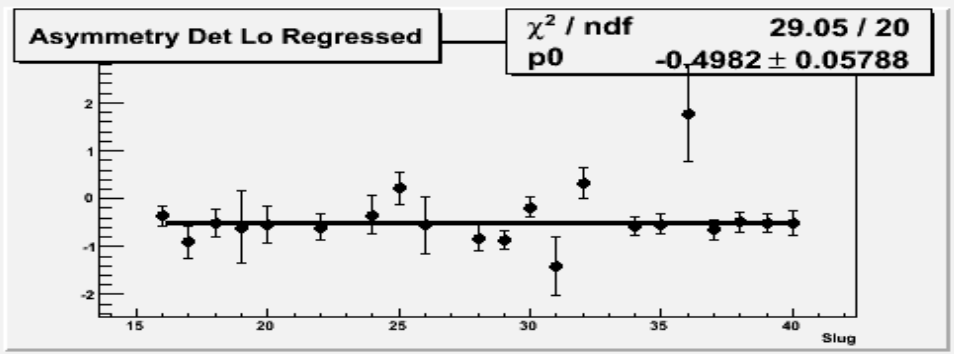






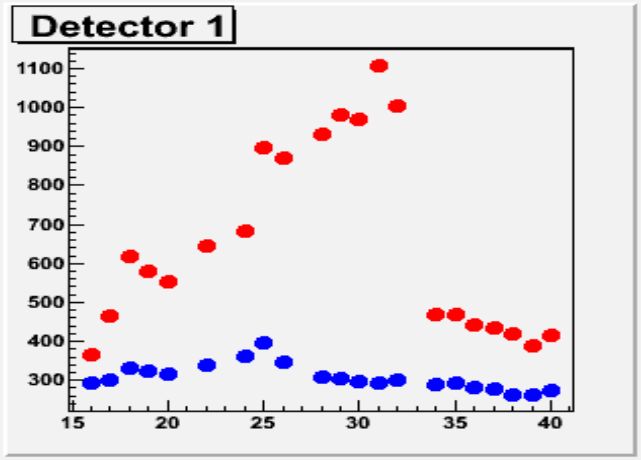


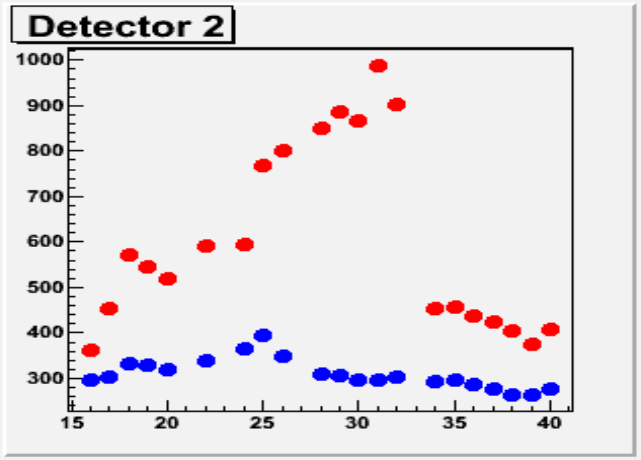


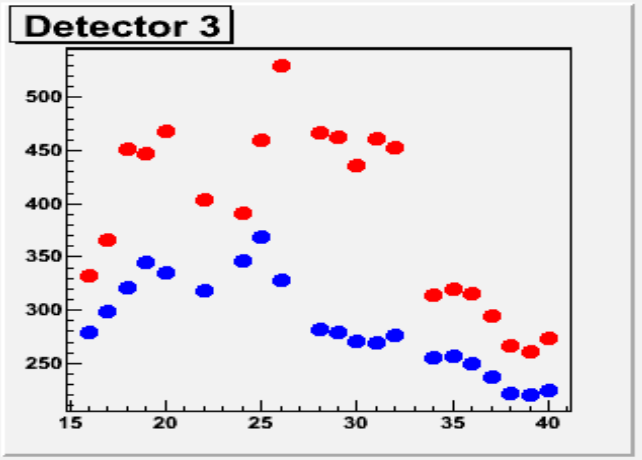


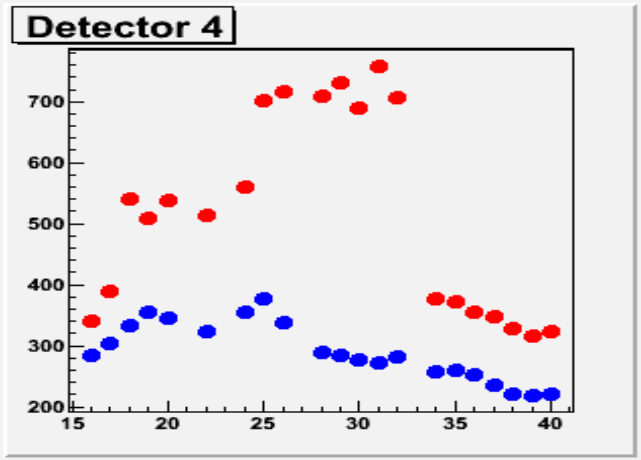
RMS of detectors asym. Without regression is in Red

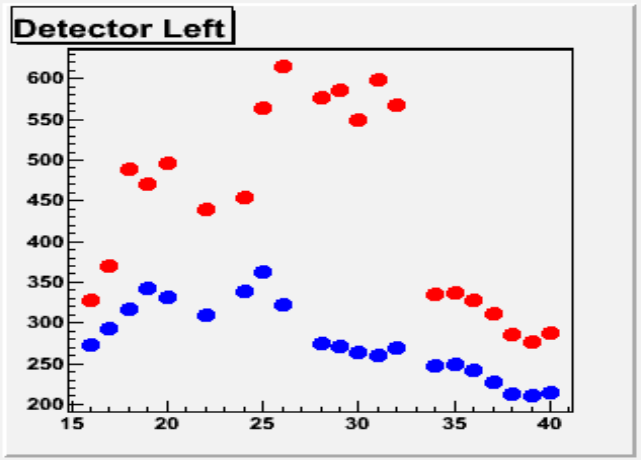
RMS of detectors asym. With regression is in Blue

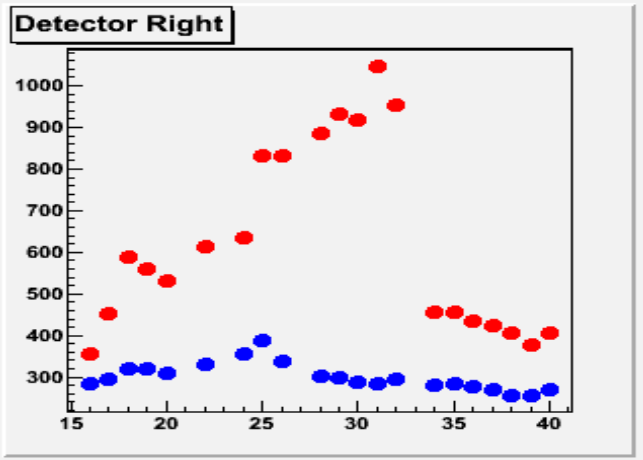


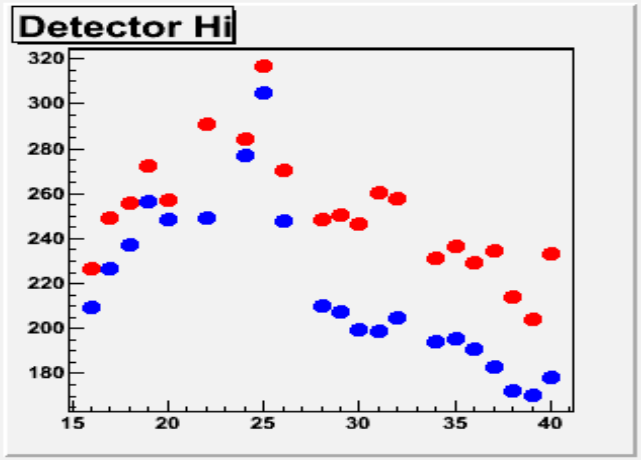


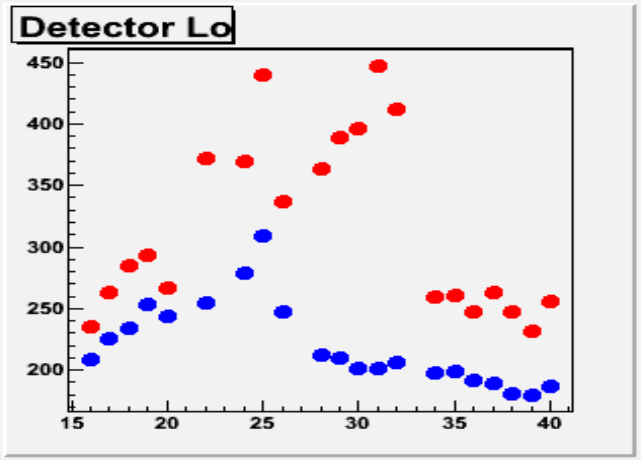


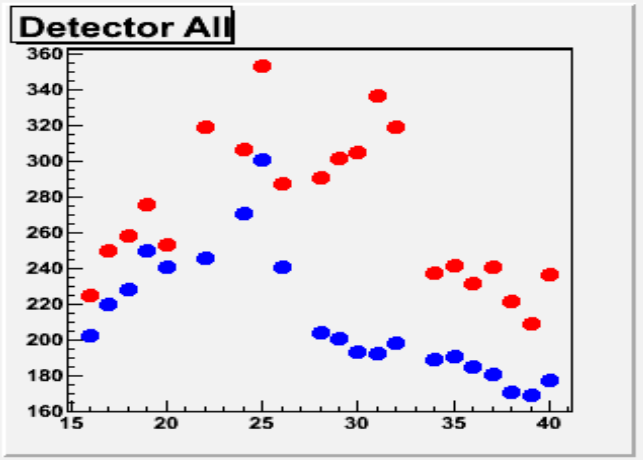




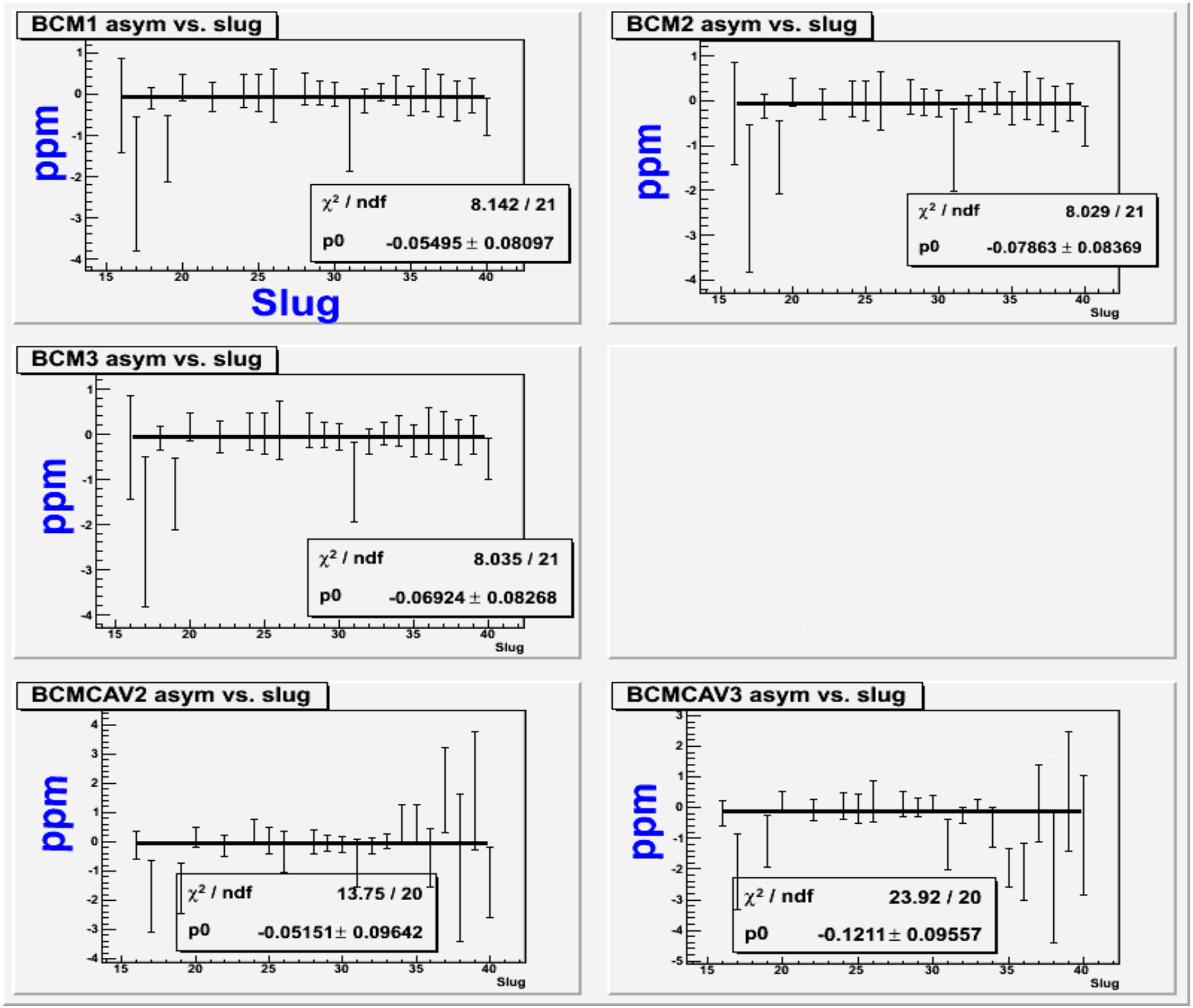




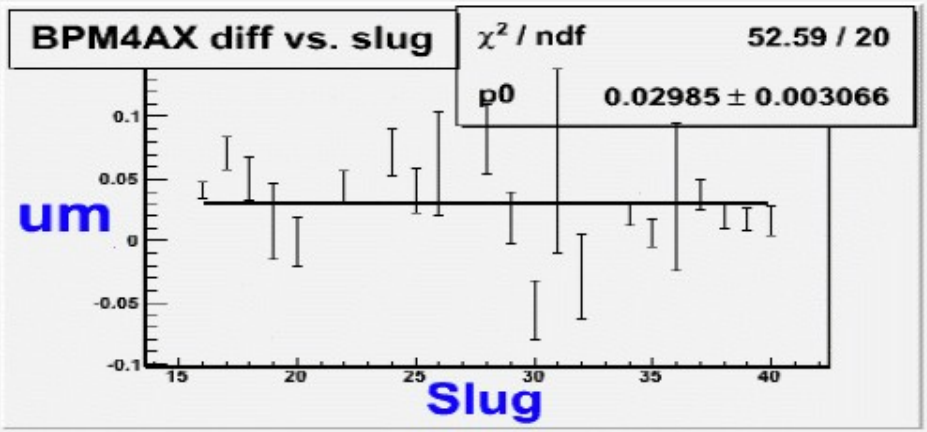


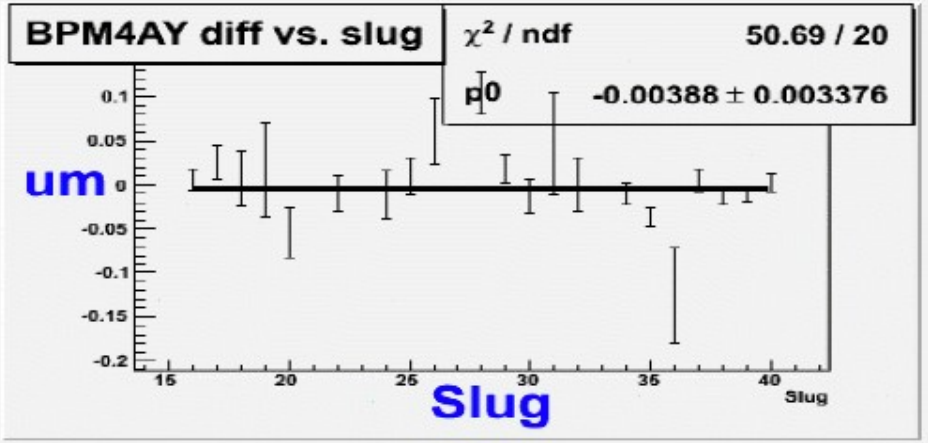


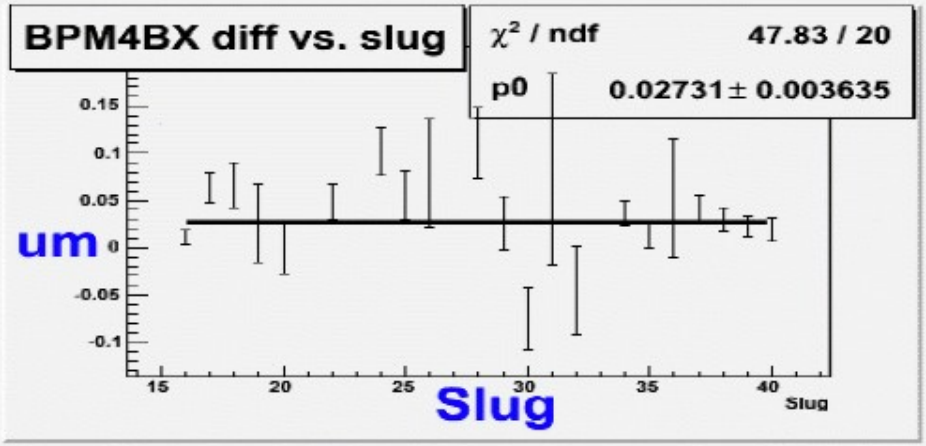
Helicity correlated charge asymmetry vs. Slug no.

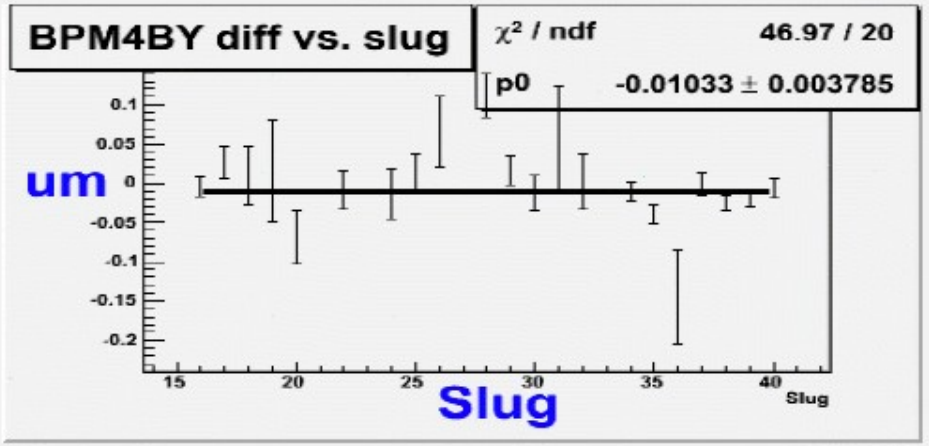


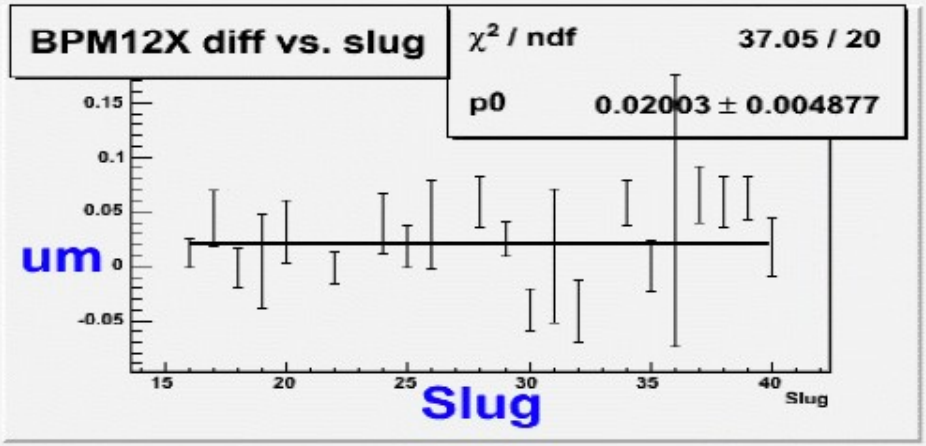
Helicity correlated position diff vs. slug no.

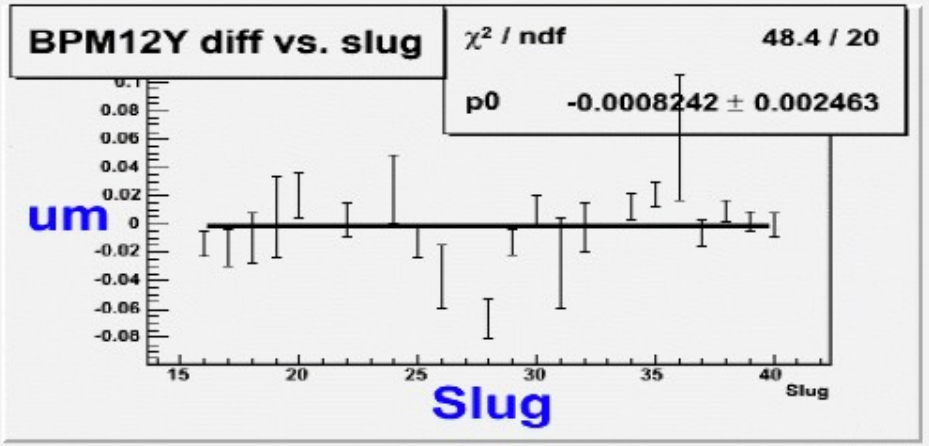




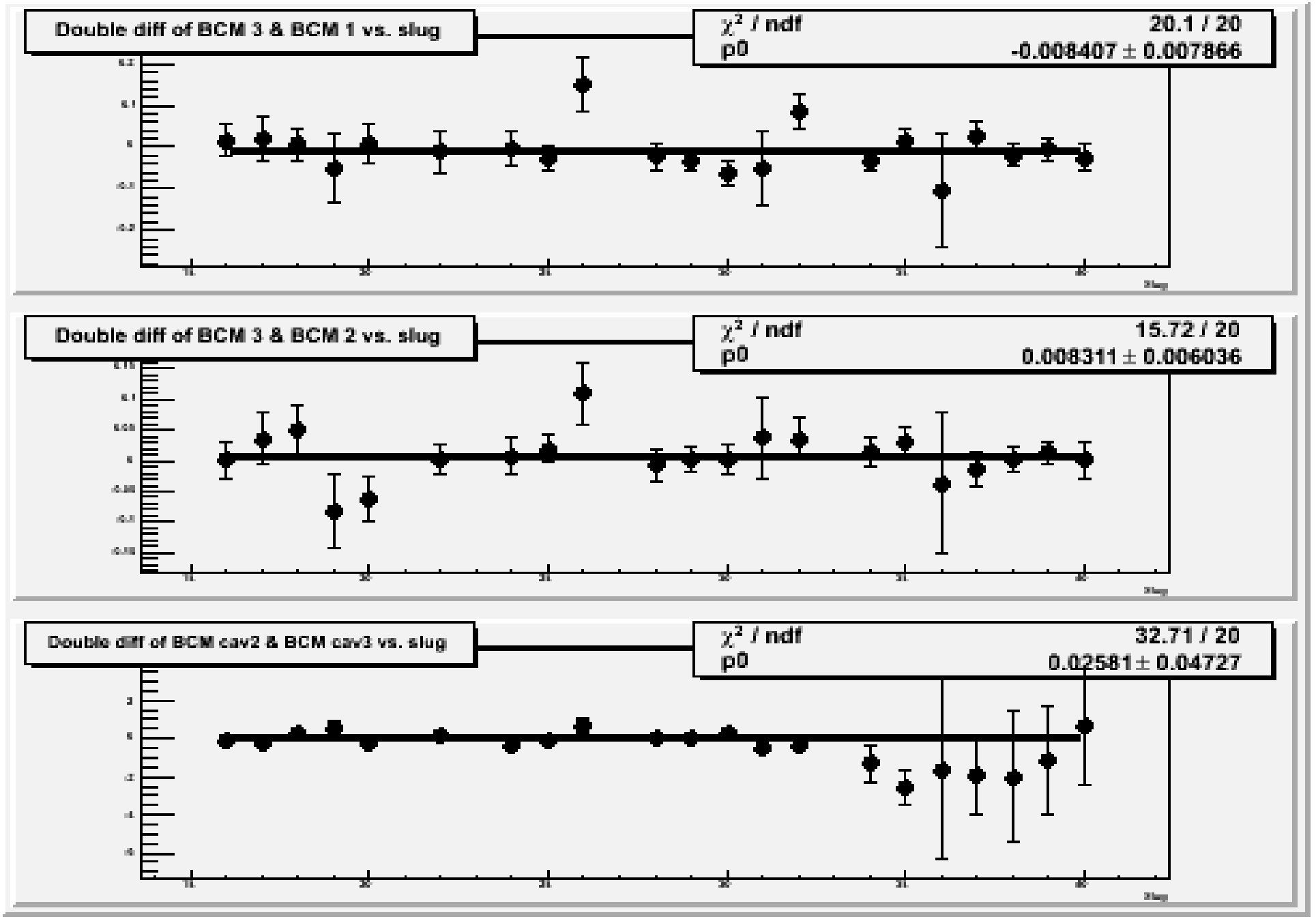




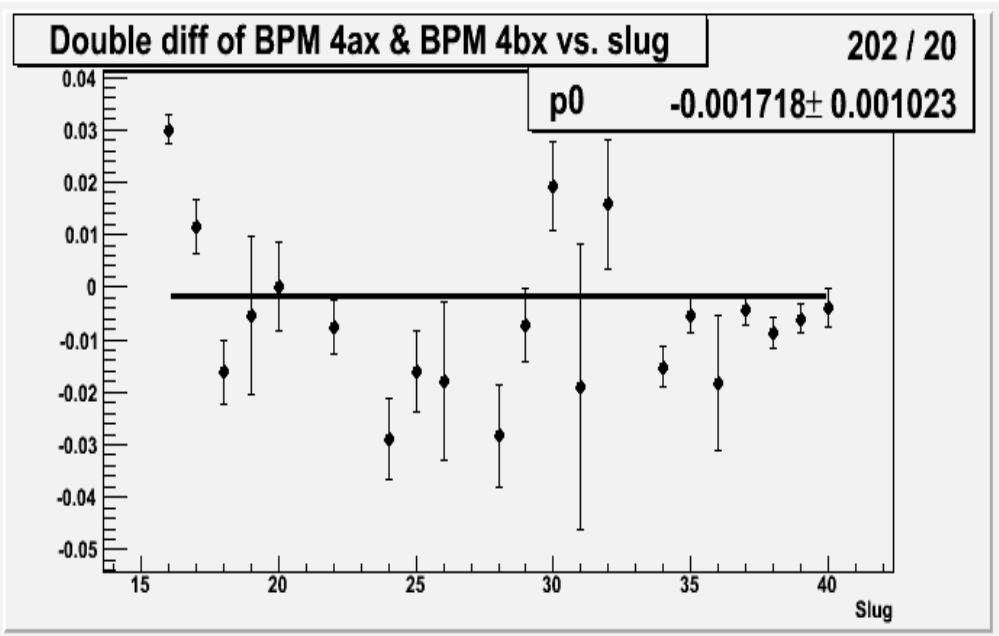


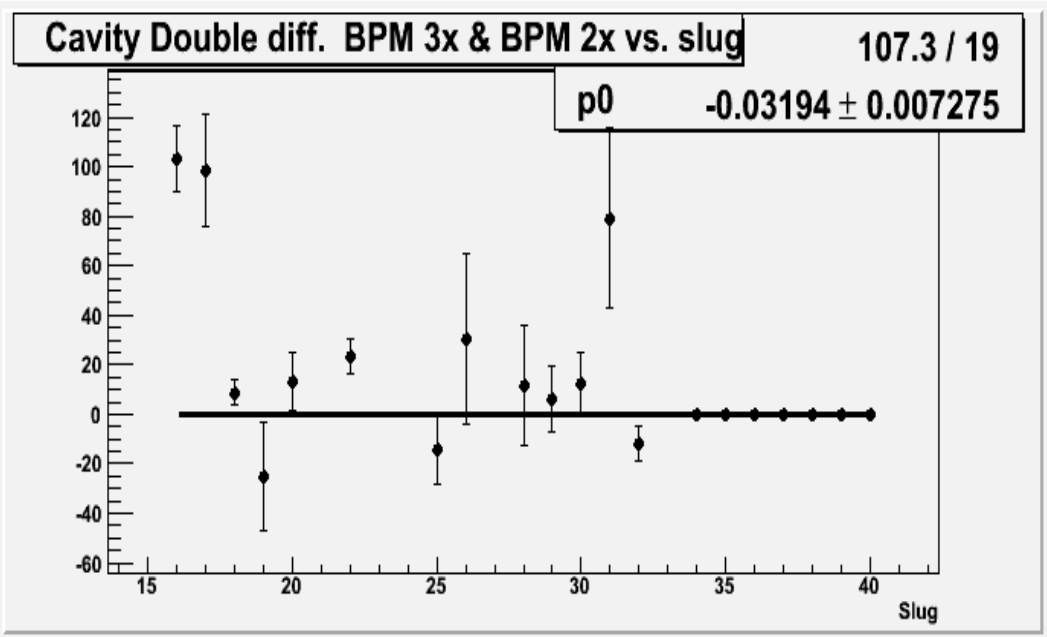


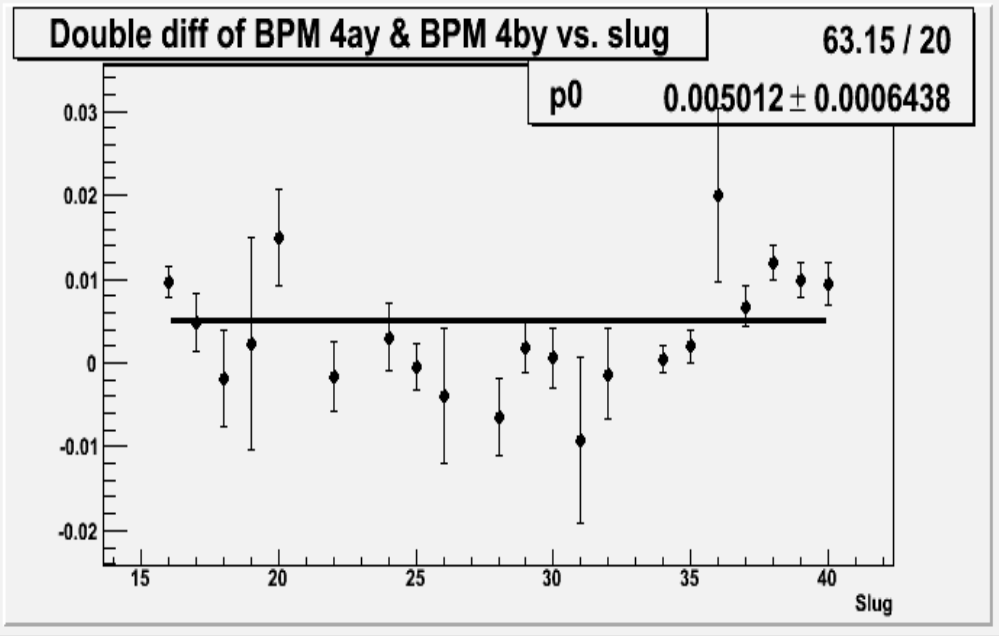
Charge asymmetry double differences

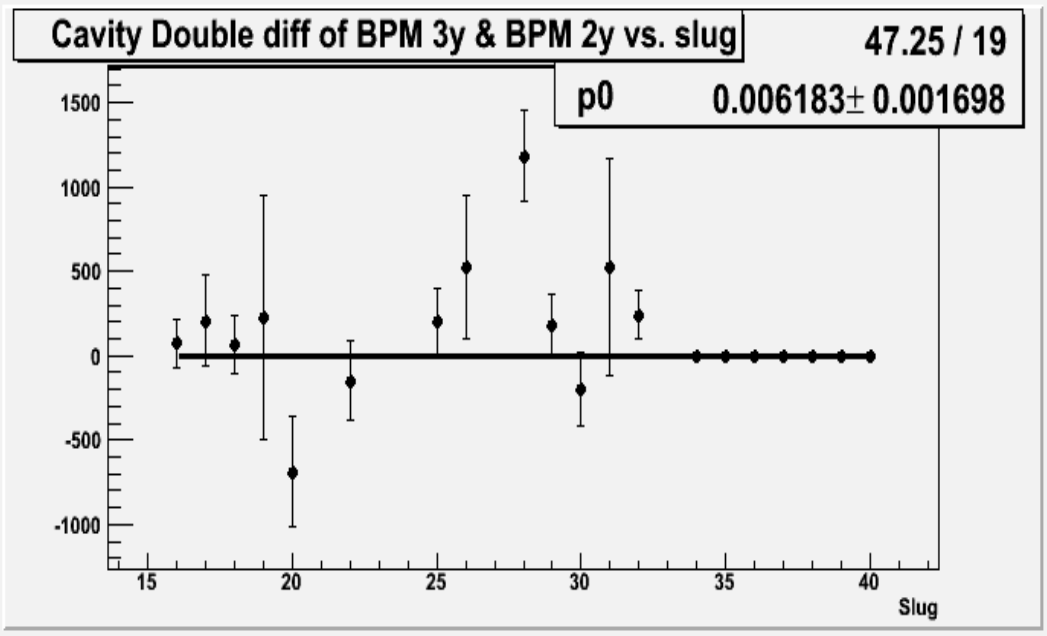


Position Double Differences



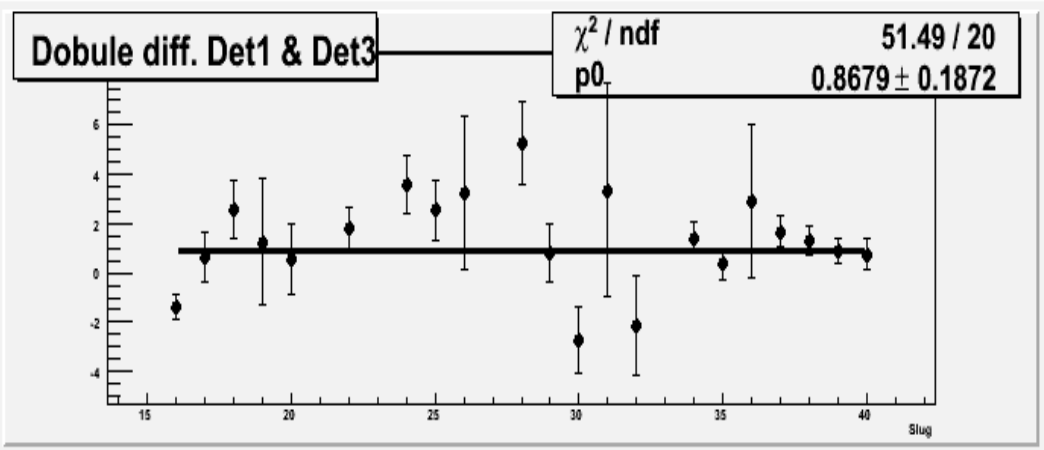


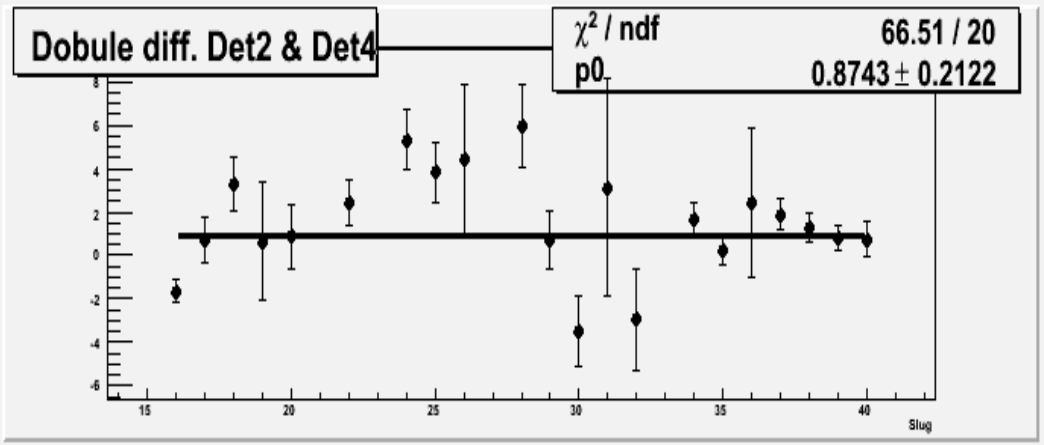


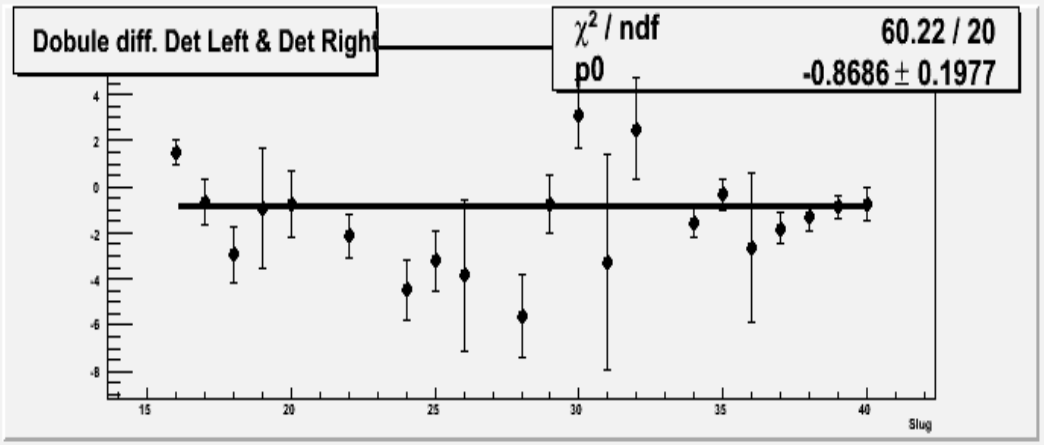


Detector double differences

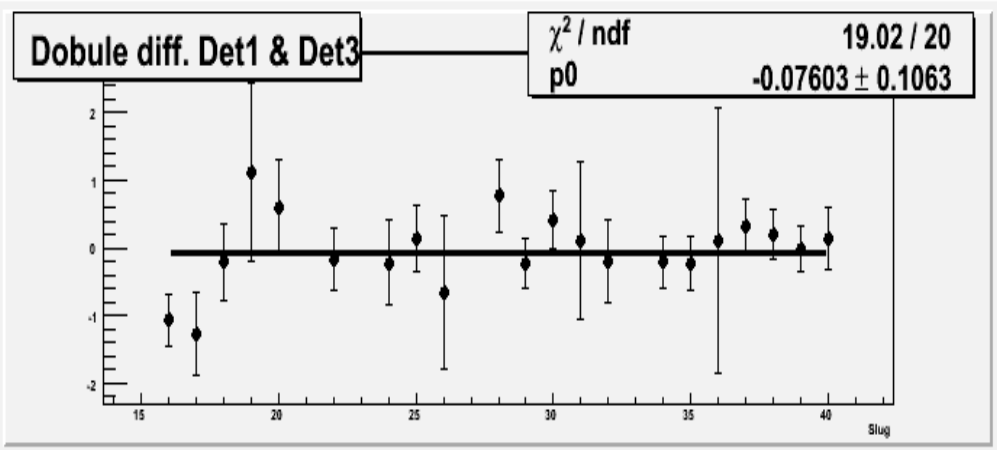
Without Regression

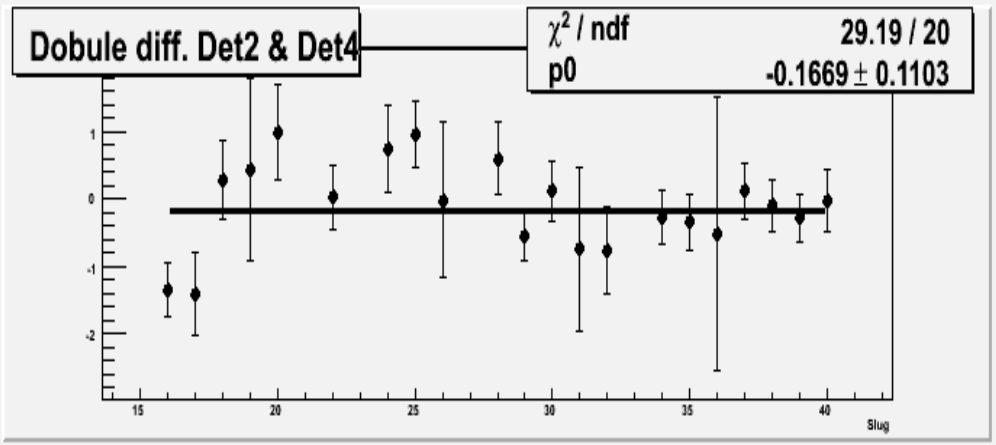


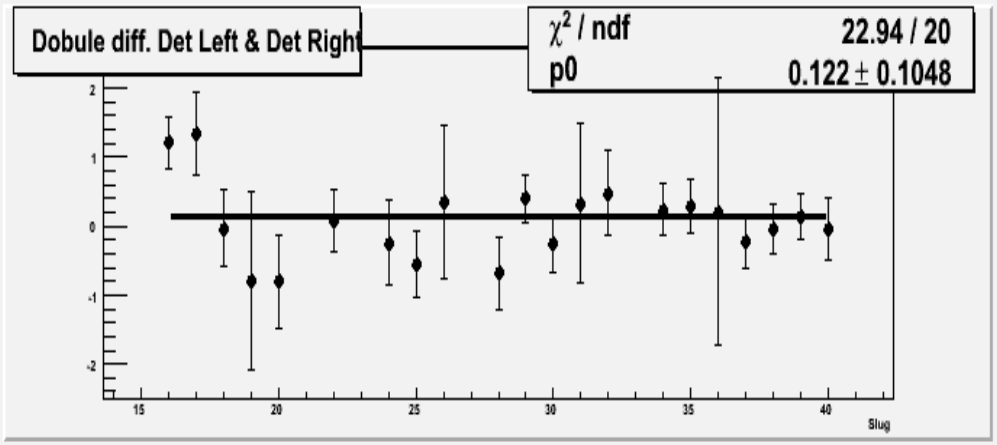




Regression Corrected







Cut List

There are 545 runs for lead production. There are 340 runs for good lead production, without Pockel's cell systematics. All the good lead runs are analyzed with these cuts.

We changed the threshold of low beam cut during PREx for running at different beam current. There are some runs with in a slug with different value of threshold.

Threshold	Slug
170,000	16, 17, 28.
40,000	18
120,000	19, 20, 22, 23, 24, 25, 26. 38, 39, 40.
100,000	21, 37.
150,000	29, 30, 31, 32, 33, 34, 35, 36.

Name of the cut	Threshold	Cutting the events before	Cutting the events after
Beam Burp	6000	40	160
Event seq		25	25
Pair seq		25	25
Startup		0	0
Mon Saturate	500000	30	30
Adcx DAC Burp	1000	10	10
Scaler Bad		1	1
Pos Bburp Enerygy	0.2	10	10
Low_beam		40	10000

Conclusion

- Helicity correlated pedestal differences are small.
- Charge asymmetry and position differences are small.
- Preliminary analysis results are close to expectation.
- Plan to unblind in spring 2011