

Beam Off Asymmetry Analysis - Progress 1

M. McCrea
University of Manitoba

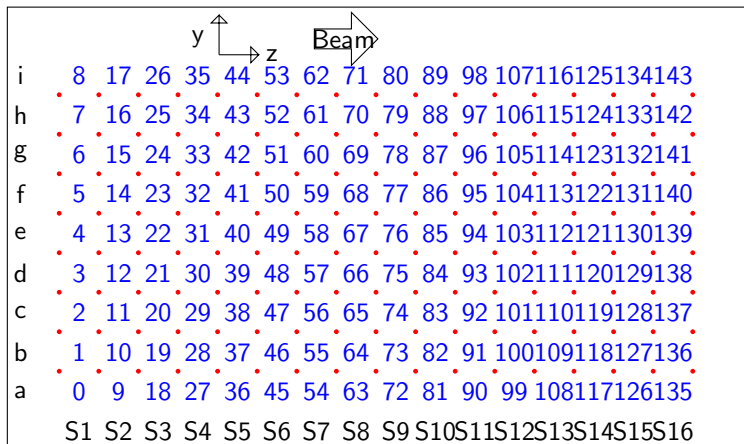
June 30 , 2017

Run List

Method

Initial Results

Wire Numbering

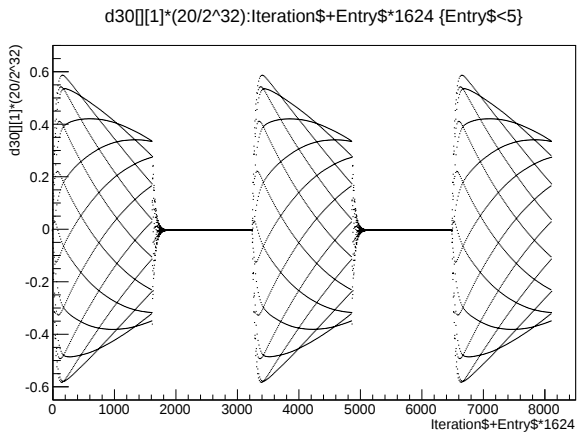


- **HV** 17 HV Frames with 8 wires each
- **Signal** 16 signal Frames with 9 wires each

List of Runs

- ▶ A list of good beam off runs has been provided by Kabir
- ▶ Initial analysis will focus on the run range 38100-38800 as that is the runs used in Kabirs initial analysis

Spin Flipper Series



Spin Flipper On/Off

A simple pulse sum is taken for pulse i in run j for the absolute value of the spin flipper:

$$x_{j,i} = \frac{1}{1624} \sum_{k=1}^{1624} \text{abs}(s_{sf,j,i}(k)), \quad (1)$$

which gives a distinct signal for spin flipper on of 0.28 and off of 0.008.

Pulse Average

For the beam monitor and wires a simple pulse sum is used pulse i in run j as:

$$M_{1,j,i} = \sum_{k=1}^{1624} s_{M1,j,i}(k), \quad (2)$$

$$w_{j,i} = \sum_{k=1}^{49} s_{w,j,i}(k), \quad (3)$$

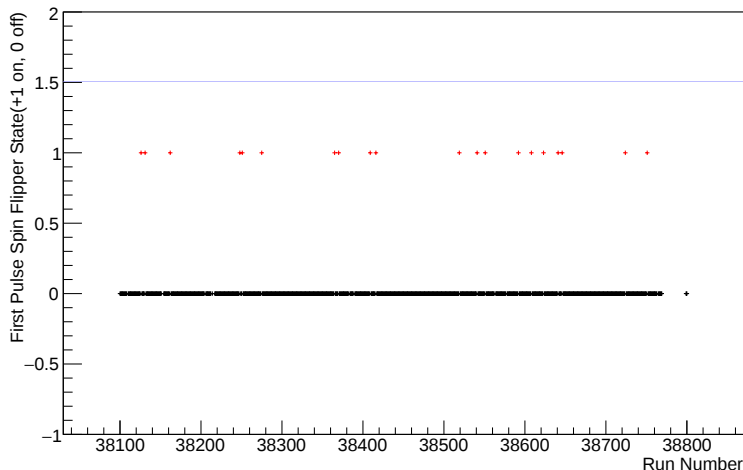
with $N = 49$ time bins for the target chamber wires and $N = 1624$ for the beam monitor, k is the time bin index, and $s_{j,i}(k)$ is the recorded signal in time bin k .

Spin Flipper Consistency Checks

- ▶ Are all even numbered pulses the same SF state?
- ▶ Are all odd numbered pulses the same SF state?
- ▶ Are all odd numbered pulses a different state from pulse 0?
- ▶ These checks are true for all runs in Kabirs good beam off run list in the range 38100-38600.
- ▶ The SF is consistent across all good runs.

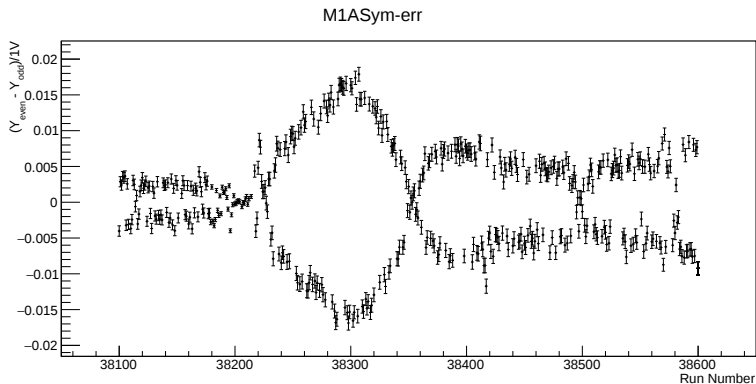
SF initial Run State

Spin Flipper State on First Pulse of Each Run

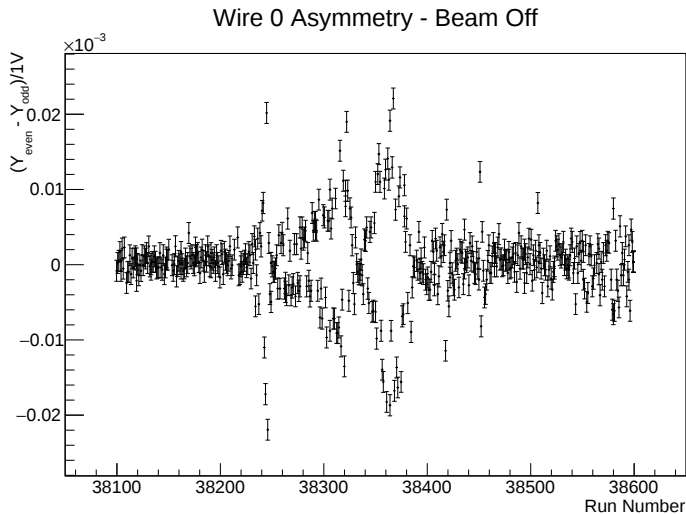


21 runs are +- SF series, remainder are -+.

Re-creating Kabir's Results

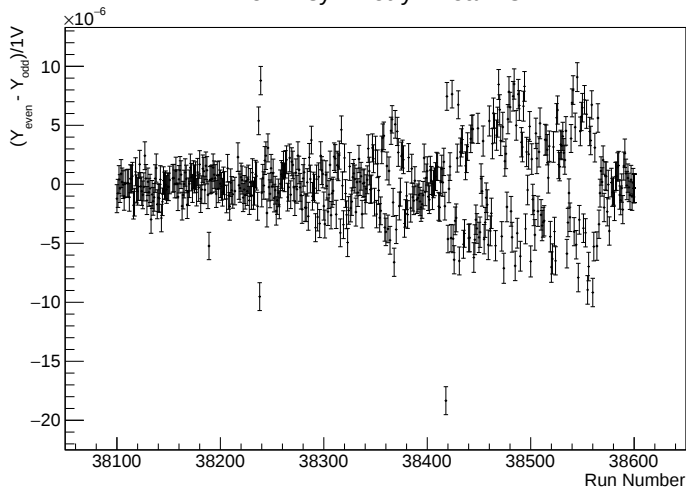


Wire Asymmetry Plots - w0

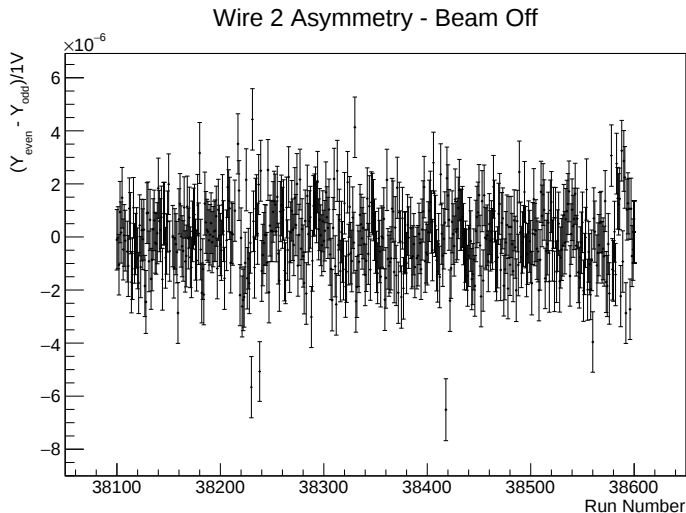


Wire Asymmetry Plots - w1

Wire 1 Asymmetry - Beam Off

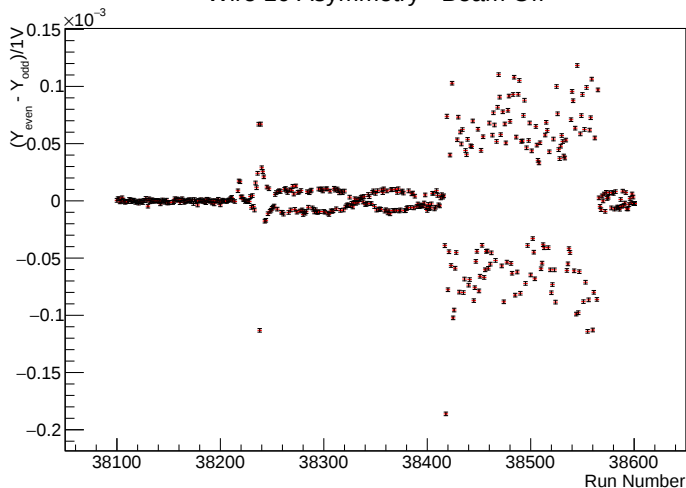


Wire Asymmetry Plots - w2

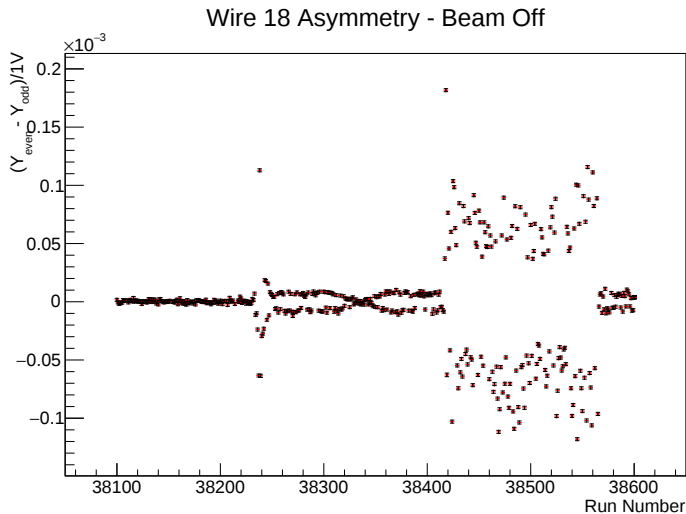


Wire Asymmetry Plots - w10

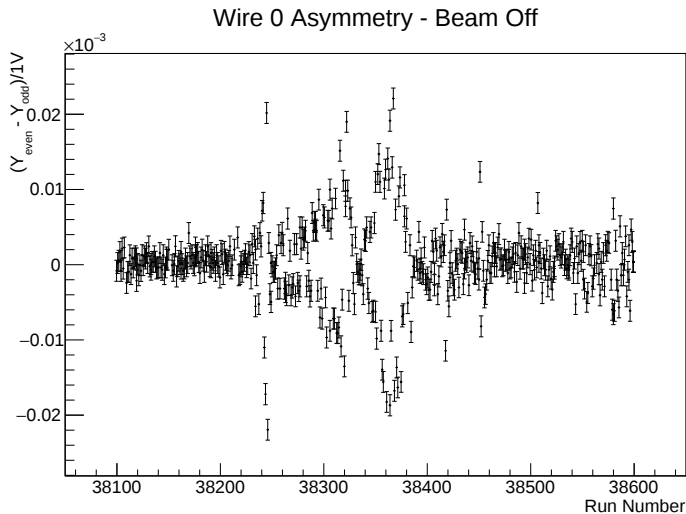
Wire 10 Asymmetry - Beam Off



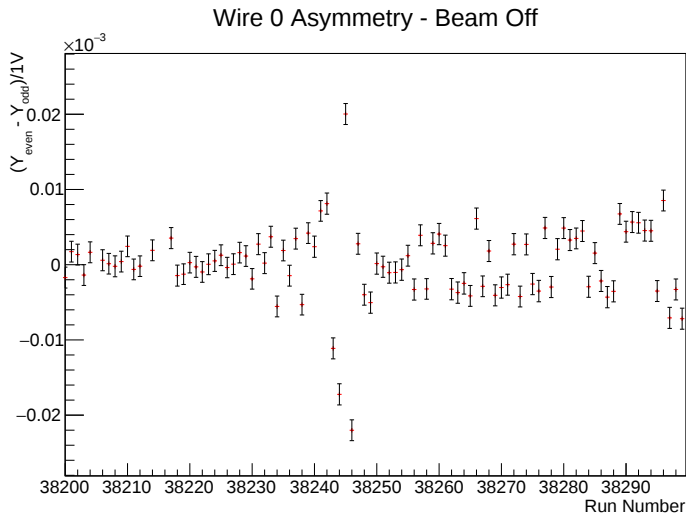
Wire Asymmetry Plots - w18



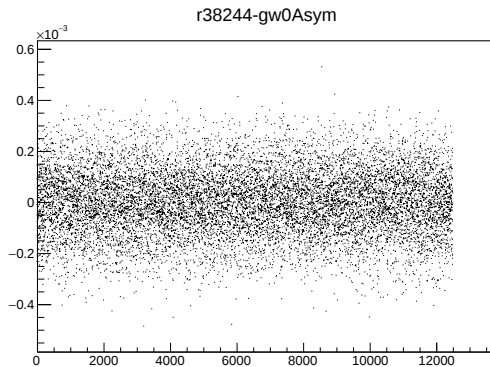
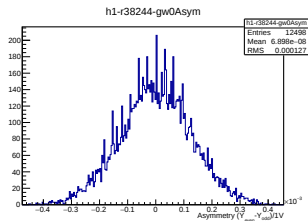
Taking Close Look at wire 0



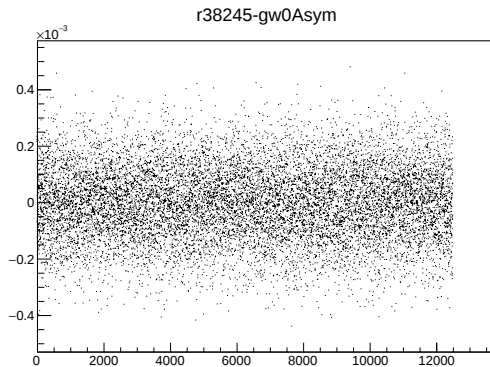
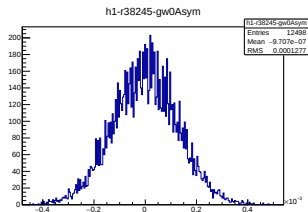
Taking Close Look at wire 0



Taking Close Look at wire 0 - run 38244 - wire or run number not accurate



Taking Close Look at wire 0 - run 38245 - wire or run number not accurate



Taking Close Look at wire 0 - run 38246 - wire or run number not accurate

