Beam-off / Wire Pedestal Asymmetry

What was done:

- Explicit spin state checking
- Skip pulses with undefined spin state
- Recalculate asymmetry for all noise runs
- Calculate NULL asymmetry (same spin state pair asymmetry)

Beam-off / Wire Pedestal Asymmetry

What was done:

- Explicit spin state checking algorithm for the pair asymmetry:

  1. Read a pulse pair (wire data and spin flipper data)

  2. Check and set spin state for both pulses (SF signal > threshold: state = spin down otherwise: state = spin up)

  3. Check that the two pulses have opposite spin state and that spin state is defined

     a. If first pulse spin state is not defined increment by one pulse and go to 1.
     b. If second pulse spin state is not defined increment by two and go to 1.
     c. If the two pulses don't have different defined spin states, increment by one and go to 1.
     d. Otherwise continue with 4 below

  4. Compute the asymmetry $\frac{Y_1^+ - Y_2^-}{Y_1^+ + Y_2^-}$ increment by two pulses and go back to 1.

All other calculations, weightings and combinations were left the same (as done by Mark and Kabir).

Beam-off / Wire Pedestal Asymmetry

What was done:

- Explicit spin state checking algorithm for the NULL asymmetry:

  1. Read a pulse quartet (wire data and spin flipper data)

  2. Check and set spin state for all 4 pulses (SF signal > threshold: state = spin down otherwise: state = spin up)

  3. Check that spin states are defined and that we one of the following patterns

     +-+-, -+-+, +--+, -++-, ++--, --++

     a. Successively increment by one pulse (going back to 1) until a valid sequence is found (an even number of up and down pulses).

     b. Otherwise continue with 4 below

  4. Compute NULL asymmetry then increment by 4 pulses and go back to 1.

     The two possibilities $\frac{Y_i^+ - Y_j^+}{Y_i^+ + Y_j^+}$ and $\frac{Y_i^- - Y_j^-}{Y_i^- + Y_j^-}$ are averaged independently.

All other calculations, weightings and combinations were left the same (as done by Mark and Kabir).

Beam-off, Wire Pedestal Asymmetry

Asymmetries with explicit spin state check:

- **Tuesday runs only:**

$$A_{ped} = (0.26 \pm 1.97) \times 10^{-9}$$

$$A_{ped,null} = (0.34 \pm 1.97) \times 10^{-9}$$

- **Summer runs (all):**

$$A_{ped} = (16.4 \pm 1.80) \times 10^{-9}$$

$$A_{ped,null} = (1.09 \pm 1.80) \times 10^{-9}$$

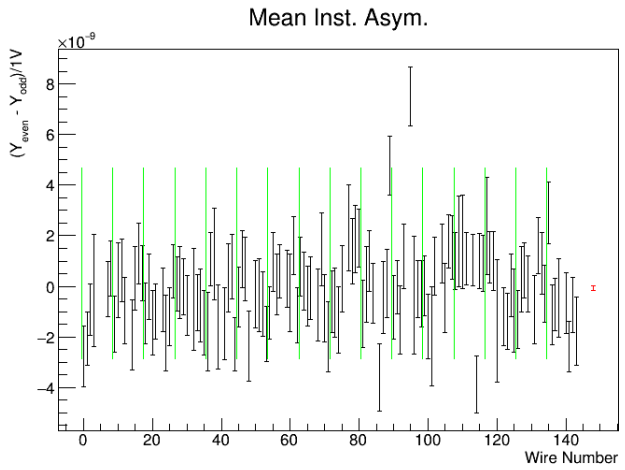
- **Inter runs:**

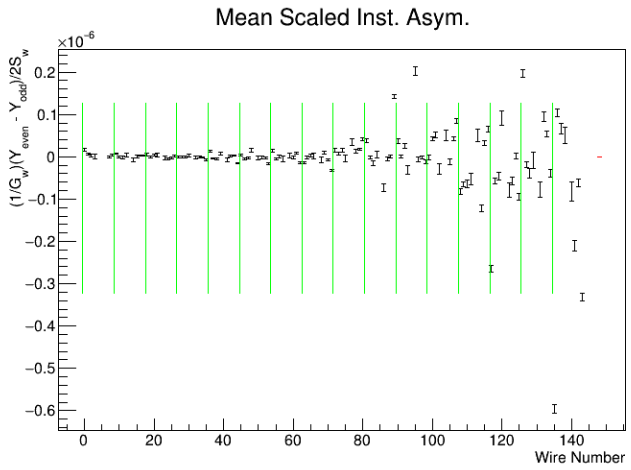
$$A_{ped} = (1.43 \pm 0.86) \times 10^{-9}$$

$$A_{ped,null} = (-0.013 \pm 0.86) \times 10^{-9}$$

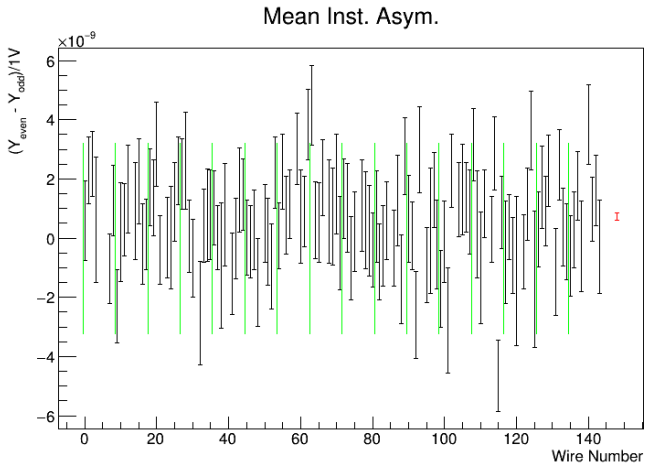
Beam-off, Wire Pedestal Asymmetry

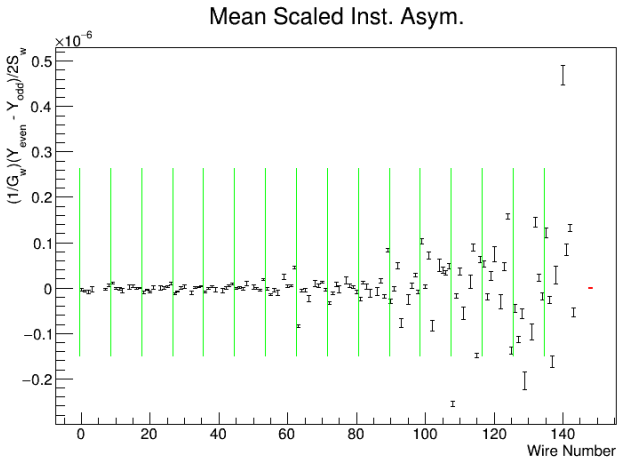
Tuesday Runs Noise Asymmetry:





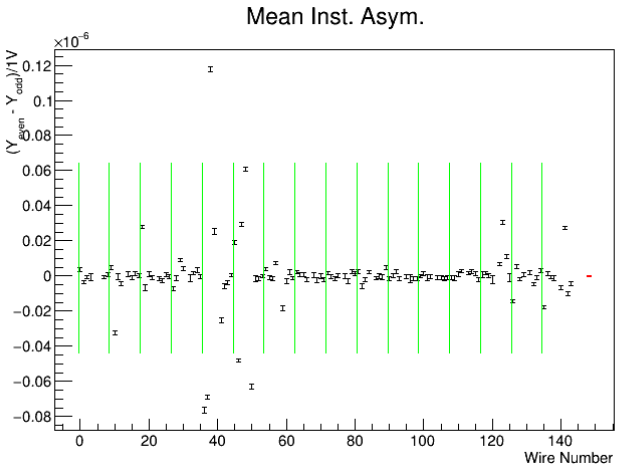
Tuesday Runs Noise Null Asymmetry

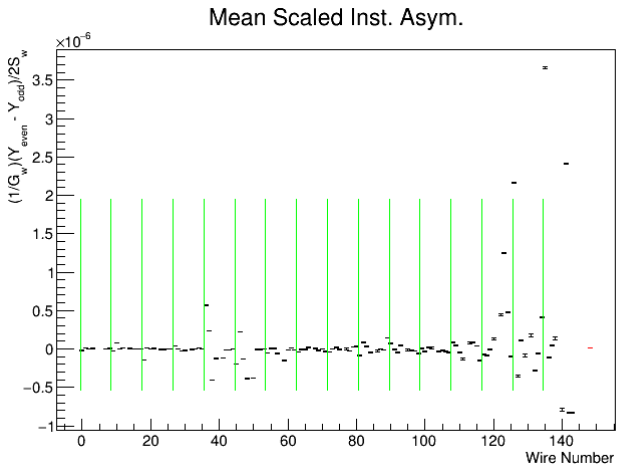




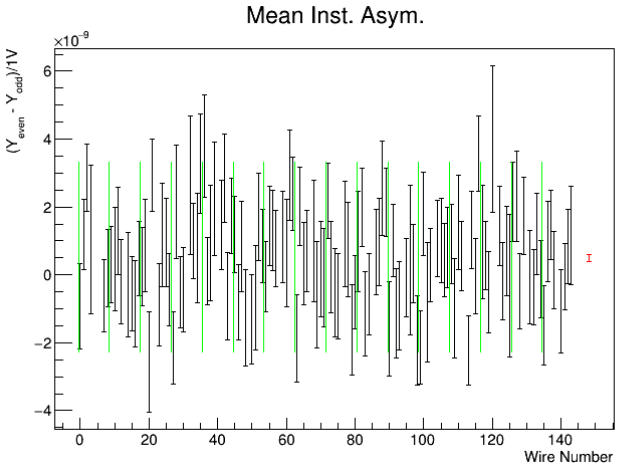
Beam-off, Wire Pedestal Asymmetry

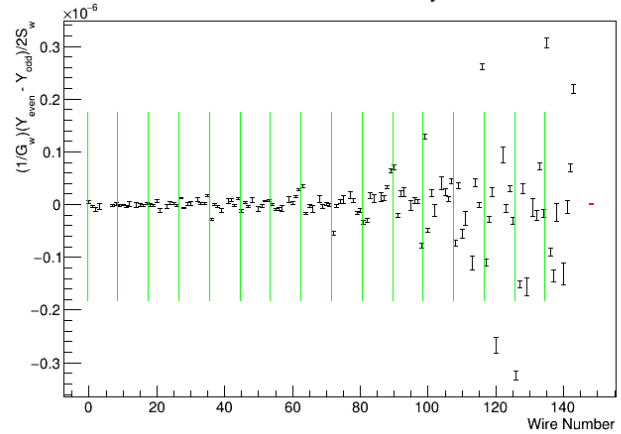
Summer Runs Noise Asymmetry:





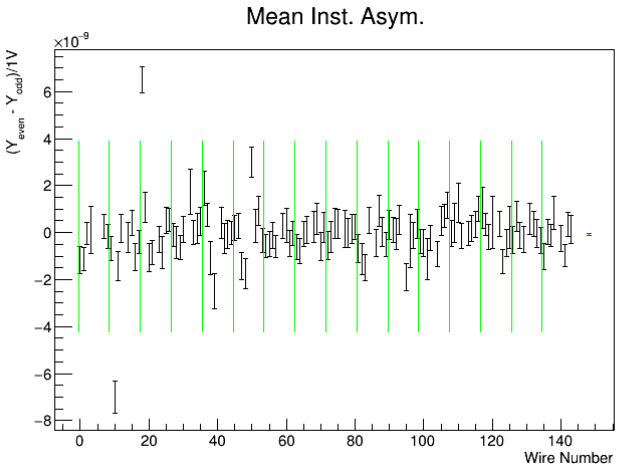
Summer Runs Noise Null Asymmetry

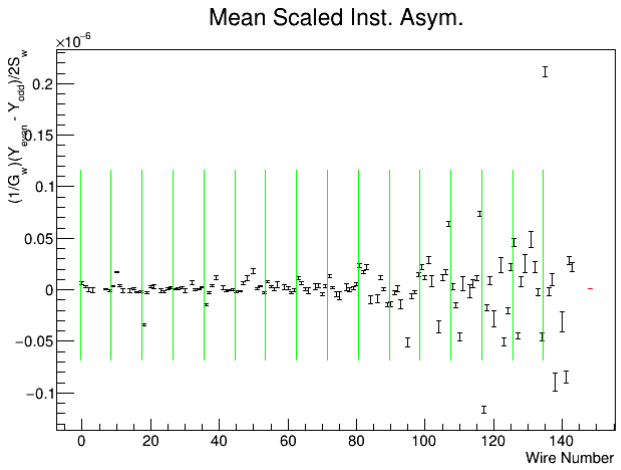




Beam-off, Wire Pedestal Asymmetry

Inter Runs Noise Asymmetry:





Inter Runs Noise Null Asymmetry