PQB Meeting

Caryn 3/20/2018

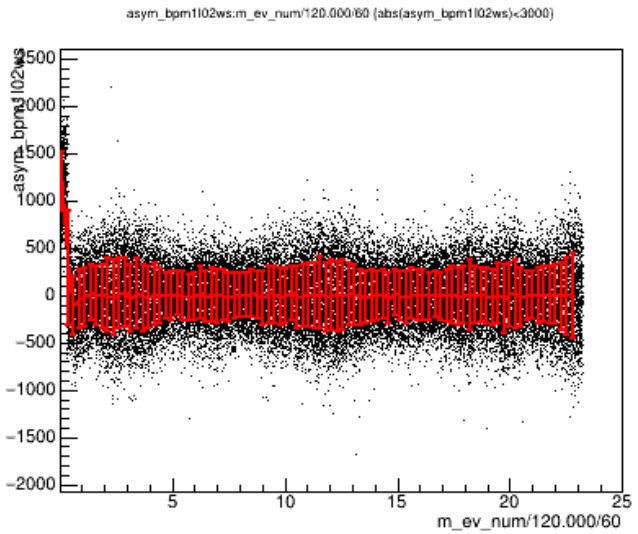
BPMs – Yes, prior calibrations were in fact off.

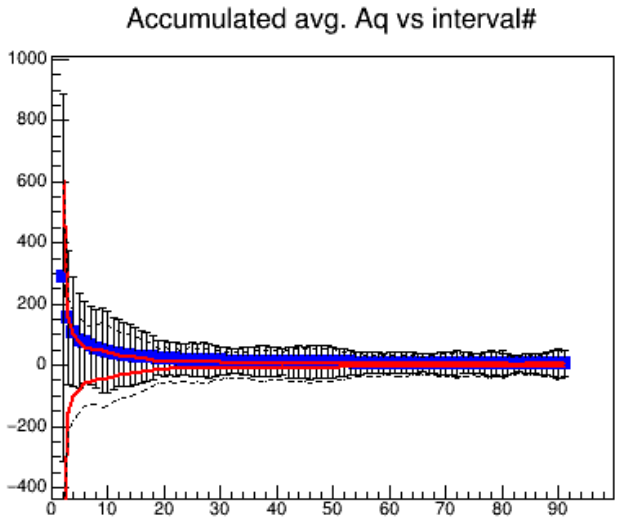
- 1st 8 bpms in the injector are ‘stubby’/short M15-mini’s. They really do have a different calibration constant than the M15’s.
- PAN and qweak analysis both used 18.76mm(M15 value), whereas the accelerator used 13.7mm
- Musson went an actually measured the bpm calibration constant as 15.49mm

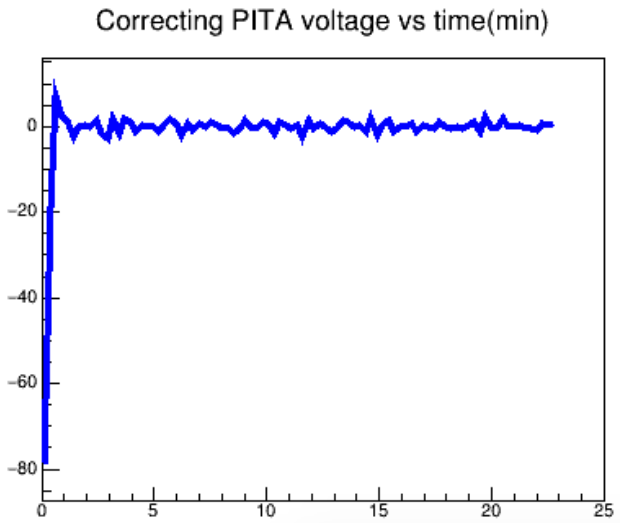
So, just to summarize:

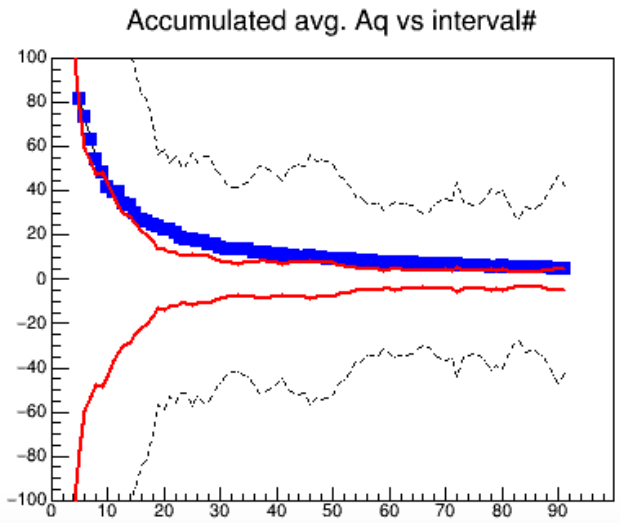
	accelerator	Parity analysis	Goubau scan	Can radius
M15	18.81mm	18.76mm	18.4+-0.12mm	OR=17.5, IR=16.6mm
M15 mini	13.7mm	18.76mm	kx,ky=15.46,15.52+-0.08mm	

KD*P Feedback – fine at 120Hz









Bob investigates:

Deadtime measurements:

-On the VME crate:

-Measured 750 usec for the readout, reasonable

”Network Blaster" tests:

-9.2 MByte/sec, fine.

Bottleneck must be on Compton

- either CODA itself of the ET system. .

- Hold up appears NOT to be caput. Bob investigating. Not critical for RTP test, but desirable to do 240Hz. (960Hz ultimately and will need appropriate multiplet)

To be clear….PAN right now…Qweak-like later

QwAnalysis

Will be basis for Hall A parity analyzer engine

Significant advantages over PAN (but, improvements possible)

- More dynamically configurable
- Potentially more efficient though more formally object-oriented
- Utilizes similar mechanisms for online/feedback event stream processing
- At some points, sophistication overwhelms simplicity
- Doesn't match Hall A DAQ buffer
- Some design decisions could be unwrapped to improve usability…
- More maintainable, preferred direction for expertise

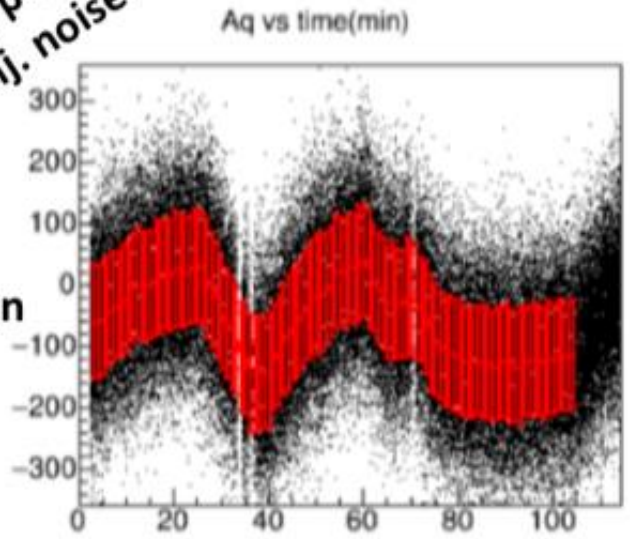
"new" analyzer?

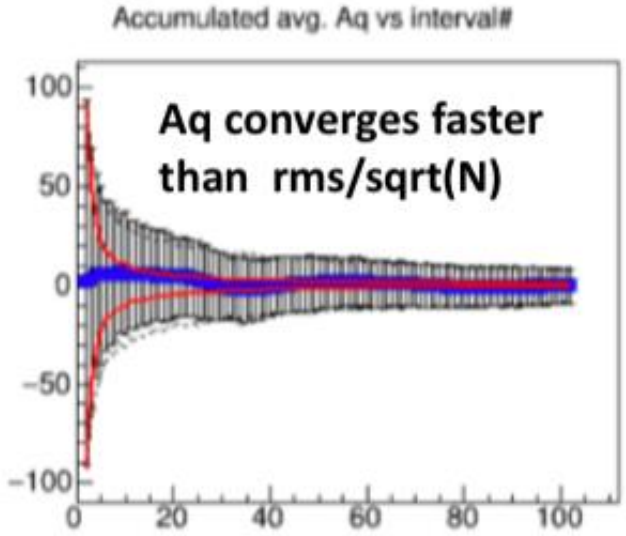
- Needs update to DAQ buffer - some moderate architecture changes may be necessary to accommodate
- output changes for beam modulation
- other improvements are possible, but probably not necessary

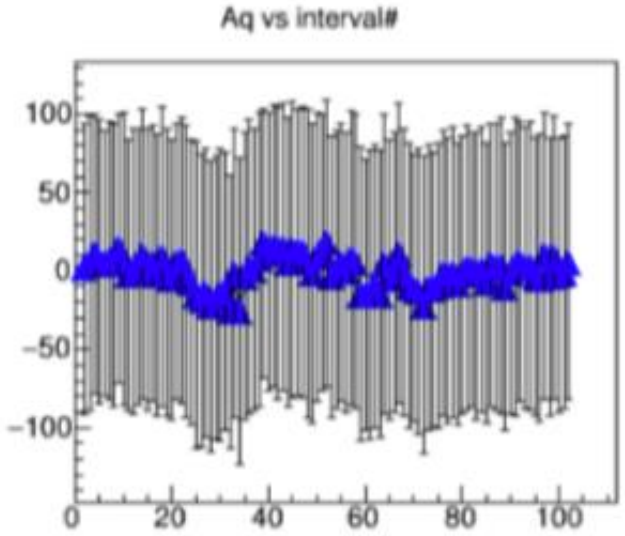
Modeling Feedback RTP

Real Laser table data
x0.5% analyzing power
+90ppm rms inj. noise

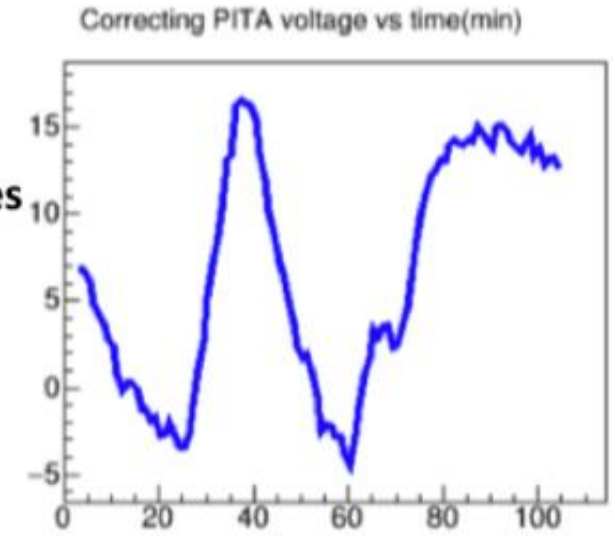
Aq fluctuation
+-150ppm

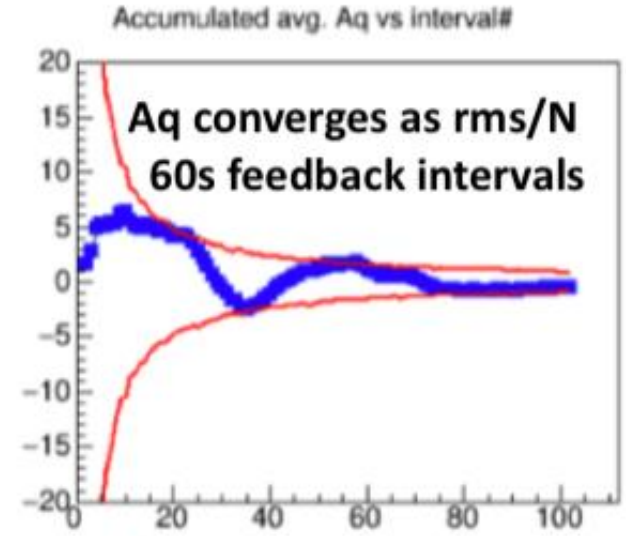


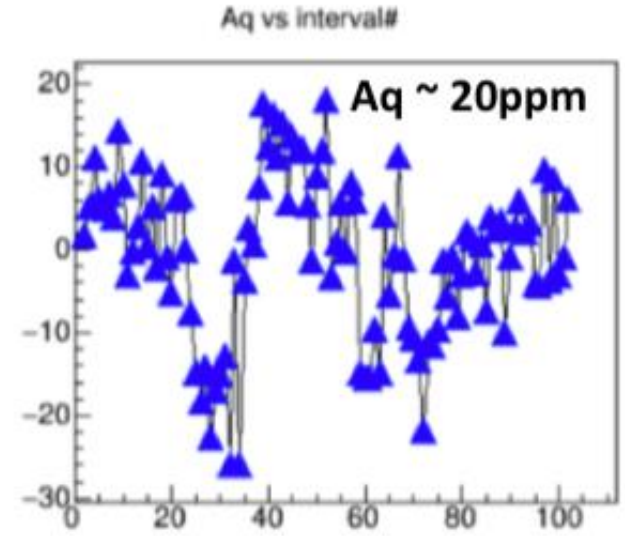




PITA voltages
<20V

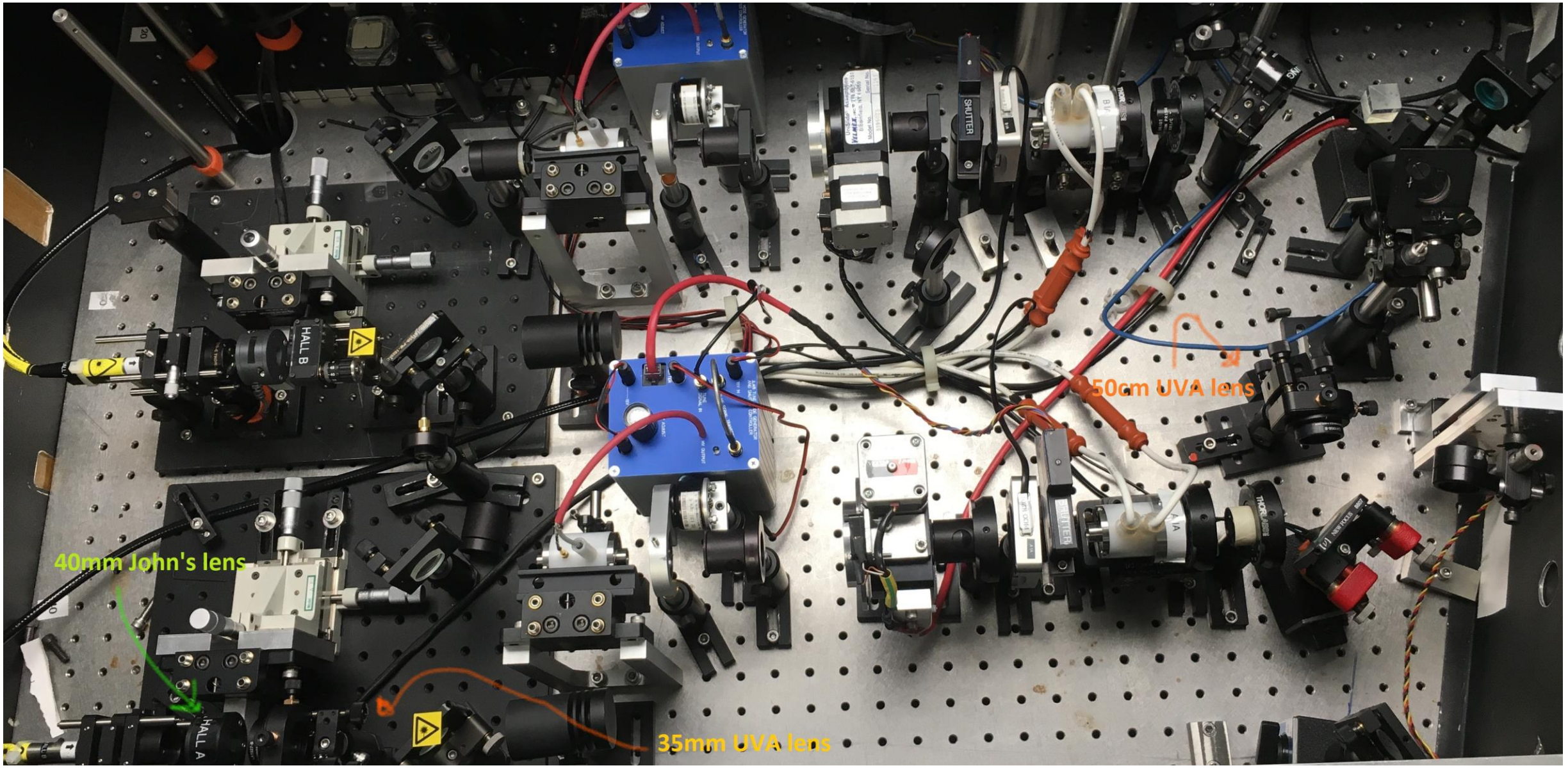




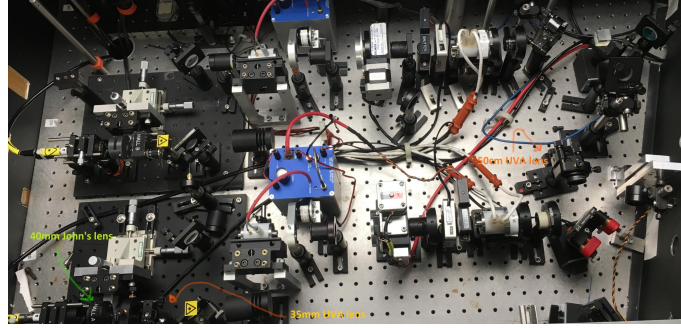


- Simulated feedback, Aq converges as rms/N. Will perform beam test in April.

Stage 1 –return to this setup



Laser Table Setup – for RTP



- PPLN lenses: 1st lens f=40mm (John's), 2nd lens f=35mm (UVa's Thorlabs)
- Extra lens: ~1m upstream of the PC, a f=50cm lens (UVa's Thorlabs) was inserted
- Measured spot sizes, 2sigma: w=0.825mm Horizontal, w=0.94mm Vertical at PC center
- Measured divergences: dw/dz 0.51mrad horizontal, 0.66mrad vertical at PC center
- Measured M2: ~1.0, no observed tails
- cathode analyzing power was measured to be ~6%
- steering lens is 2m, cathode 4sigma 2.9mm Horiz, 3.1mm Vert, distance to cathode ~3.1m 1/19/17, distance to steering lens ~1.067m, effective throw from PC to cathode ~2.015m
- Note: Qweak laser spot size on cathode was 0.5mm for run1, 1mm for run2
  - Implies 4sigma = sqrt(2/ln2) FWHM = 1.7mm for 2nd half of run,
  - **Qweak run2 had 2X smaller laser spot-size than what we have now**
  - **Want: Steering lens change from 2m -> 0.75m lens, so cathode 4sigma is ~1.7mm**

Tests in order of priority

- Setup RTP on the laser table, feedback on Aq, minimize pos diffs, laser spot

1. Setup inj beamline, FC1, RTP feedback+minimize pos diffs
   - e-beam at 25uA/70uA up through 0I05 region, current calibration run, PITA pos scans, feedback on, iterate PITApos voltages to minimize pos diffs in 0I05….(FC2 iterate PITApos voltages to minimize pos diffs in a select 0L region bpm)
2. Joe - Wein flip test: 3 configs (off, right, left) with 130 keV gun
3. Joe - SPOT moves on cathode -> map injector bpm sensitivities, anal. power
   - Compare to RTP steering control -> map injector bpm sensitivities.
4. Spot size asymmetry test – helicity magnets
5. Joe- Solenoid e-beam rotation-> obsv. spot size asymmetry on one bpm vs θ

Later

1. FC2 - RTP
2. Joe – Wein flip test: 3 configs (off, right, left) with NEW gun
3. New bpms – study position differences with RTP