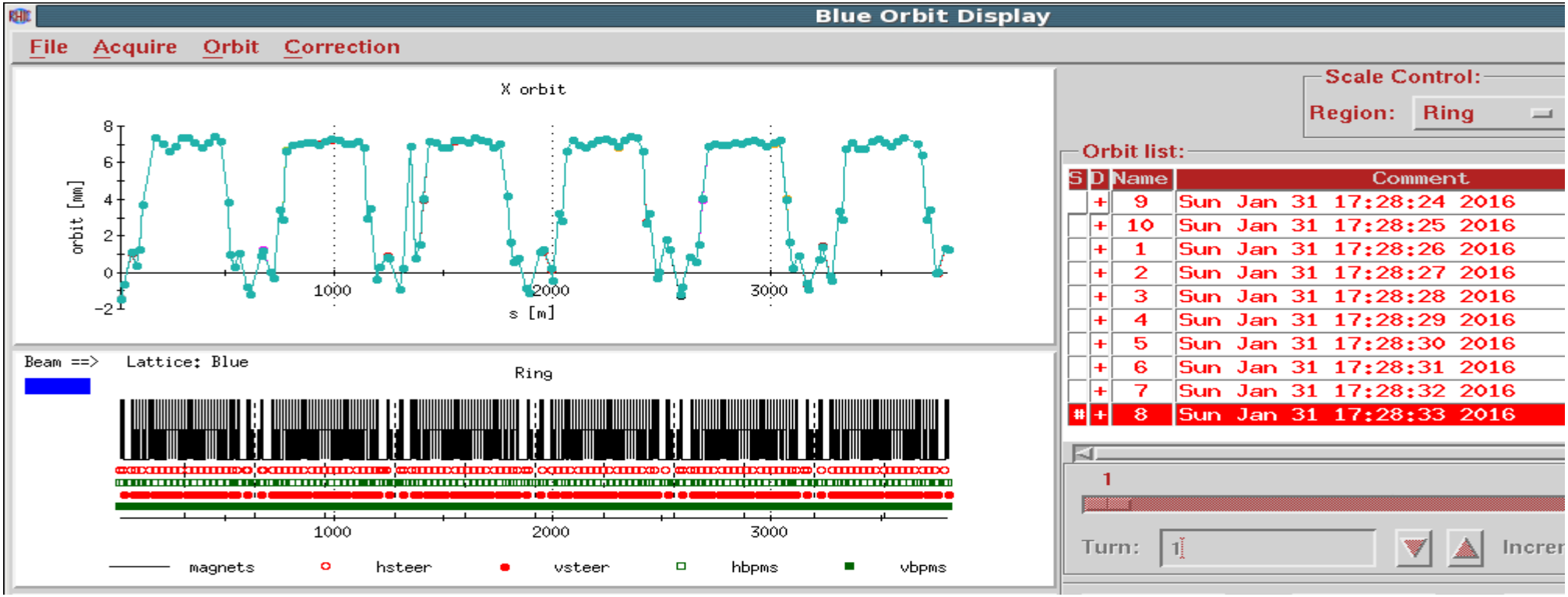
RHIC APEX Report

(Time Meeting: 2016 Feb. 16)

Momentum aperture measurement at RHIC injection : C. Montag

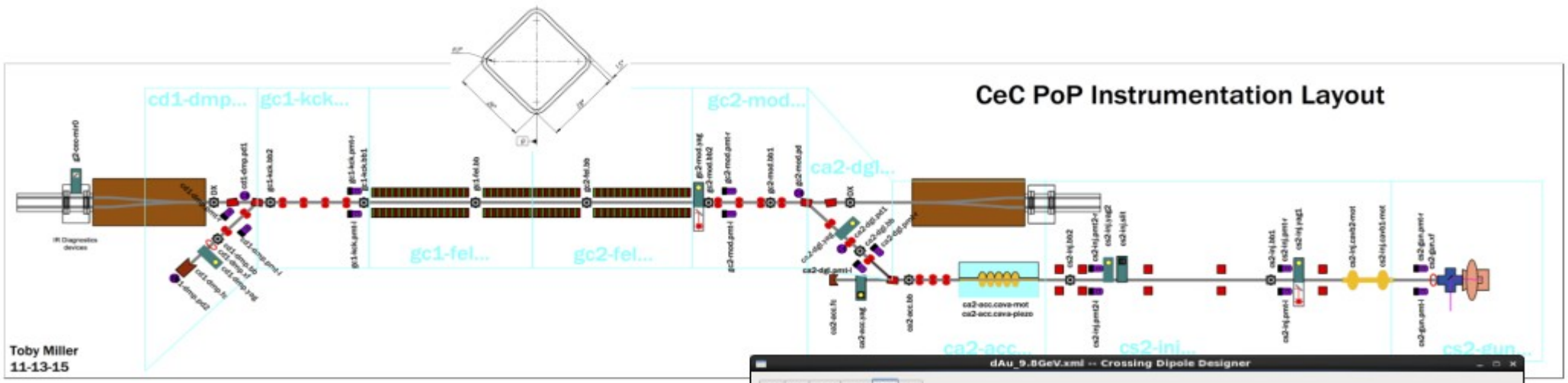
Experiment Number:	16-03
Beam Experiment Title:	RHIC momentum acceptance measurement
Spokesperson(s):	C. Montag
Status:	Proposed
Team:	C. Montag, W. Fischer, M. Blaskiewicz
Experiment Goal:	Determine the RHIC momentum acceptance using unbunched beam at injection.
Benefits:	Required as a first step towards energy alignment with the LEReC electron beam.
Experiment Description:	Inject gold bunches, and violently debunch them to fill the momentum aperture. Use longitudinal Schottky monitor to determine momentum aperture.

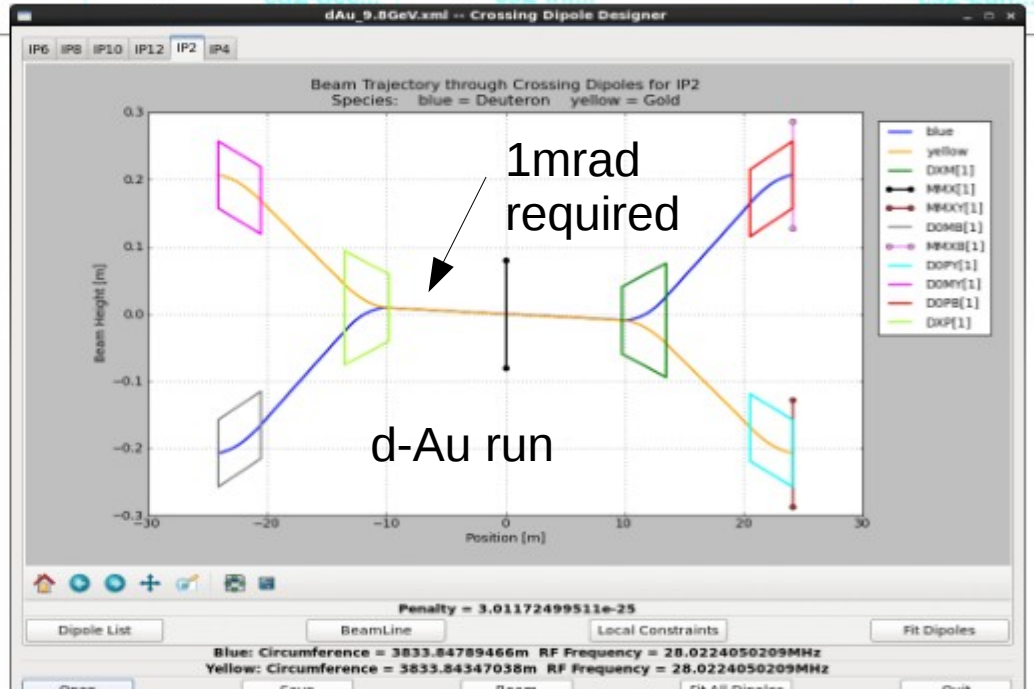
Measured: (dp/p0)_{max} = 8e-3



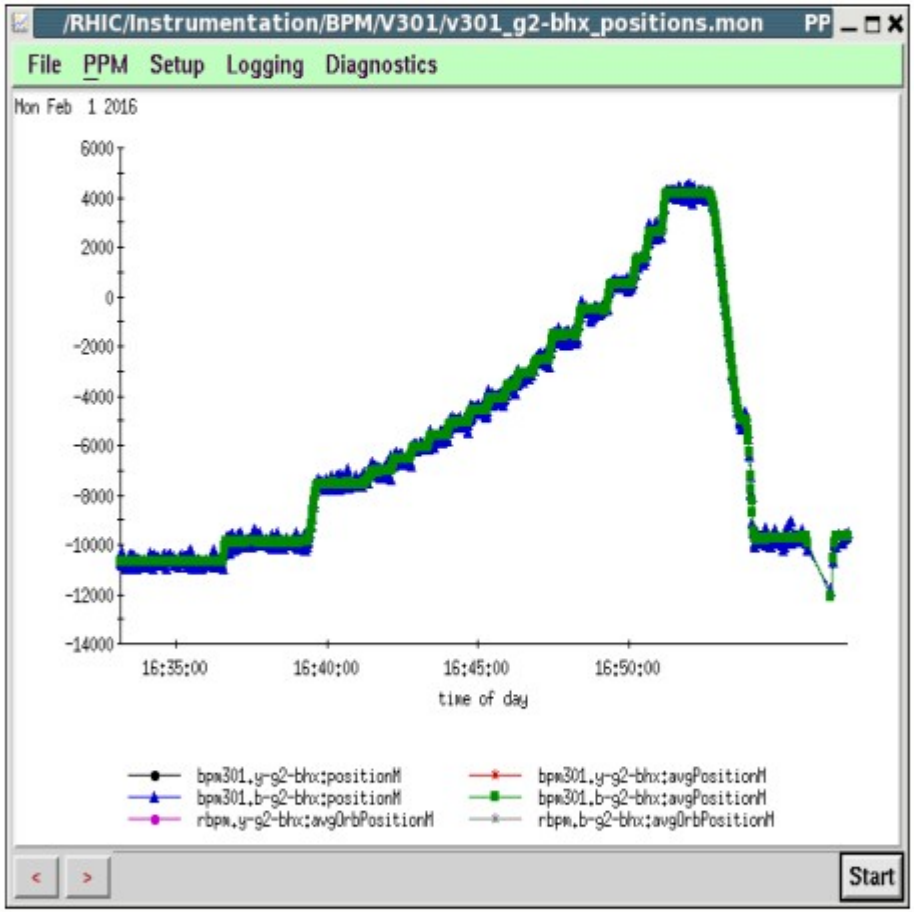
IR2 Physical Aperture Measurement

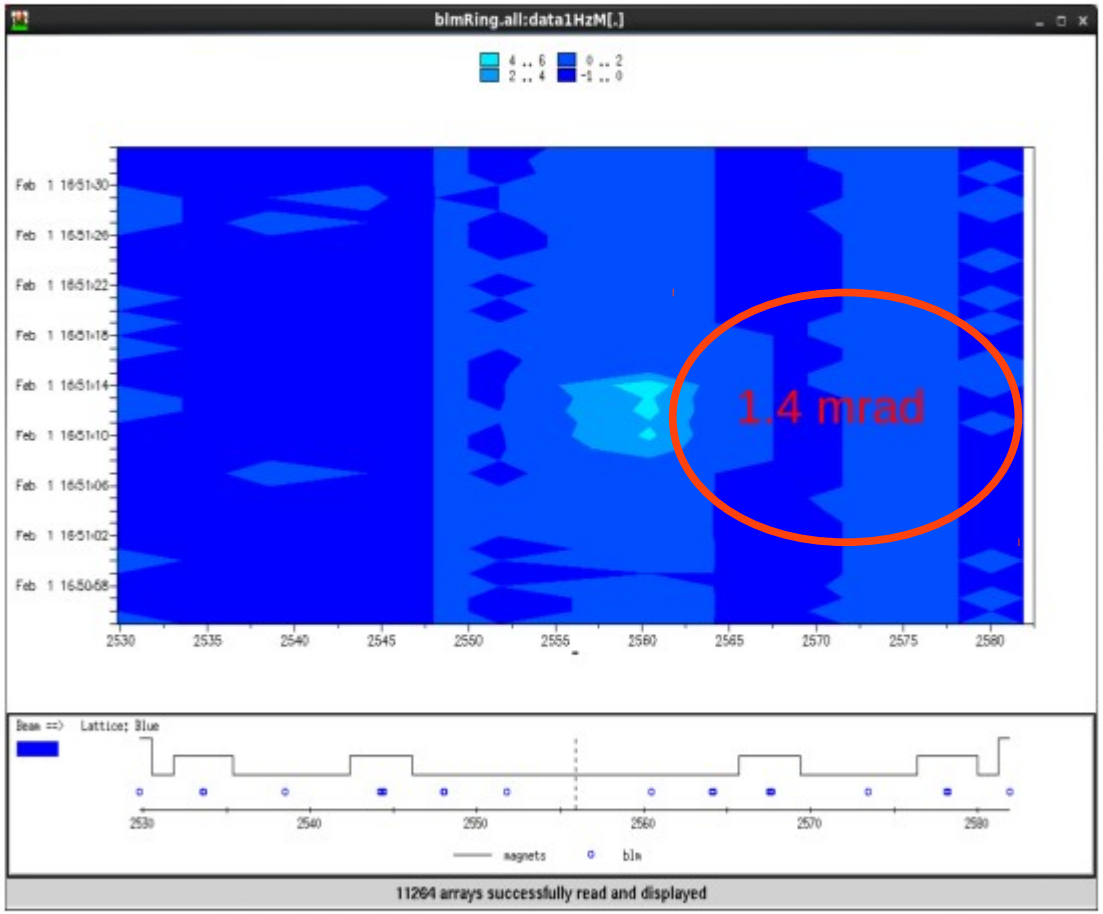
C. Liu , A. Marusic



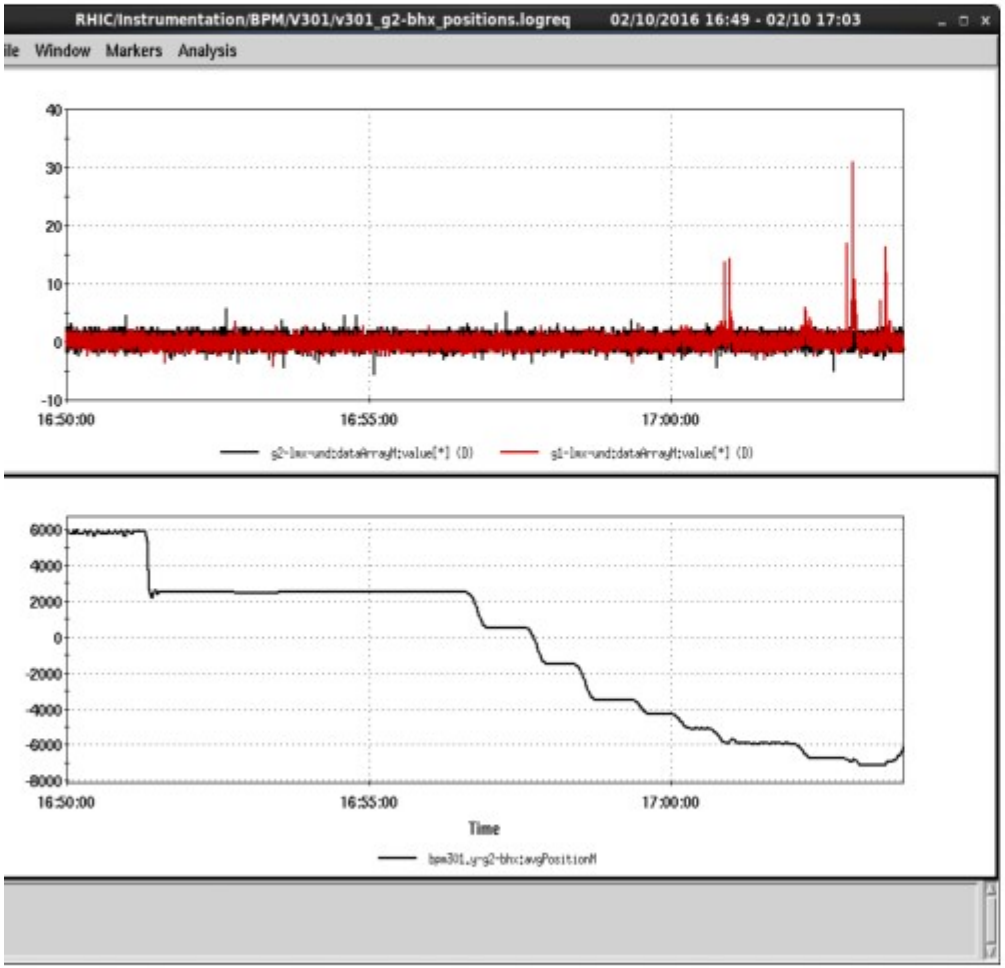


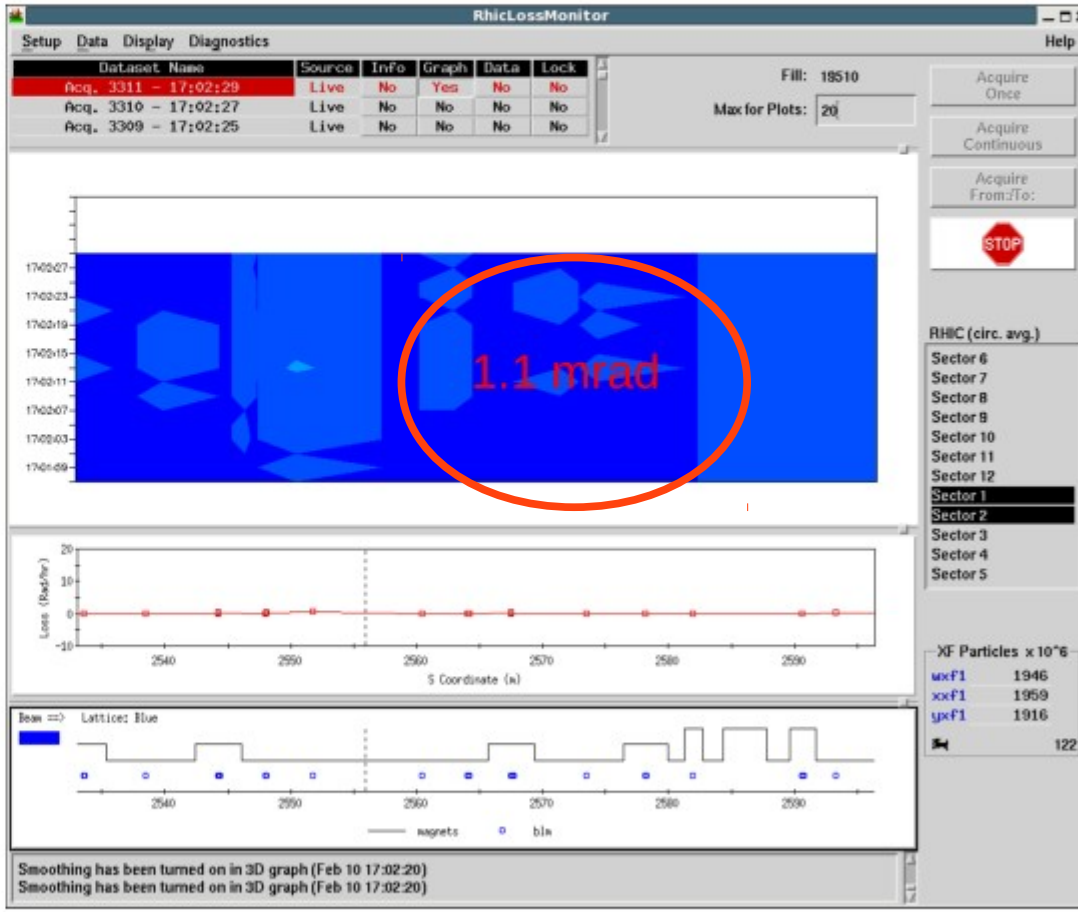
Scan with Blue beam





Scan with Yellow beam





Inject beam with angle at IR2

We attempted to inject beam with angle at IR2. The angle is required to be smaller than 0.7 mrad to avoid injection loss at IR2.

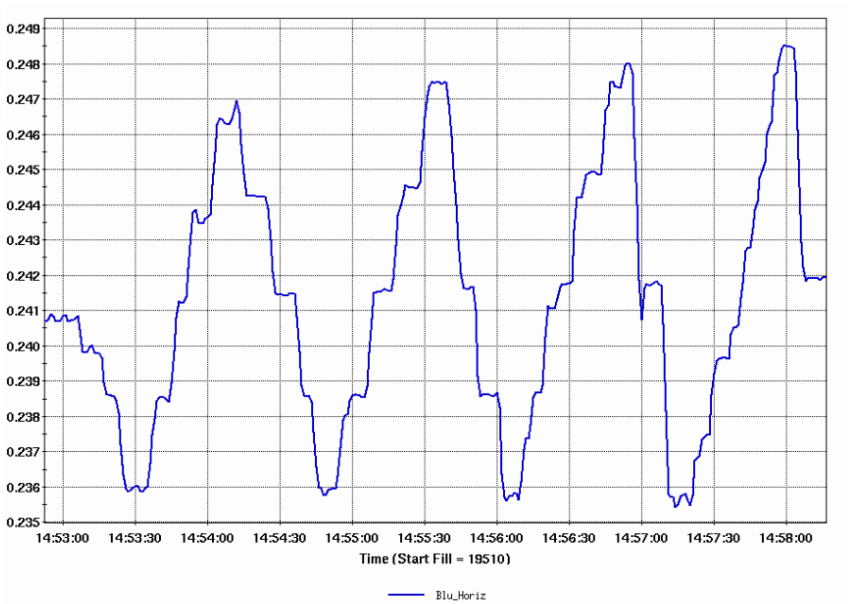
Plans

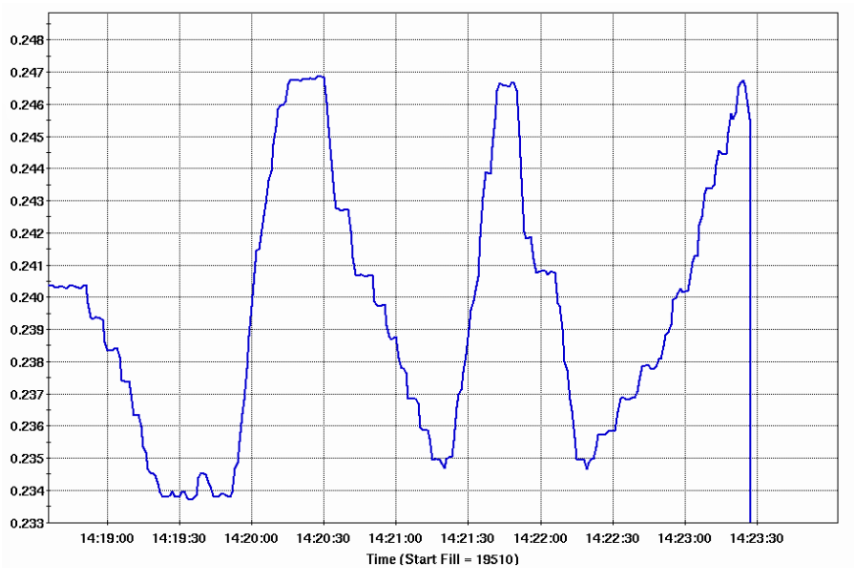
- 1. Scan Yellow beam horizontally with angle at +/-4 vertical offset.
- 2. Injection Yellow beam at designed dAu angle (1 mrad).
- 3. Tests to reduce the design angle for dAu (D0 offset, D0 angle).
- 4. Test +/-3 vertical separation.
- 5. Position bump scan to map out the aperture.

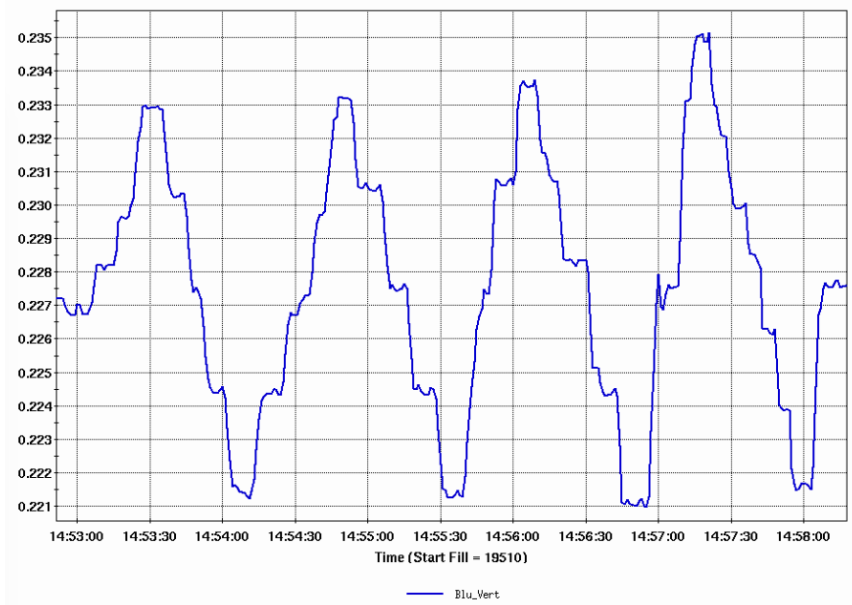
Effect of CeC PoP magnets on RHIC ion beam: Igor

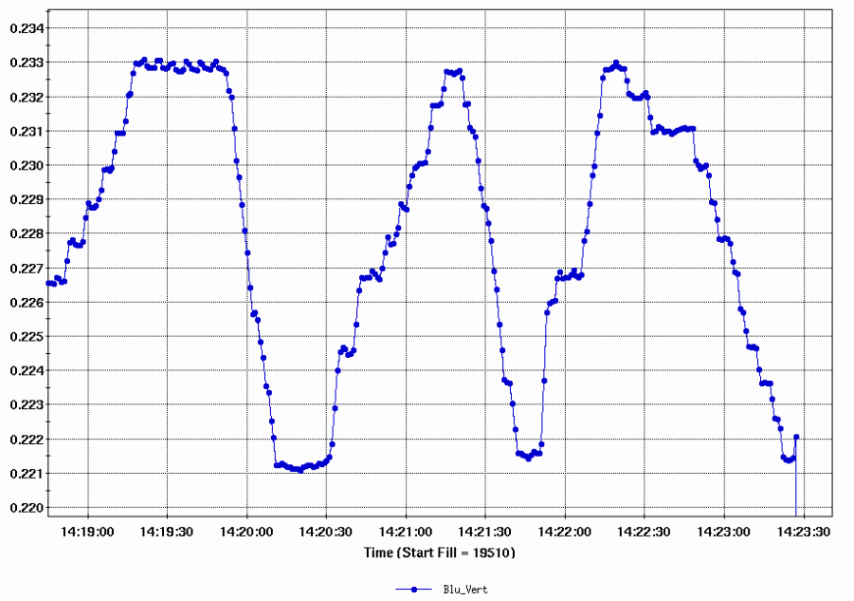
- 12 (13, 14) bunches in the blue ring
- Gold ions at injection energy (γ=10.52, Br=81.13 T m)
- Eight quadrupoles were energized from -6 to 6 Amperes (gradient integral 0.45 T at 5.8 A)
- Tunes for both planes were observed
- There were beam drop outs

Tune Change Observed









During the experiment, qudrupoles were powered one by one.
No excessive beam loss observed.

Results

Quadrupole	L, m	$\Delta\nu_X$	$\Delta\nu_Y$	β_X, m	β_Y, m
Mod1	-6.45	0.0129	0.0116	14.13	12.70
Mod2	-5.91	0.0116	0.0112	12.70	12.26
Mod3	-5.38	0.0118	0.0115	12.92	12.59
Mod4	-4.84	0.013	0.0118	14.23	12.92
Kick1	4.80	0.0105	0.0114	11.50	12.48
Kick2	5.35	0.0117	0.0119	12.81	13.03
Kick3	5.90	0.0119	0.0126	13.03	13.80
Kick4	6.43	0.0129	0.0135	14.13	14.78