



E-lens related beam-beam experiment

02/25/2015 + 03/31/2015

A. Dress, W. Fischer, Y. Luo, P. Thieberger, X. Gu

BROOKHAVEN
NATIONAL LABORATORY

a passion for discovery



1. Angle alignment of Yellow lens

- use LISA for alignment
- test angle alignment with a number of transverse offsets (must give same result)
- if necessary use SLX and SLY to change electron beam angle in lens, re-establish good transmission
- re-optimize collimation (may need different store, 12x12 not enough)
- Found a bug in the new Lisa version

2. BTF with different number of collisions and e-lens strength (2:00PM)

2.1 e-lens only (0, 100, 200, 300, ..., 700 mA)

2.2 1 bb collision + e-lens (0, 100, 200, 300, ..., 700 mA)

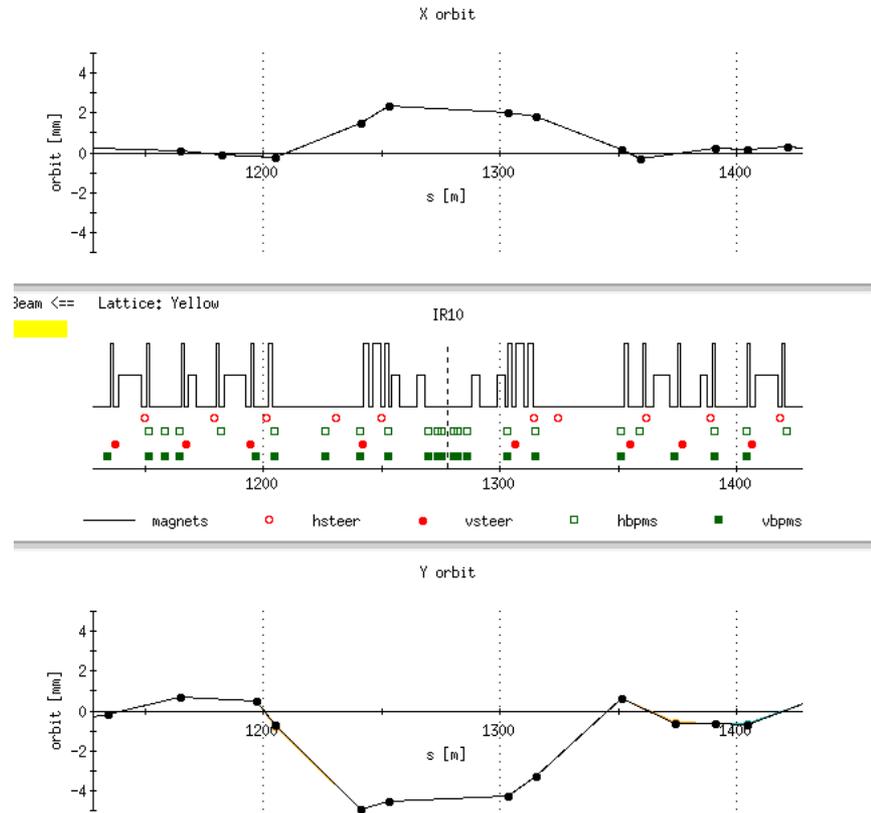
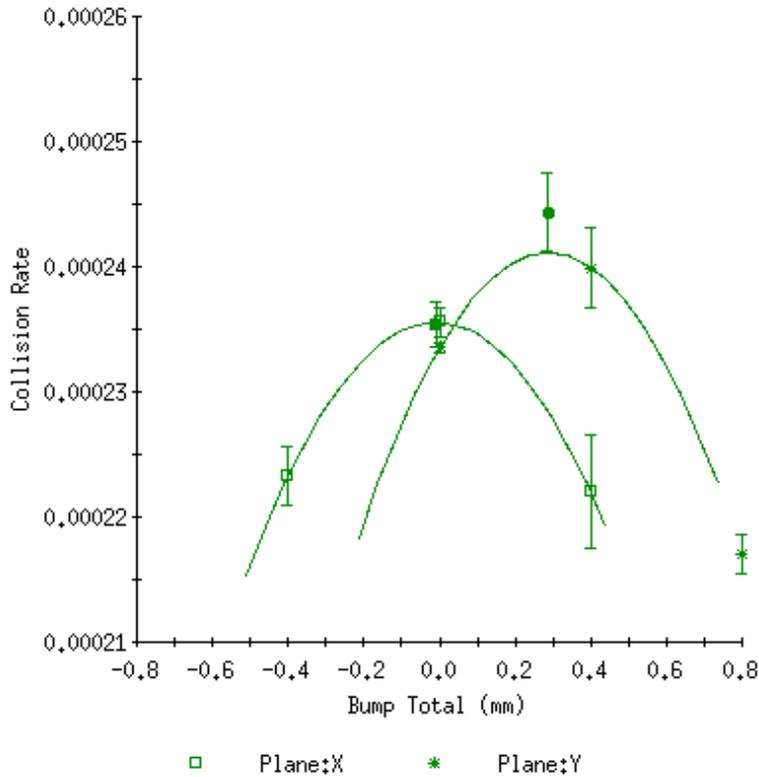
Need to raise lattice tunes by (0.003, 0.003)

2.3 2 bb collisions + e-lens (0, 100, 200, 300, ..., 700 mA)

3. Yellow e-beam transverse profile measurement

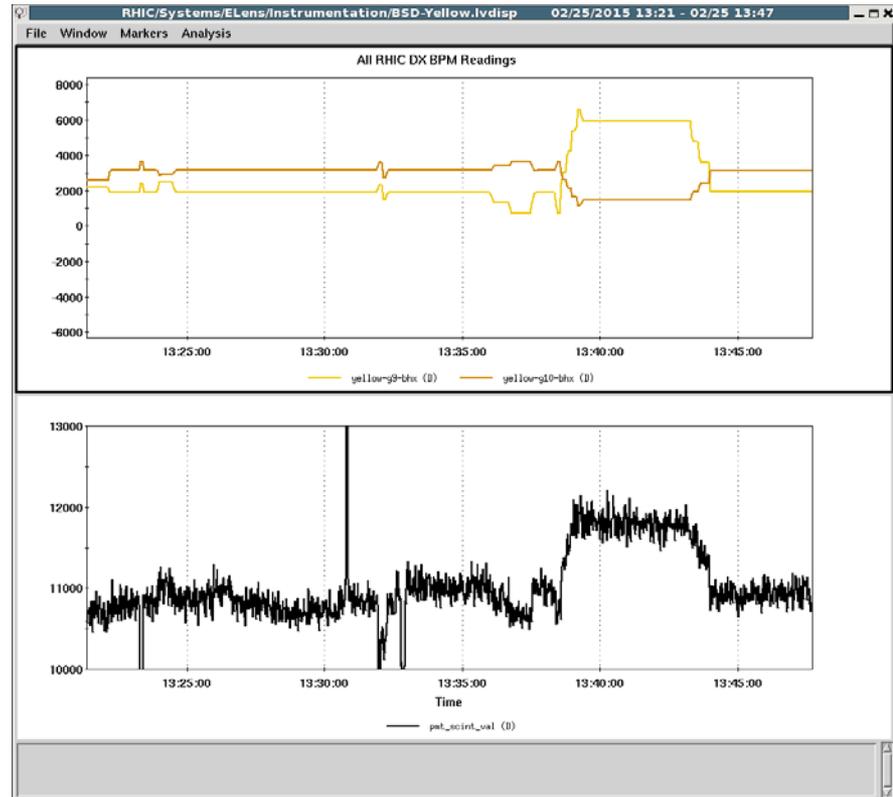
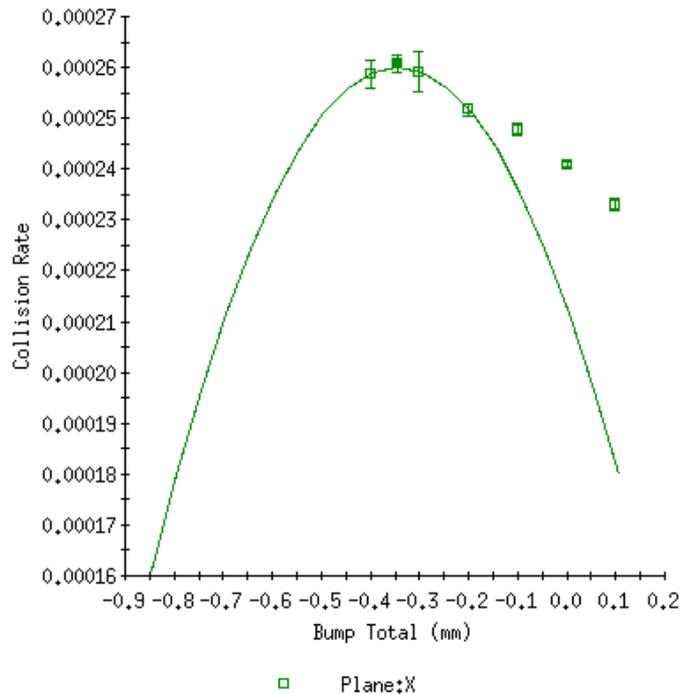
4. Run yellow e-beam with 800 mA





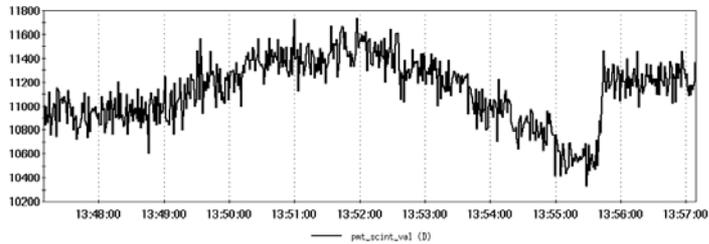
optimal position is at 2 mm (hor): changed e-beam position
 Vertical: No change



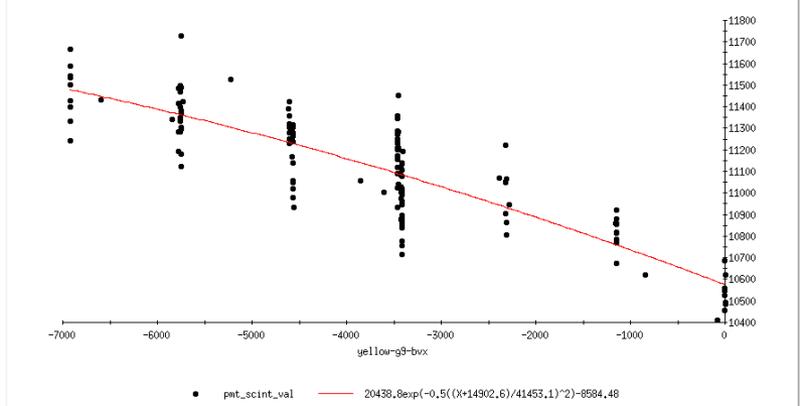
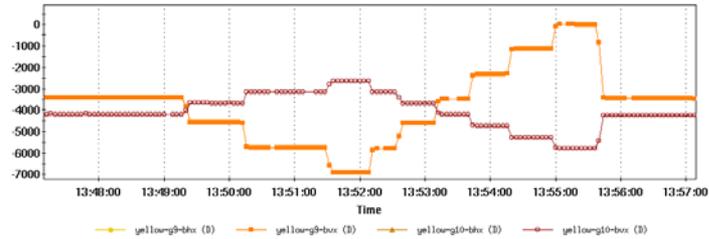


optimal angle is at -0.344 mrad (hor): change e-beam angle, no improvement for eBSD.



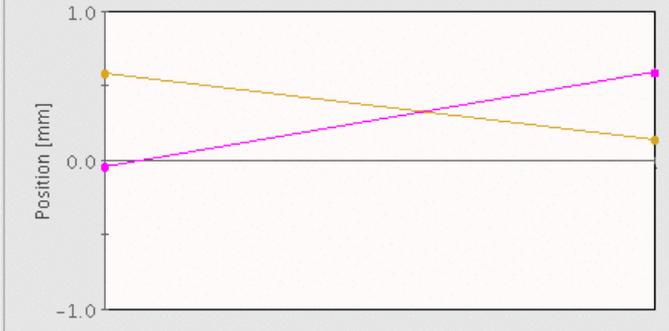


All RHIC DX BPM Readings

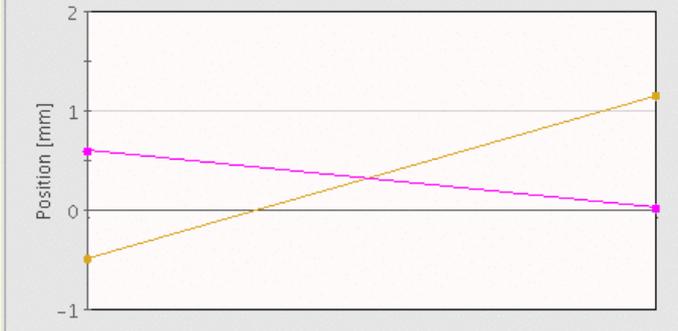


Index	yellow-g9-bvx	pmt_scint_val
0	-3417	10999
1	-3416	10757
2	-3417	11010

Beam Position (Horizontal)



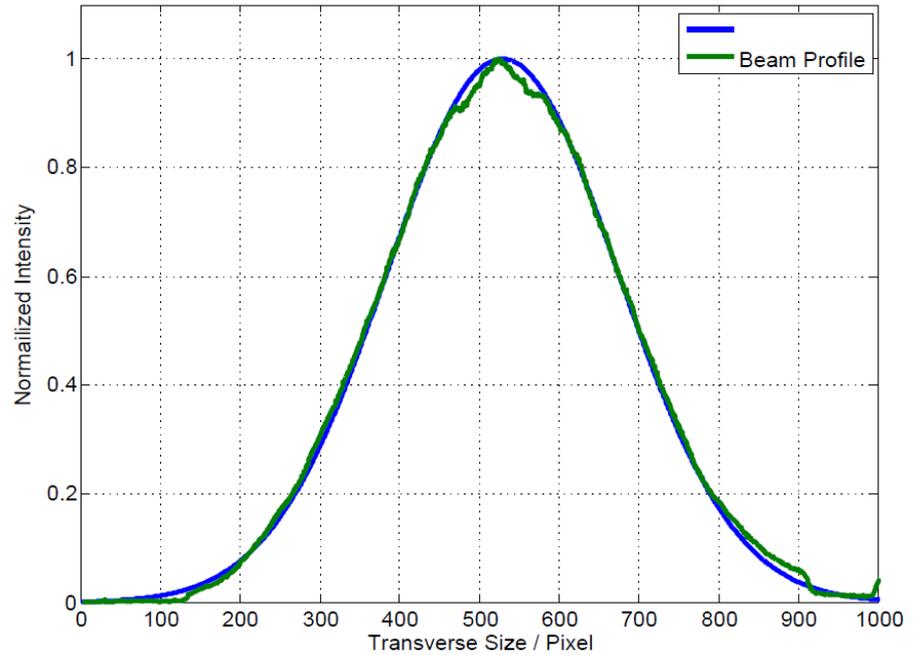
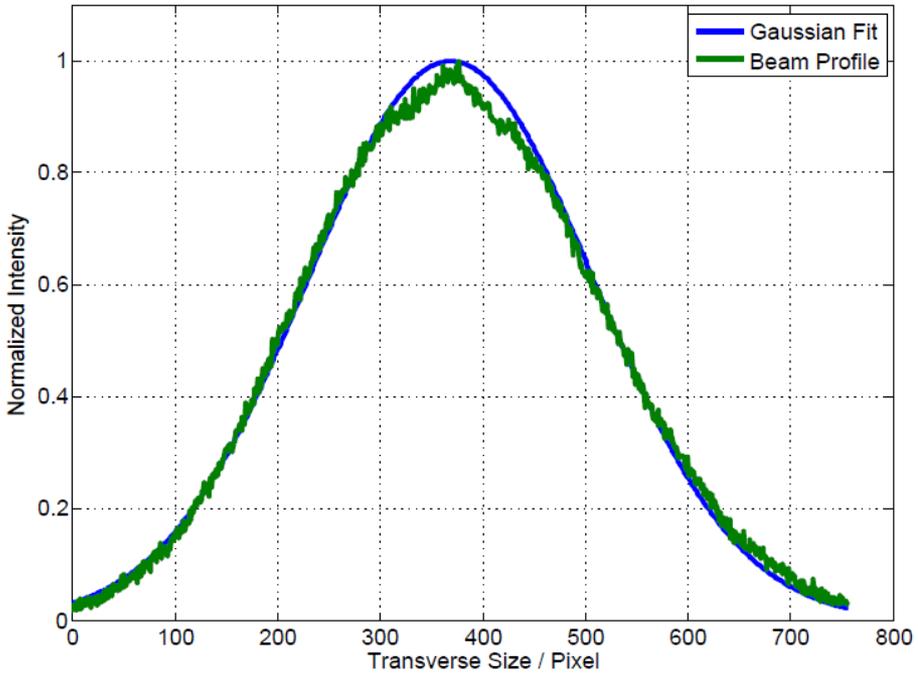
Beam Position (Vertical)

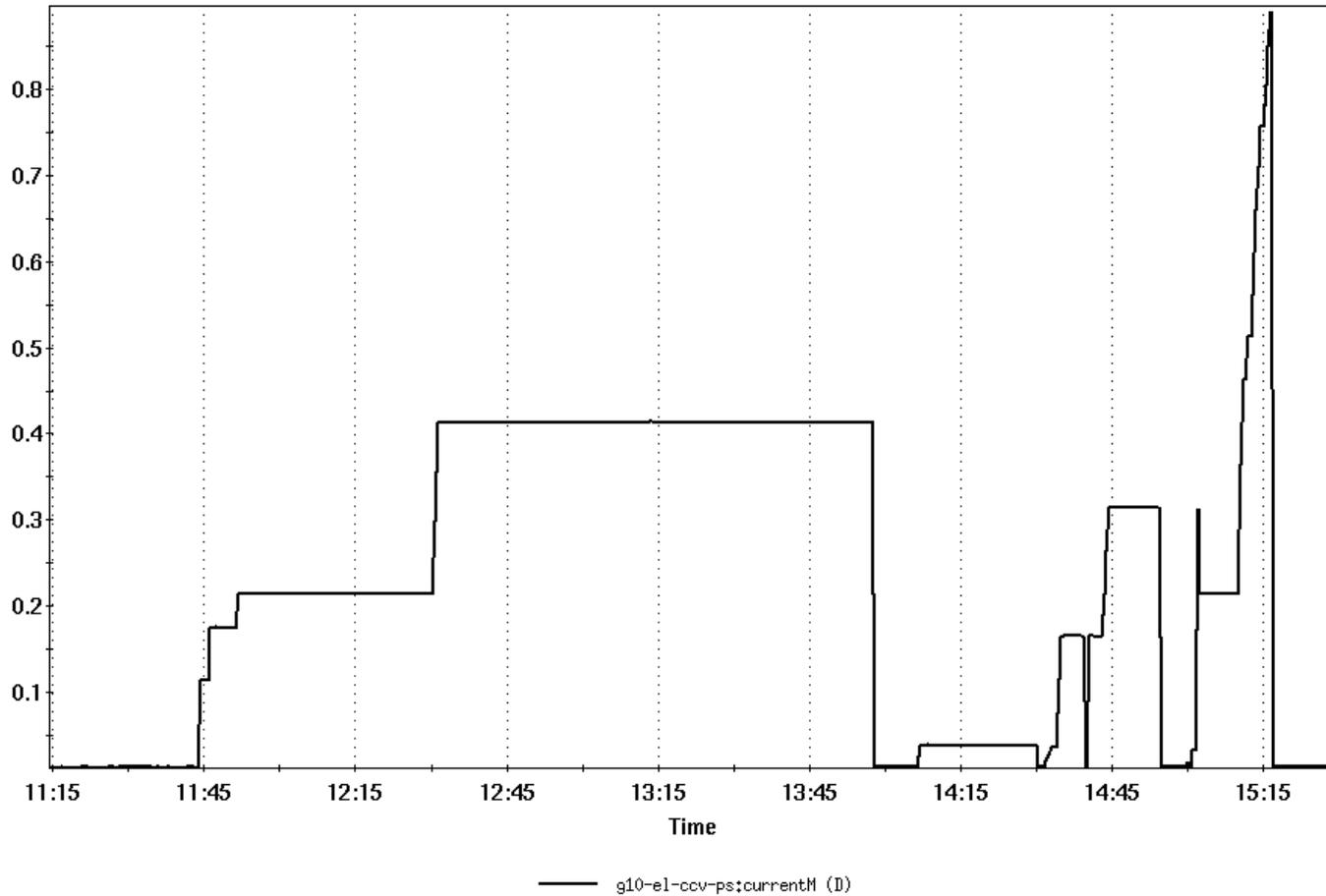


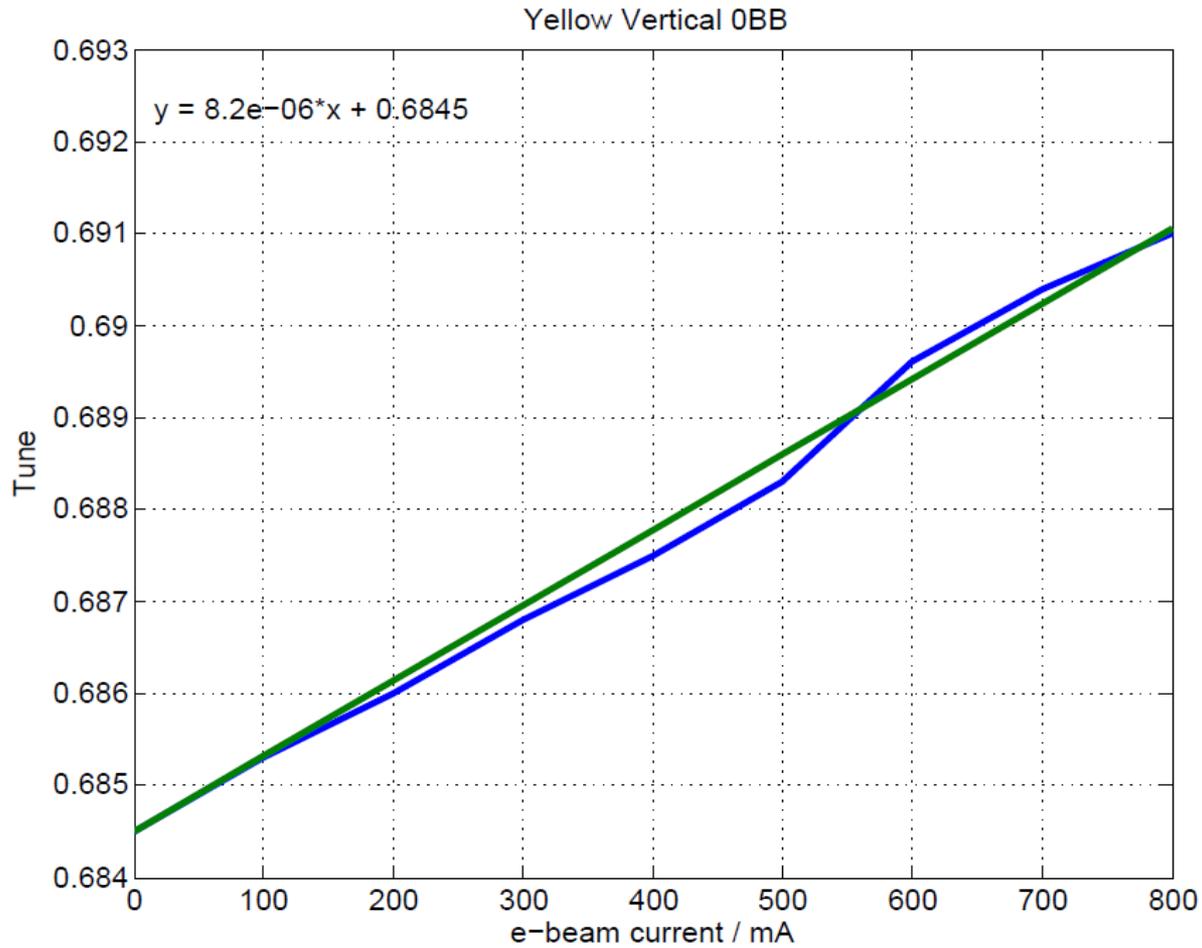
H2_R [mm]: 0.580 Angle [mrad]: -0.288 H1_R [mm]: 0.136 V2_R [mm]: -0.490 Angle [mrad]: 1.064 V1_R [mm]: 1.149
 H2_E [mm]: -0.0 Angle [mrad]: 0.411 H1_E [mm]: 0.6 V2_E [mm]: 0.6 Angle [mrad]: -0.373 V1_E [mm]: 0.0

03/09/2015





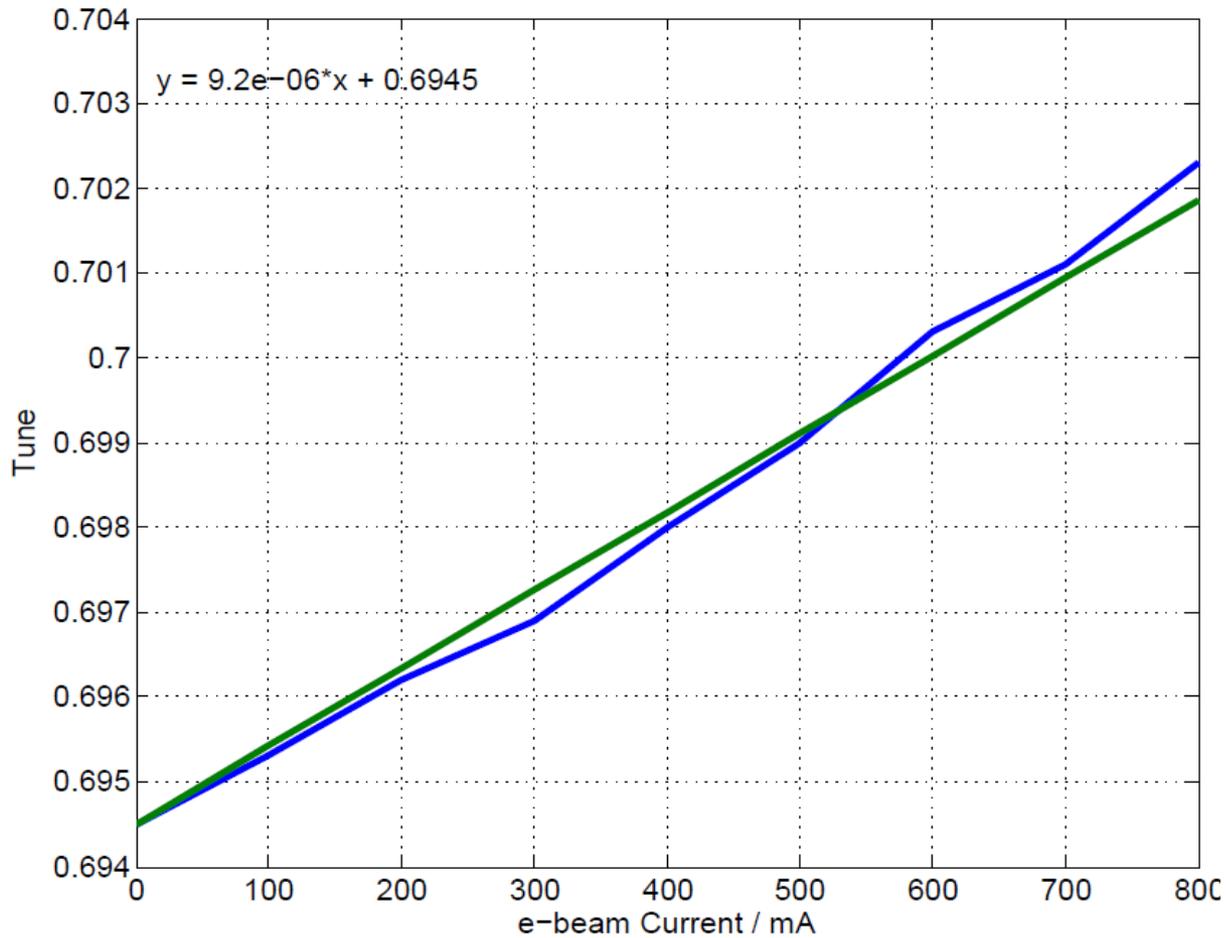




0.89E-3 for yellow, and 0.86E-3 for blue

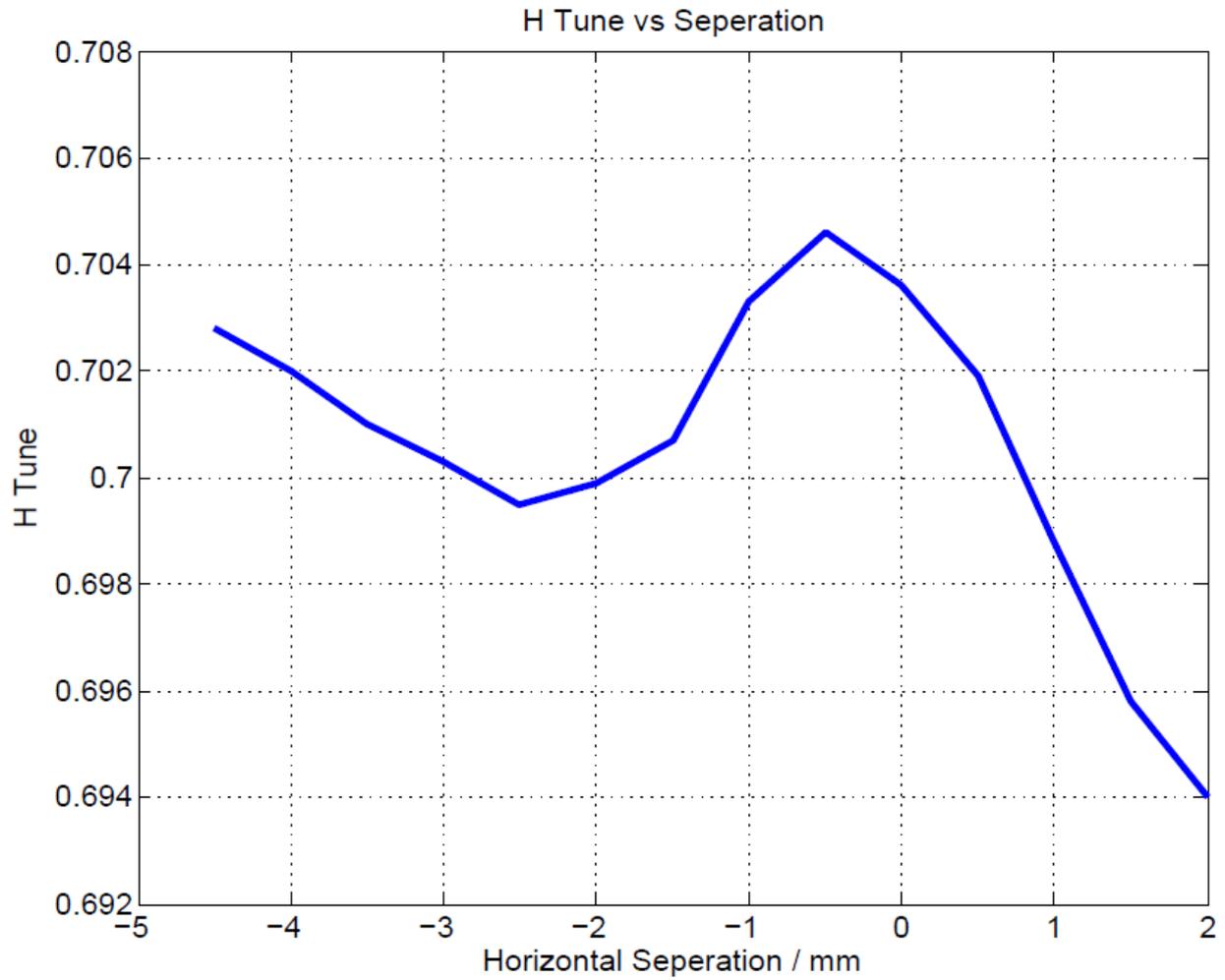


Yellow Horizontal 0BB



0.89E-3 for yellow, and 0.86E-3 for blue





-
1. Notched DC (parasitic mode with full length) or turn on drift tube (be careful) for ion accumulation test; Need e-p collision at the end of store
 2. Transverse displacement to check beam loss and tune: minimum beam loss and maximum tune when well aligned. Although these check maybe less sensitive to the eBSD signal. Need e-p collision at the end of store
 3. Change to longer bunch length to check whether we have more fast emittance growth (?); Need e-p collision at the end of store
 4. Beam profile measurement via YAG with RHIC beam, to check beam profile distortion by RHIC beam. No e-p collision at the end of store
 5. Beam longitudinal current measurement via Pinhole with RHIC beam, to check beam longitudinal change by RHIC beam. No e-p collision at the end of store
 6. Optimize RHIC working point;
 7. For beam position and current jitter, BPM stripe plate signal and DT01 signal (FFT) w/o DC e-beam;
 8. E-beam energy vs Tune measurement (4kV, 4.5kV, 5kV, 5.5 kV, 6kV)
 9. E-beam size vs Tune measurement
 10. 1D beam separation vs Tune

