BBA plan for 05/02/11 (preliminary)

9 GeV, Au
28 MHz

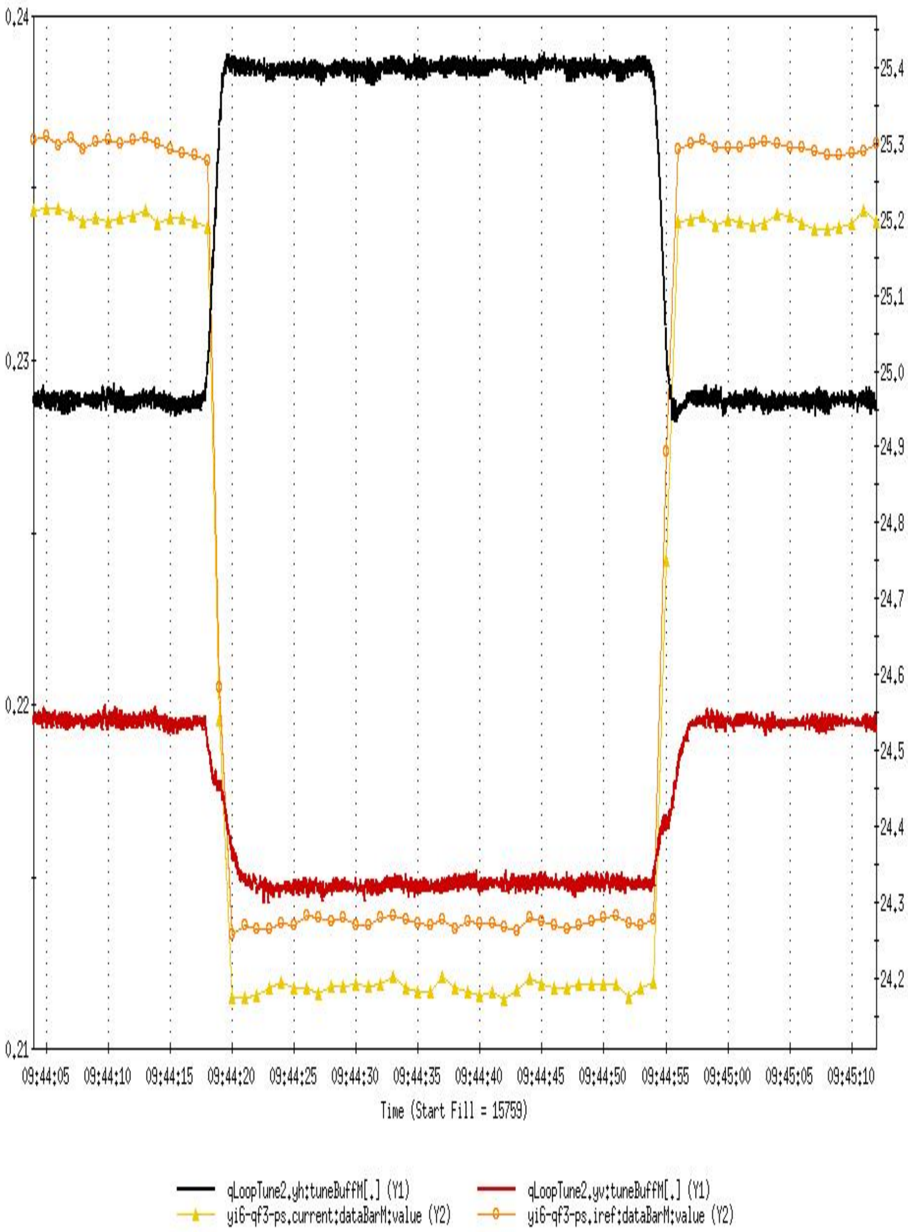
Goal(s): identify possible sources of systematic errors
demonstrate reproducibility
test 2 codes

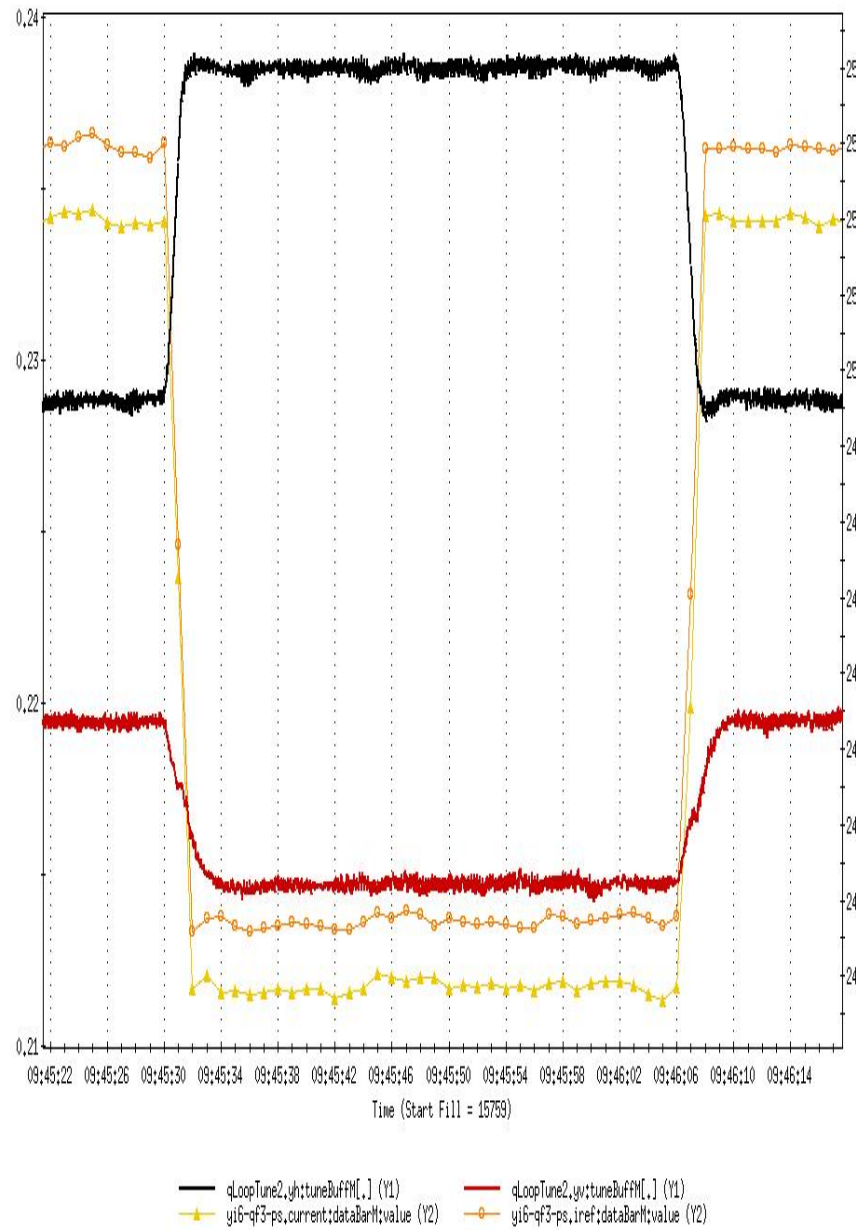
if time permits: acquire data at IP6 and/or IP12 (that order?), however we will request time for similar at high energy when conditions allow

Pre data acquisition:
- evaluate (if applicable) time-dependencies due to persistent currents
  - (make APEX backup plan if present?)
- ensure large proximity to resonance
- separate tunes, measure coupling and correct if needed
- verify BPM timing for gain optimized for (single-bunch) beam current available
- ensure good starting orbit (using orbit feedback)

(1) For fixed bump amplitude, acquire data with multiple on/off changes to quad of interest (to verify settle times, number of acquisitions, check for external noise sources,… determine anticipated resolution / error bars associated with each subsequent data point)
(2) Iterate 3 measurements for a given BPM (vertical first, then horizontal)

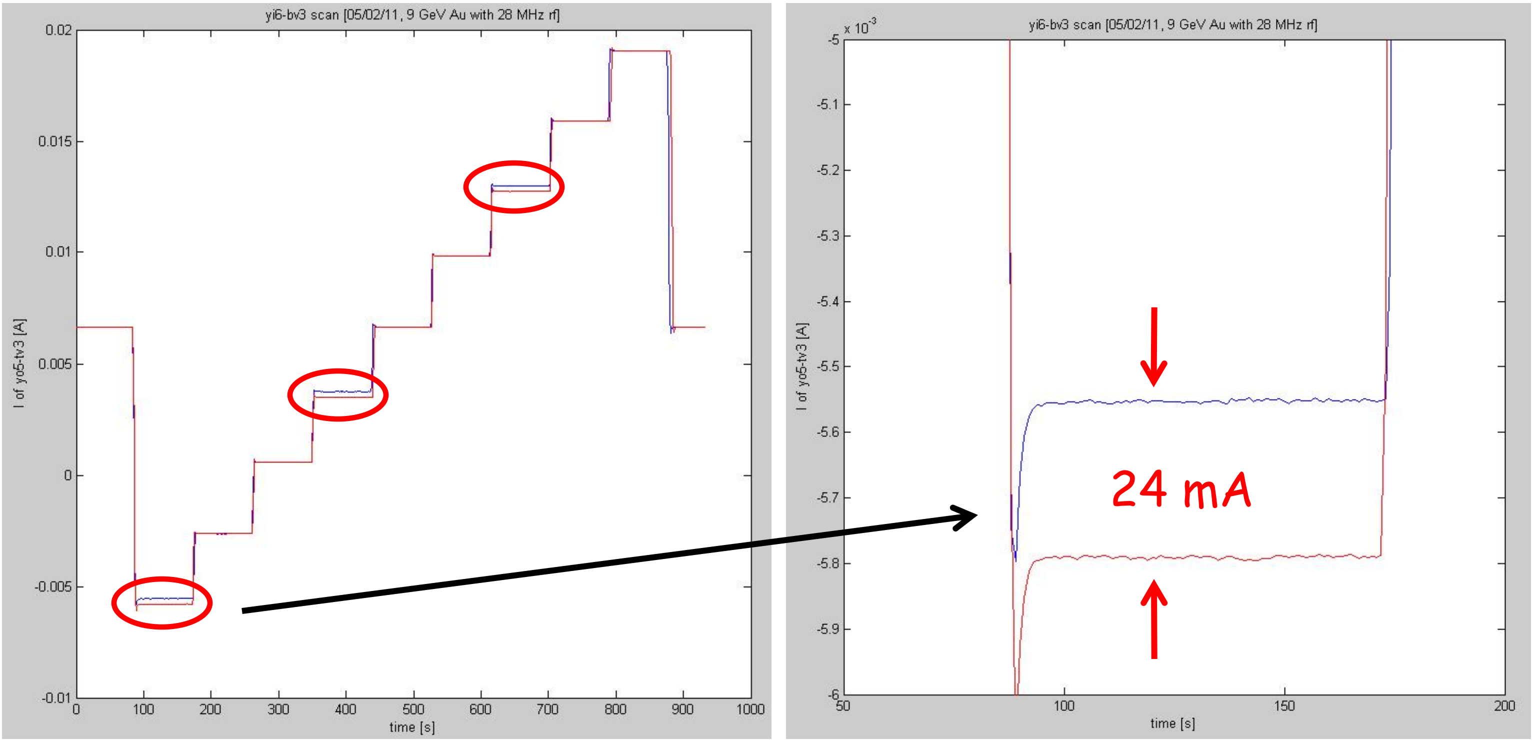
check stability of quadrupole power supply





⇨ yi6-qf3-ps – tunes stable (readbacks less so)

check stability of corrector power supply



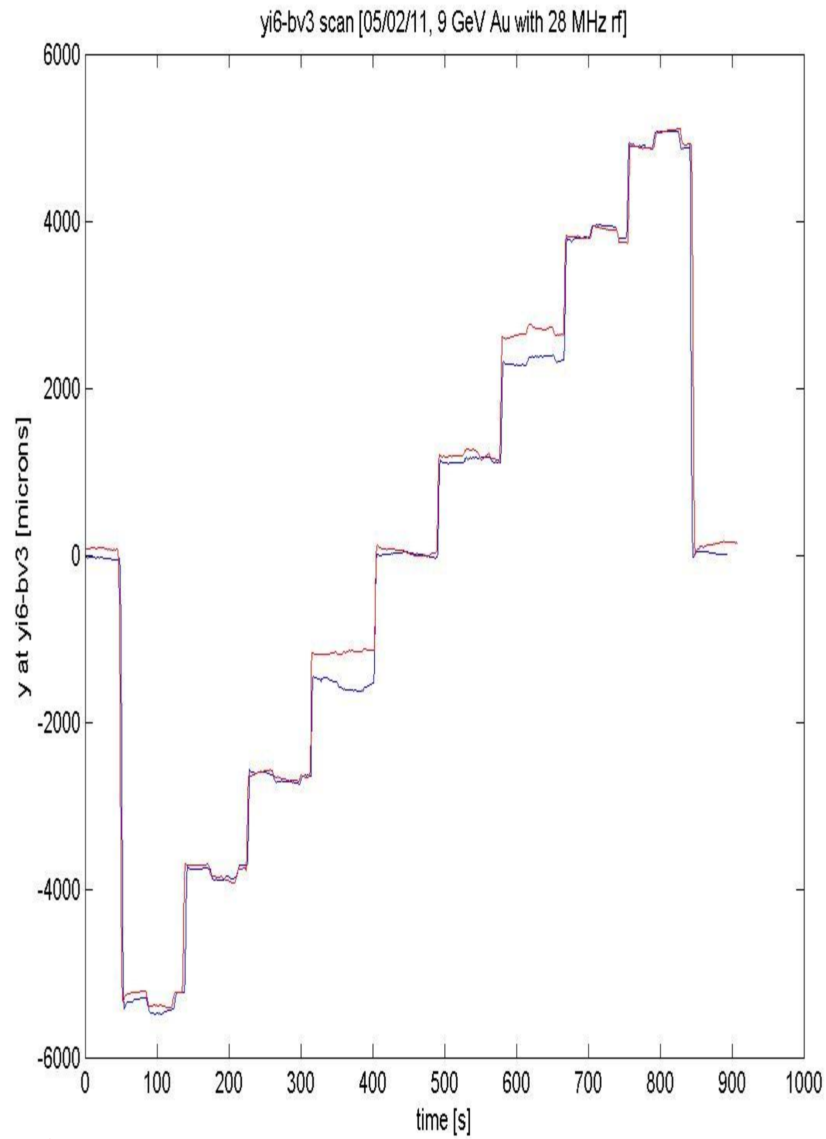
Vertical axis: current/100 [A]

Power supply controller regulation specification:

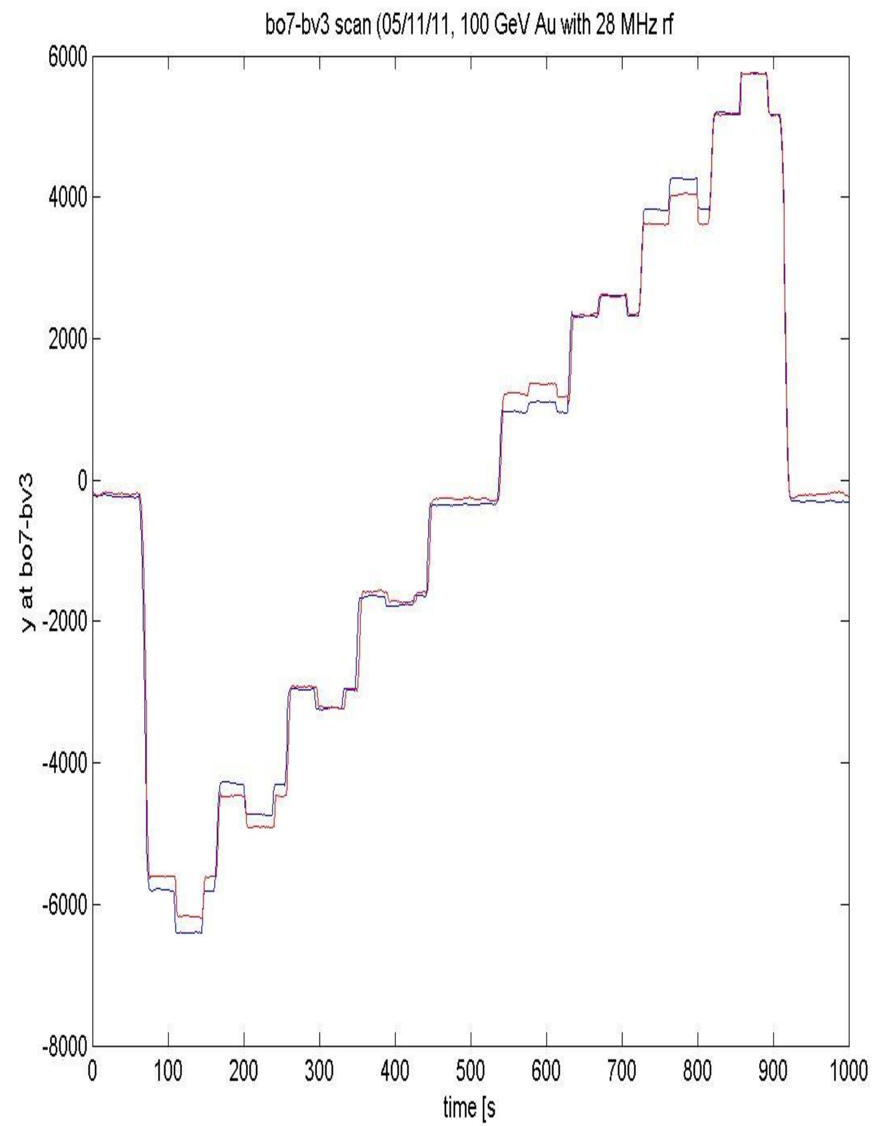
+/- 50A/2^12 = 24 mA

⇨ Reproducibility of bump settings limited by corrector power supply controller resolution

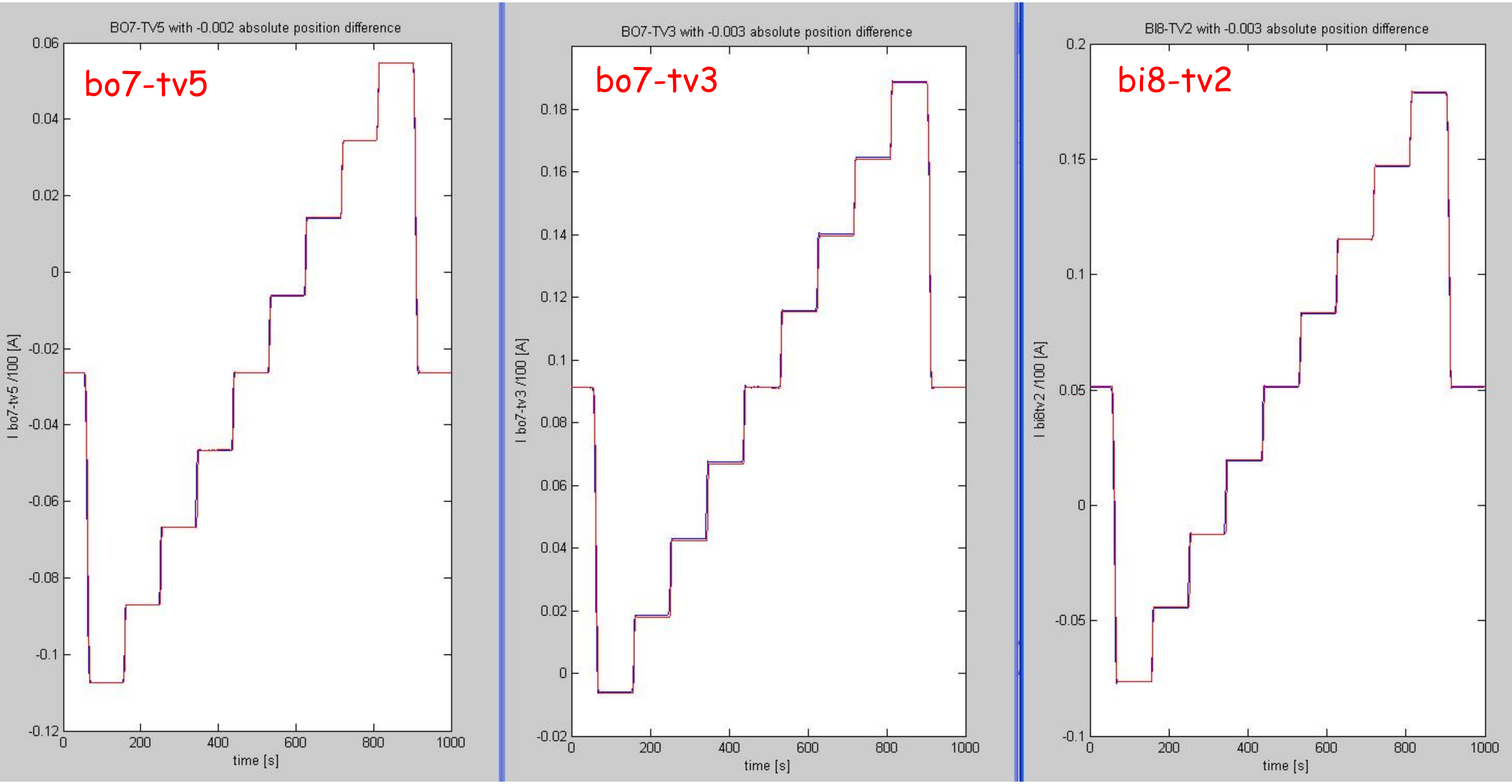
APEX 05/02/11
9 GeV, Au



APEX 05/11/11
100 GeV, Au

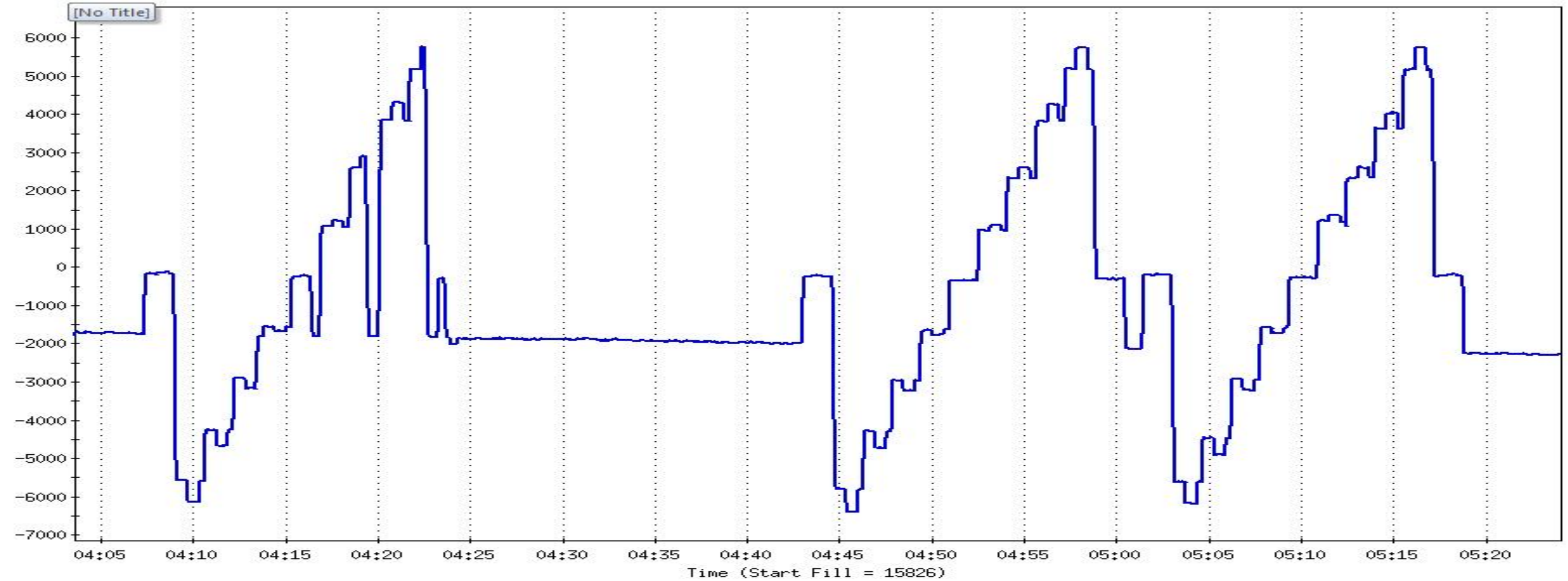


⇨ Surprise, still observe step-by-step irreproducibility check stability of corrector power supply, at 100 GeV

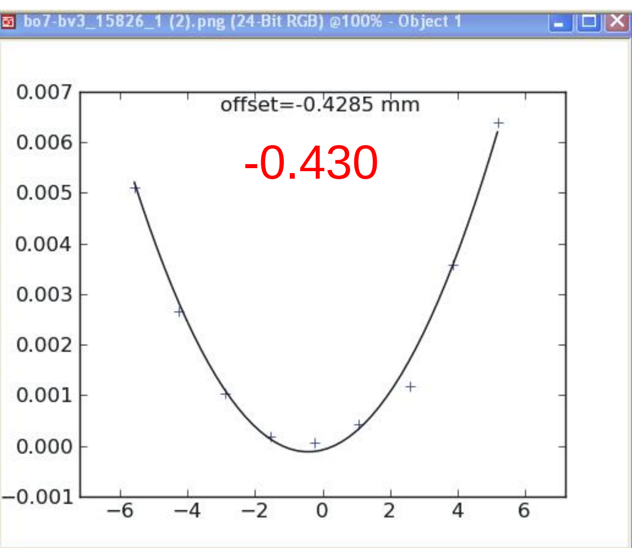


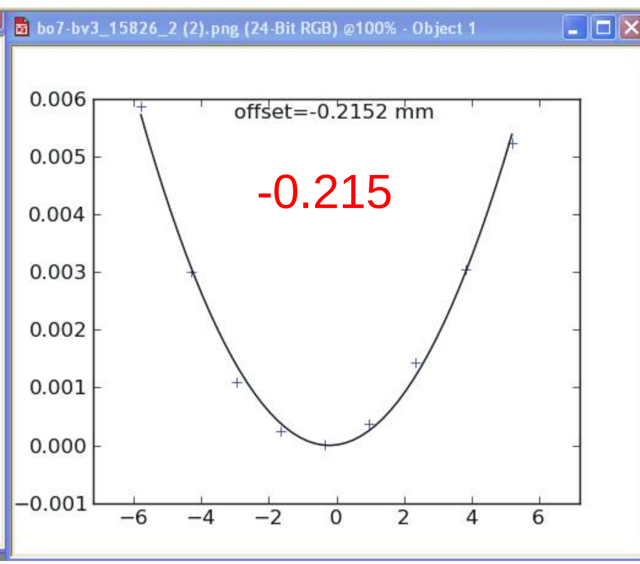
⇨ good – conclusion: at the desired level of precision, method susceptible to accelerator drift

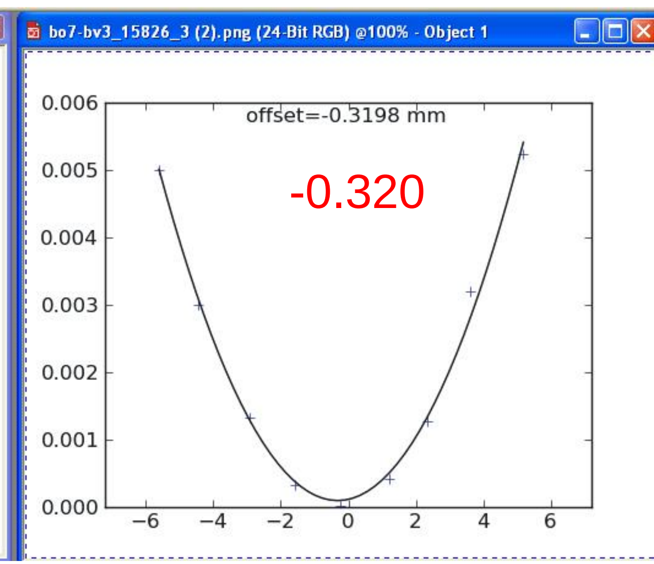
05/11/11 data



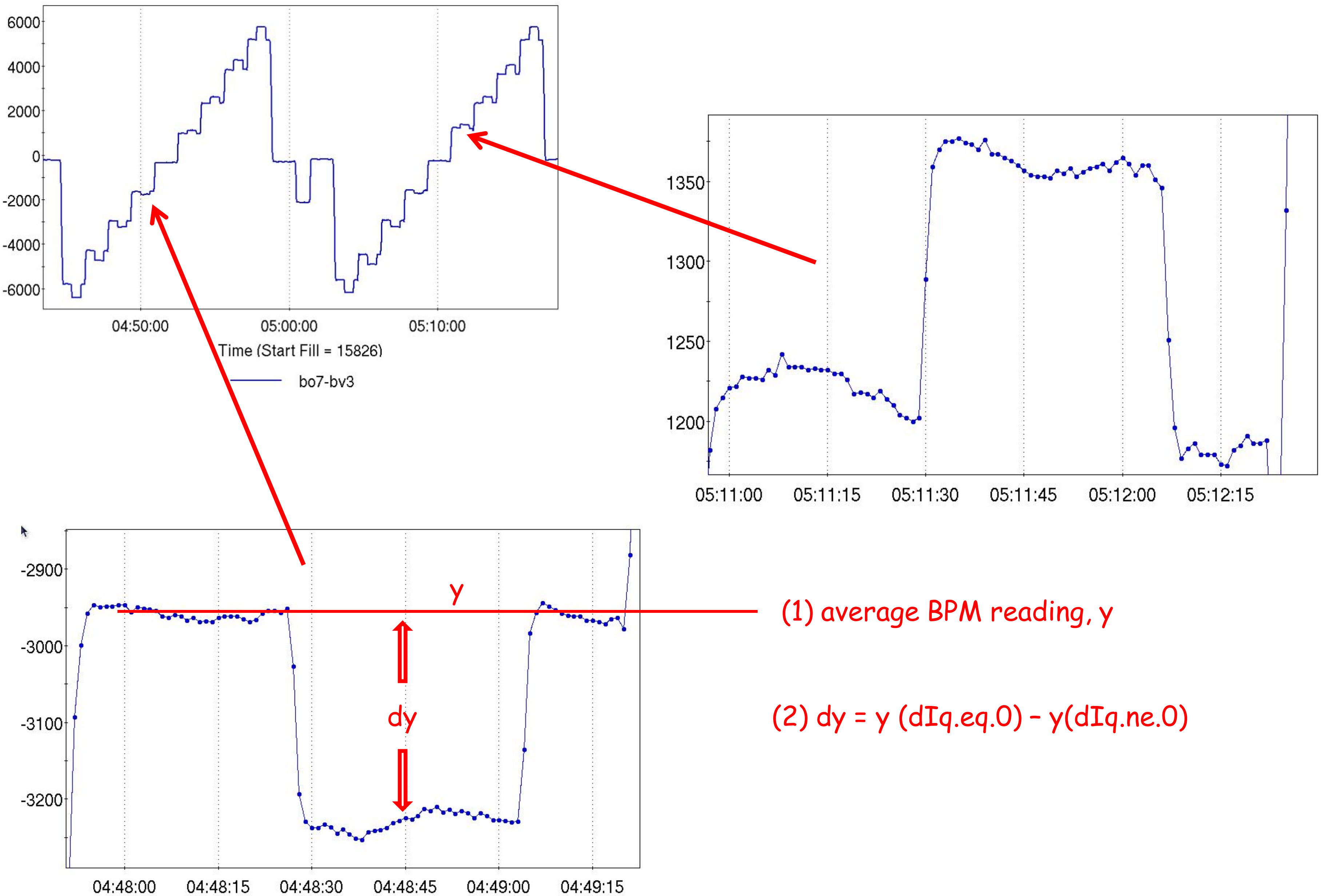
online (arc rms) method

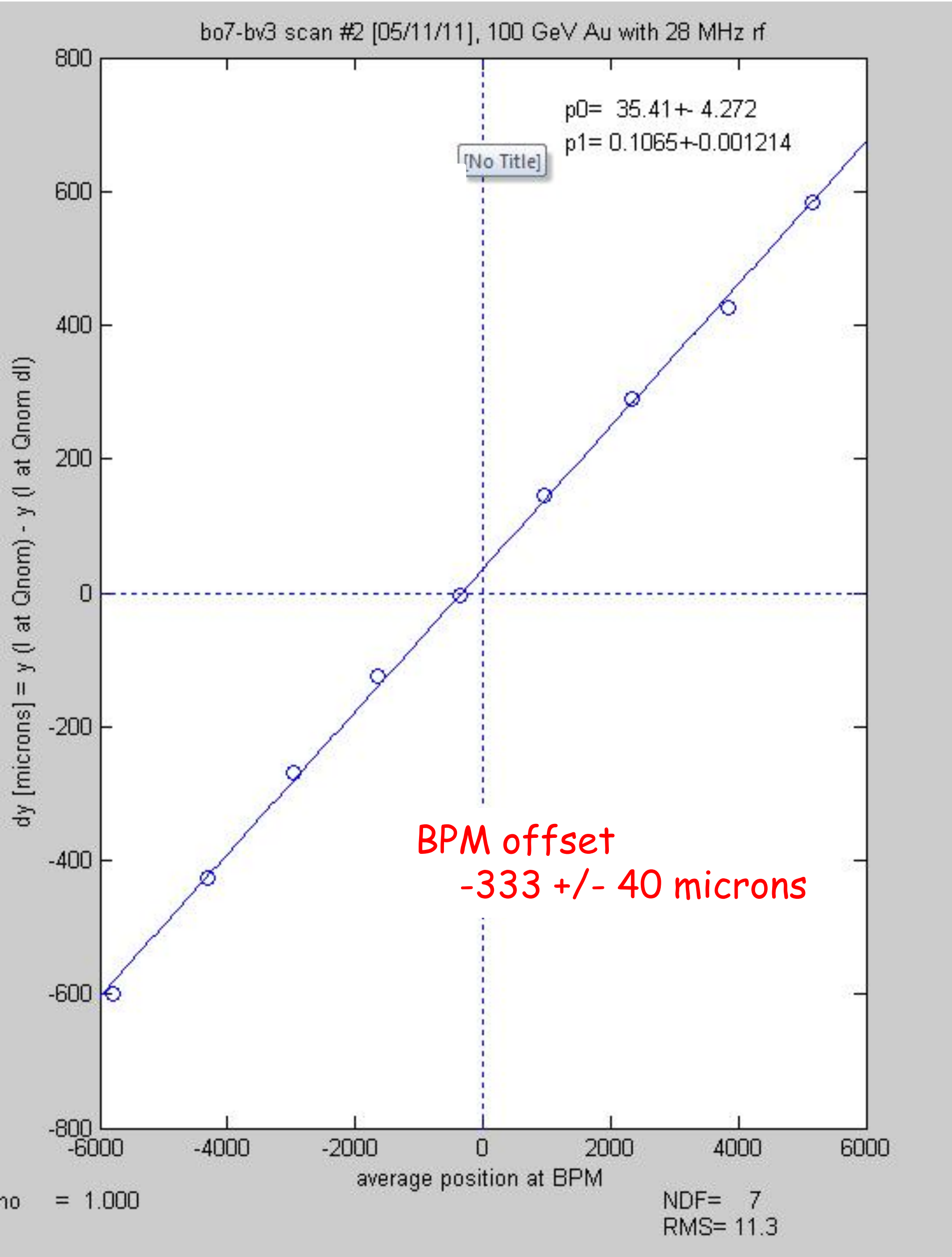


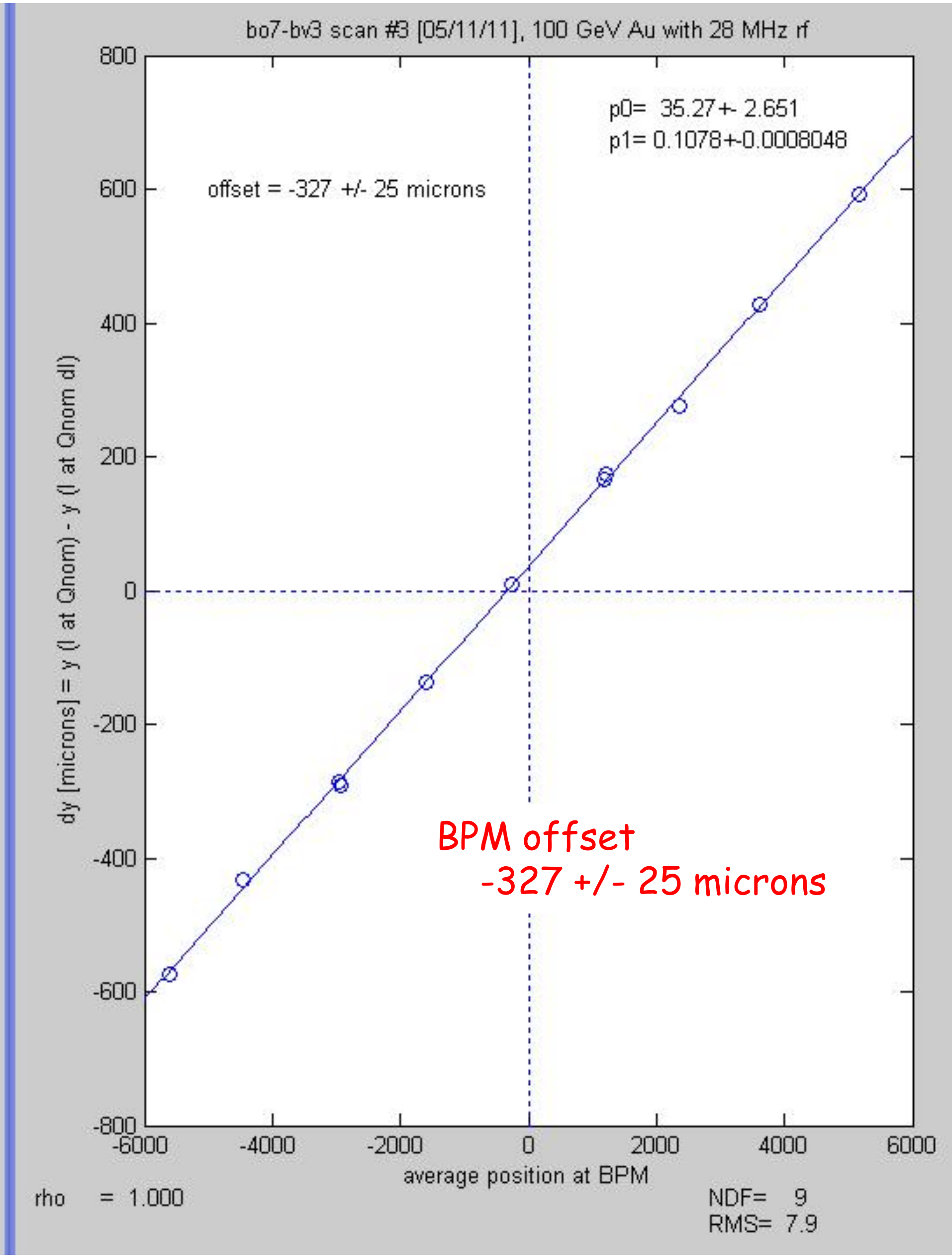




alternate approach

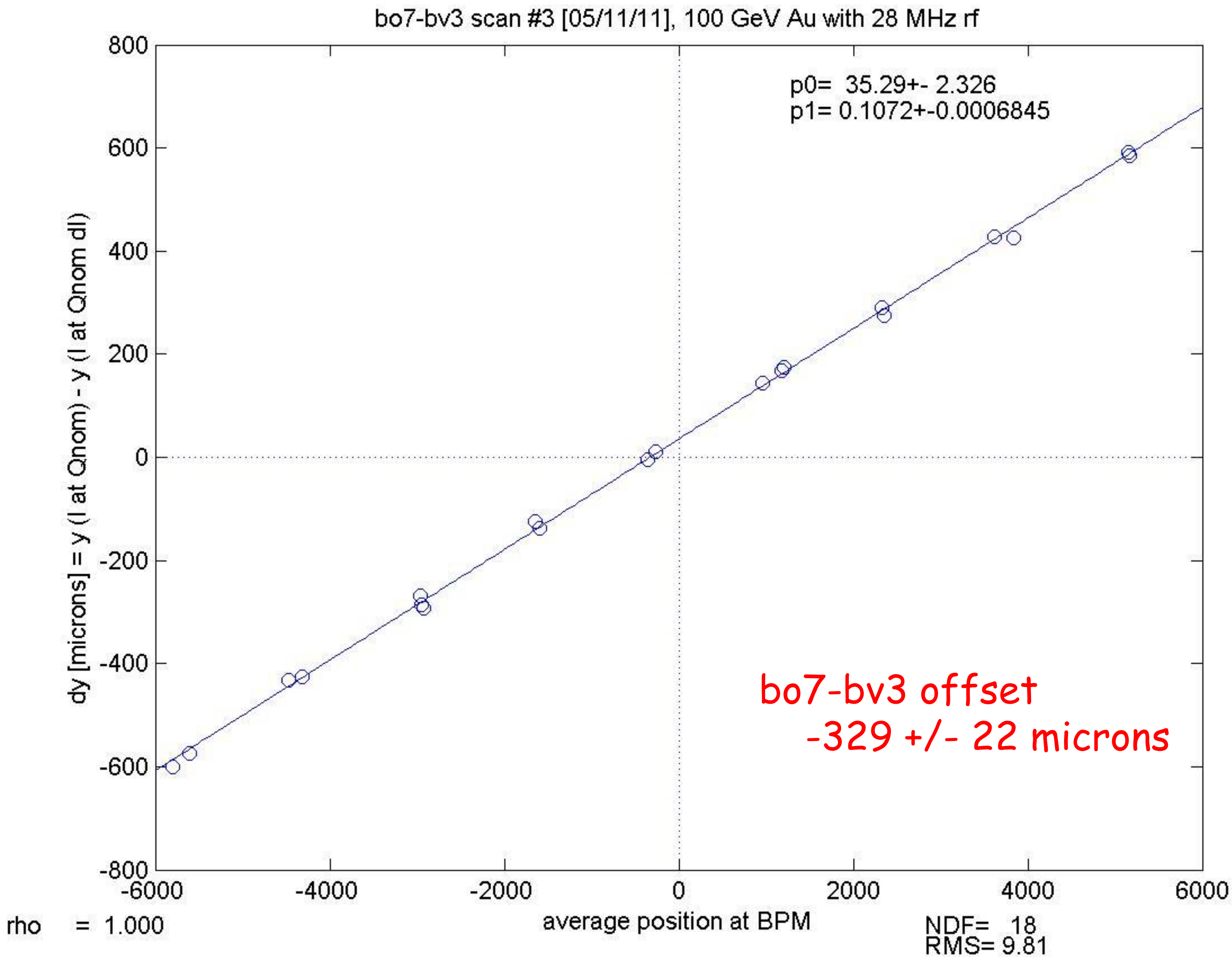






⇨ reproducible

⇨ combine the data



This should provide a strong motivation to set up the beam with close to zero angle into the quad of interest..for the triplets this amounts to:

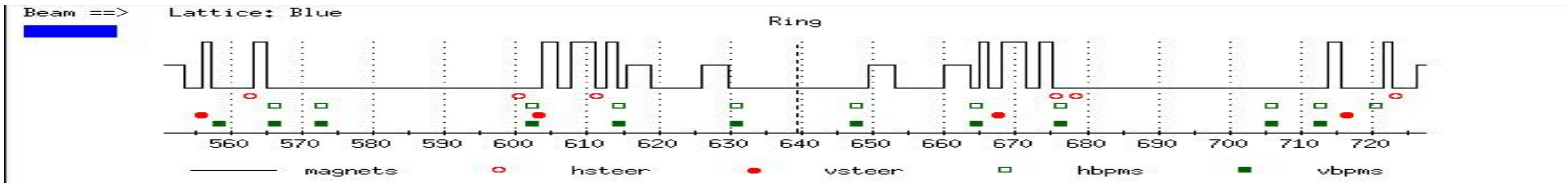
05/12/11 – P. Pile

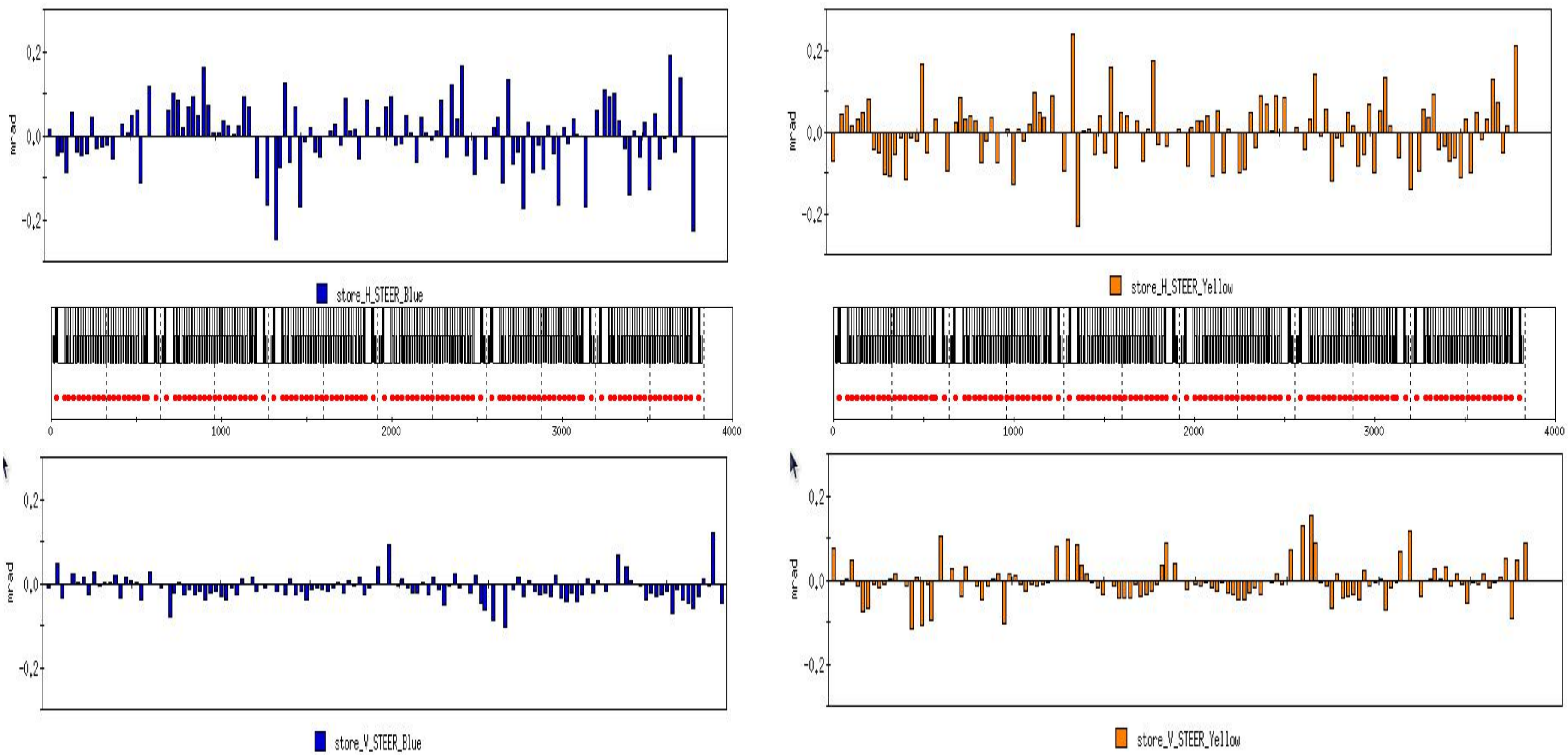
(1) turning off Q1-Q3 dipole kickers

(2) tweeking upstream kickers to get x=y=0 at Q3 and Q1 bpms

(3) check that the x/y rms orbit shifts with Q3 and Q1 changes are close to zero and if not tweek x/y positions at the respective quad to minimize the orbit sfifts

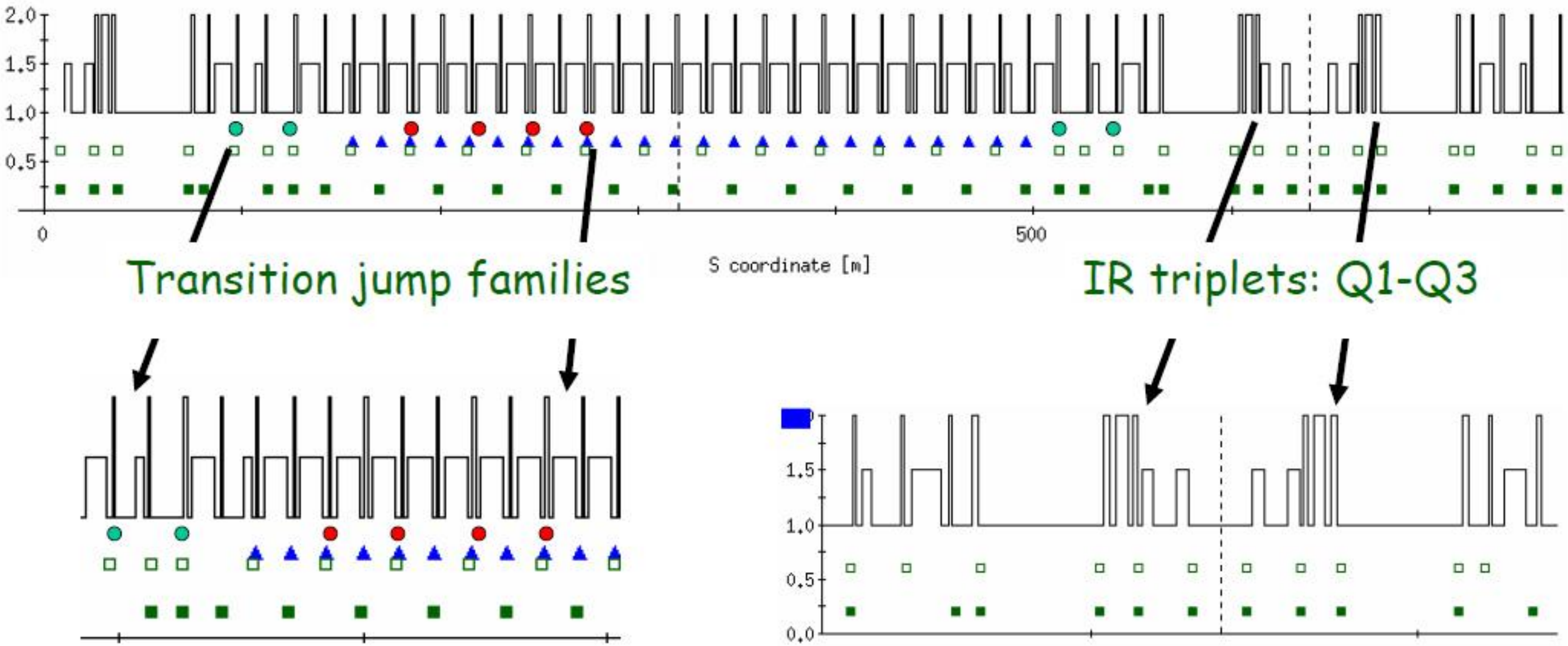
With this the normal bump routine should give reproducible results...or simply settle for the offsets one gets using the above procedure.



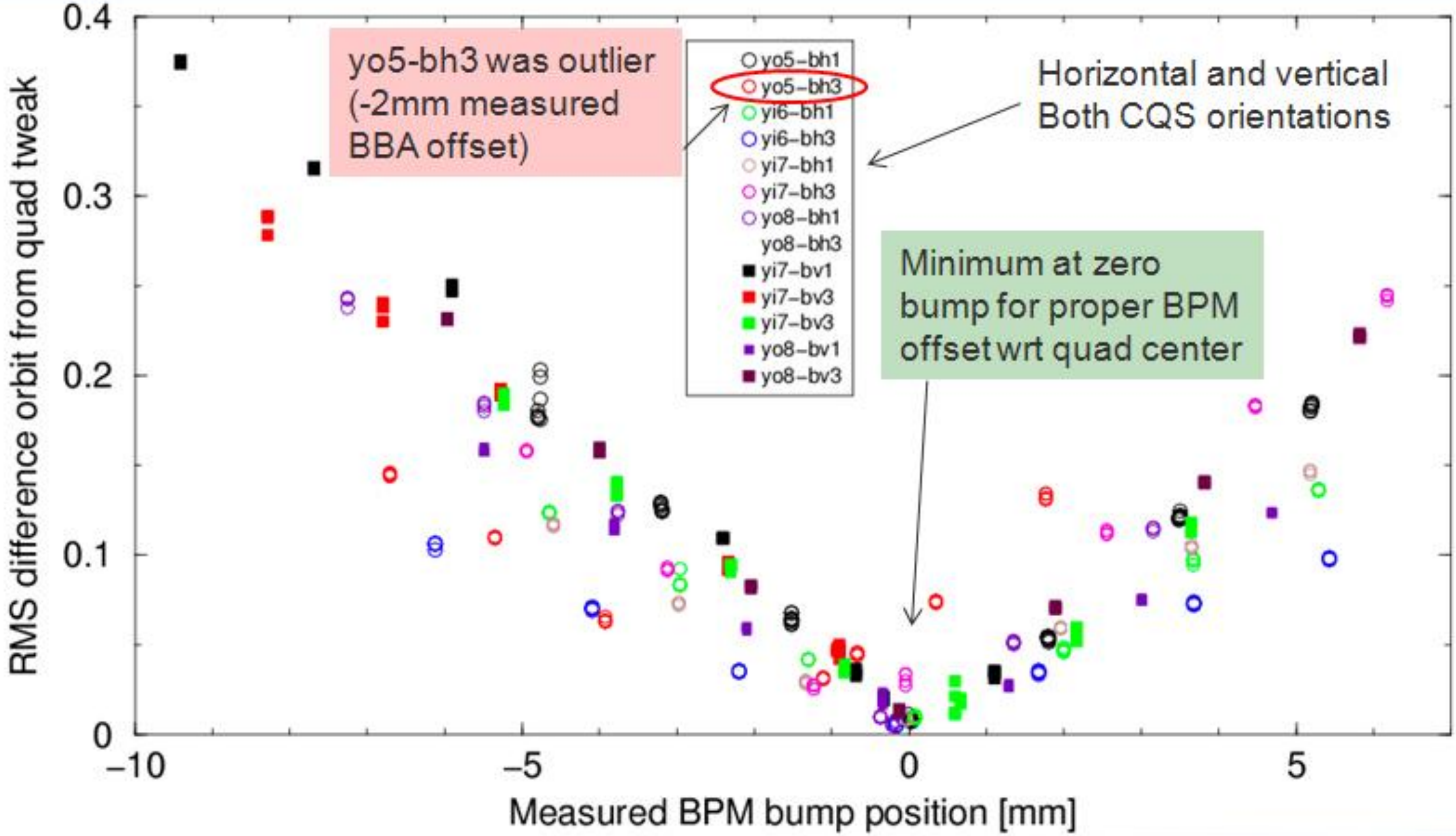


One sixth of one RHIC ring:

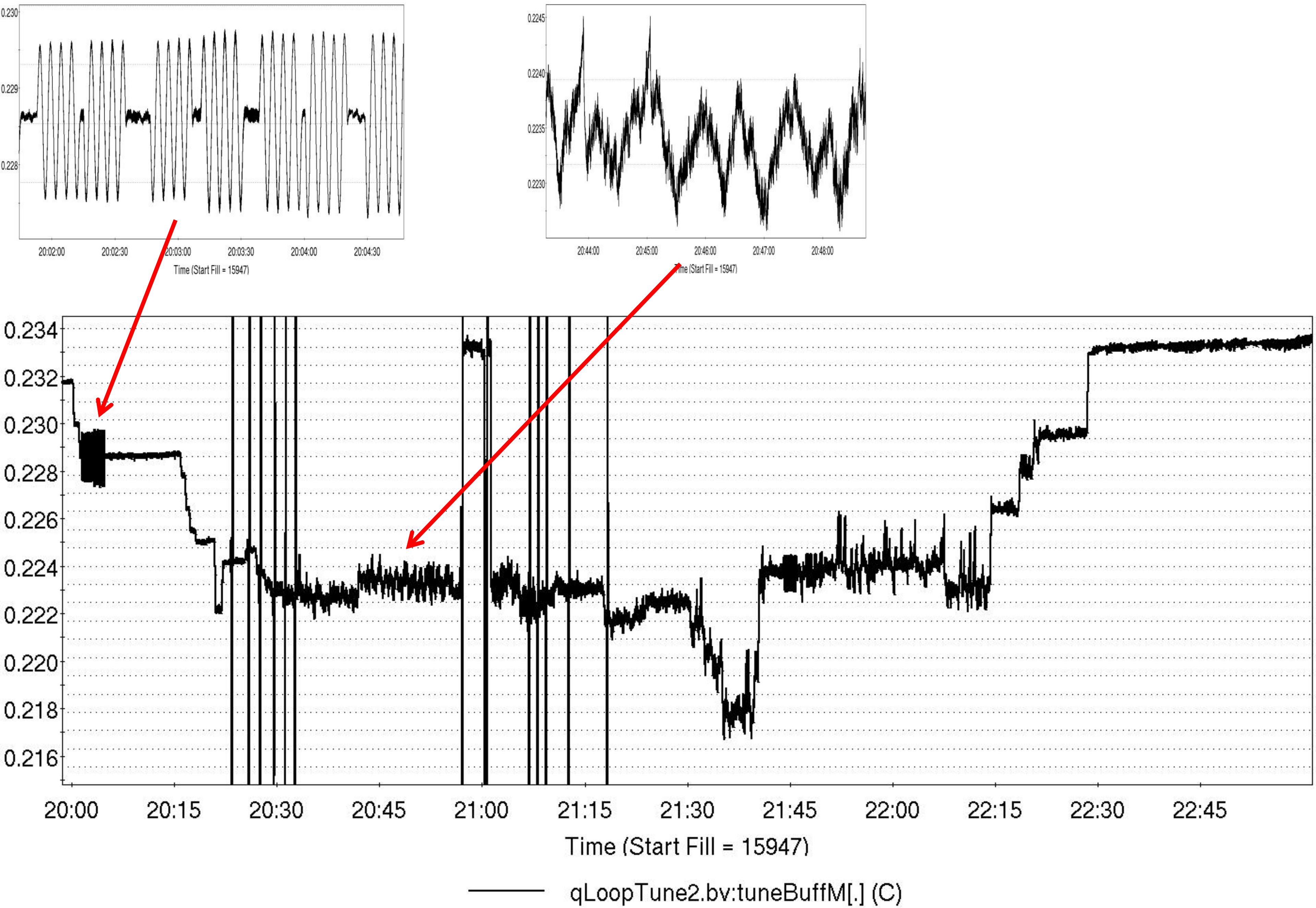
6 IR quadrupoles, 54 BPM planes, 24 chrom sextupoles (2 families), transition jump quadrupoles (2 families)



Yellow BBA Data, Mar 3-9 2010



- BBA offsets measured (near zero) in nearly all yellow low-β IR BPMs
- **Confirmation that BPM offset correction, including orientations, was correct**
- BBA data acquisition is 5min/BPM, Jordan has automated BBA data analysis



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0.228
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20:02:30
20:03:00
20:03:30
20:04:00
20:04:30
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0.2235
0.2230
20:44:00
20:45:00
20:46:00
20:47:00
20:48:00
Time (Start Fill = 15947)
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0.232
0.230
0.228
0.226
0.224
0.222
0.220
0.218
0.216
20:00
20:15
20:30
20:45
21:00
21:15
21:30
21:45
22:00
22:15
22:30
22:45
Time (Start Fill = 15947)
qLoopTune2.bv:tuneBuffM[.] (C)