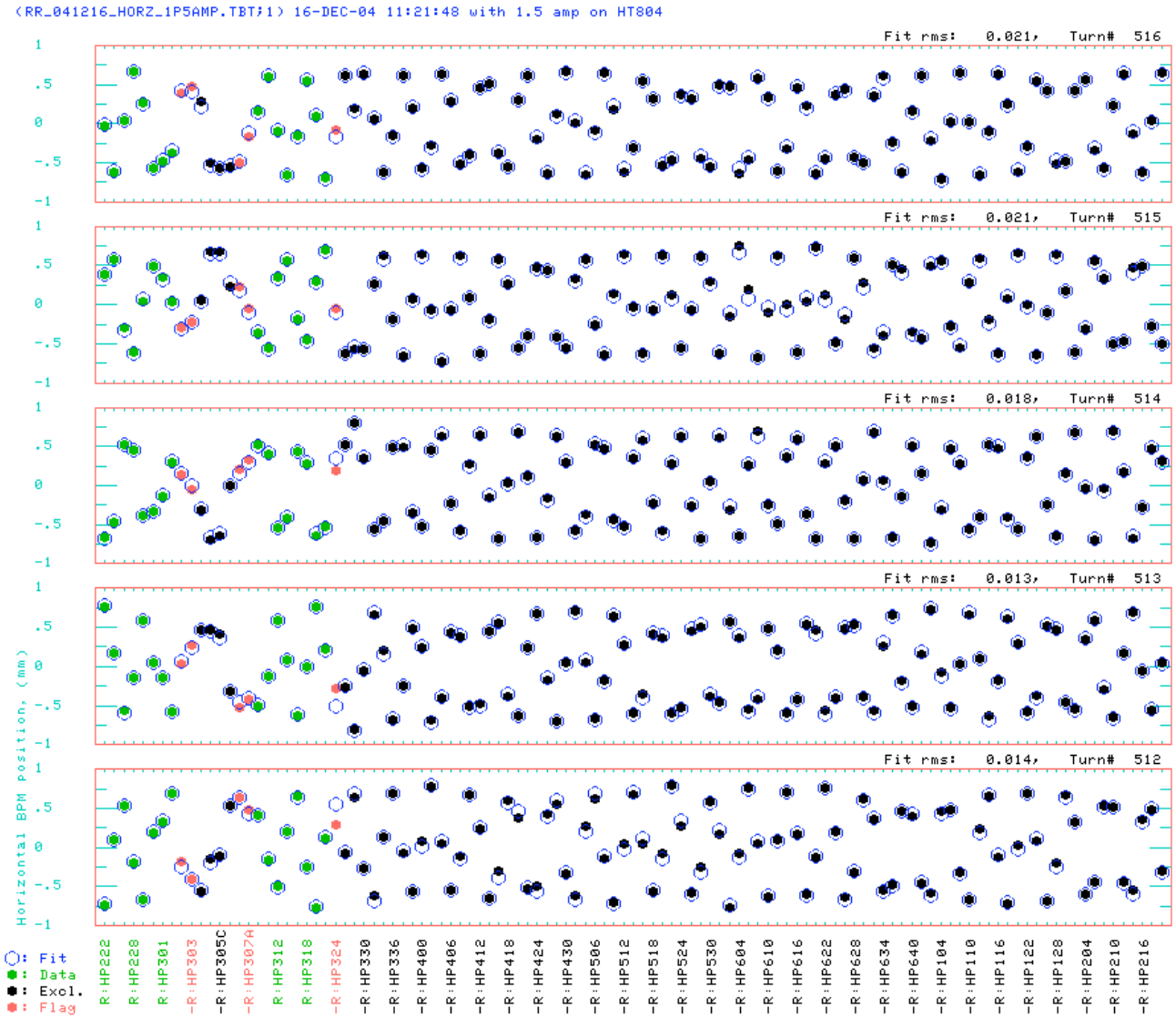
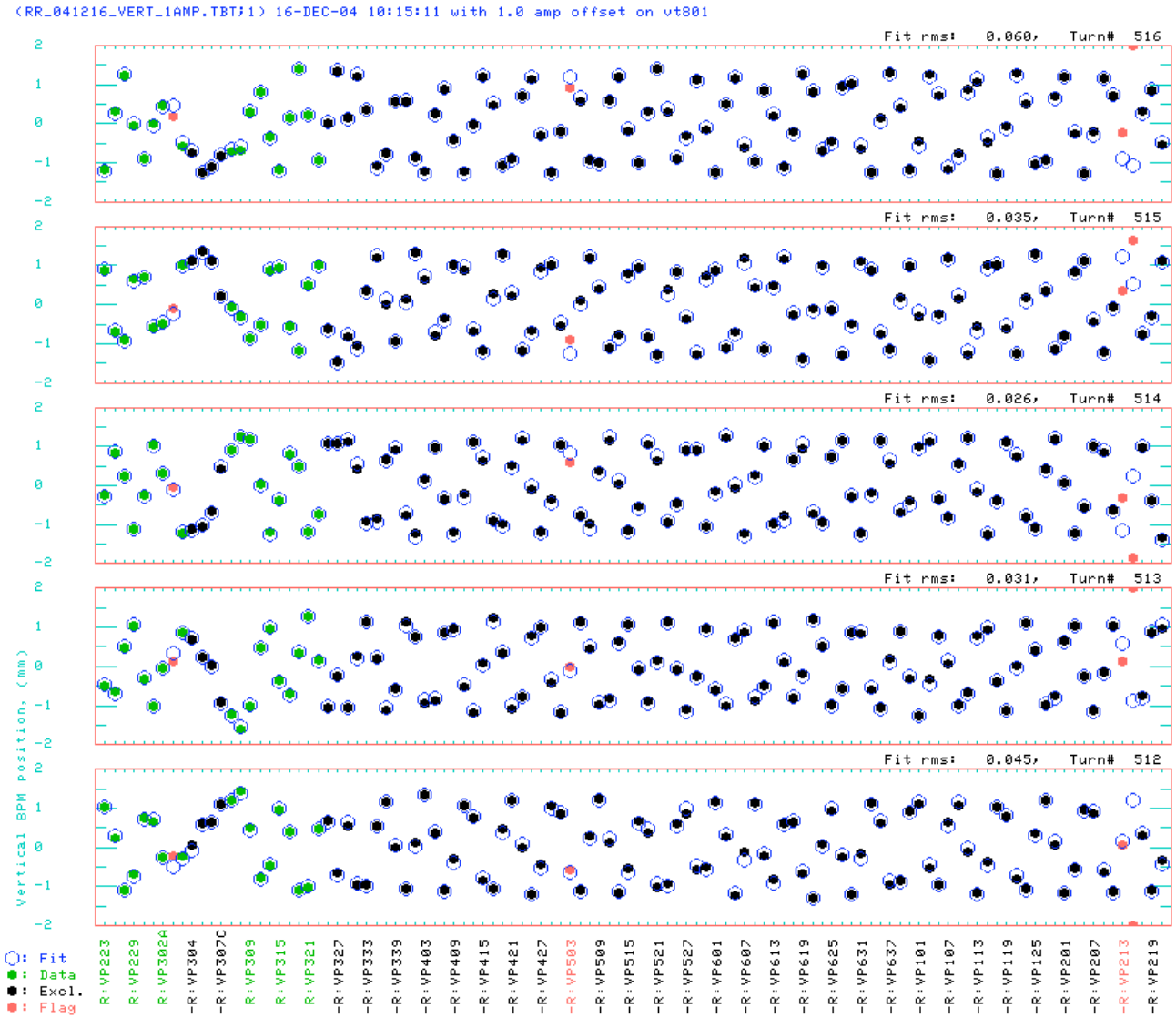
Recycler TBT lattice study

- TBT data
  - Injection, Horizontal & vertical planes.
  - Stored beam, horizontal plane
- Lattice function
  - Phase advance.
  - Beta & alpha functions.
- BPM diagnostics
  - RMS
  - Calibration

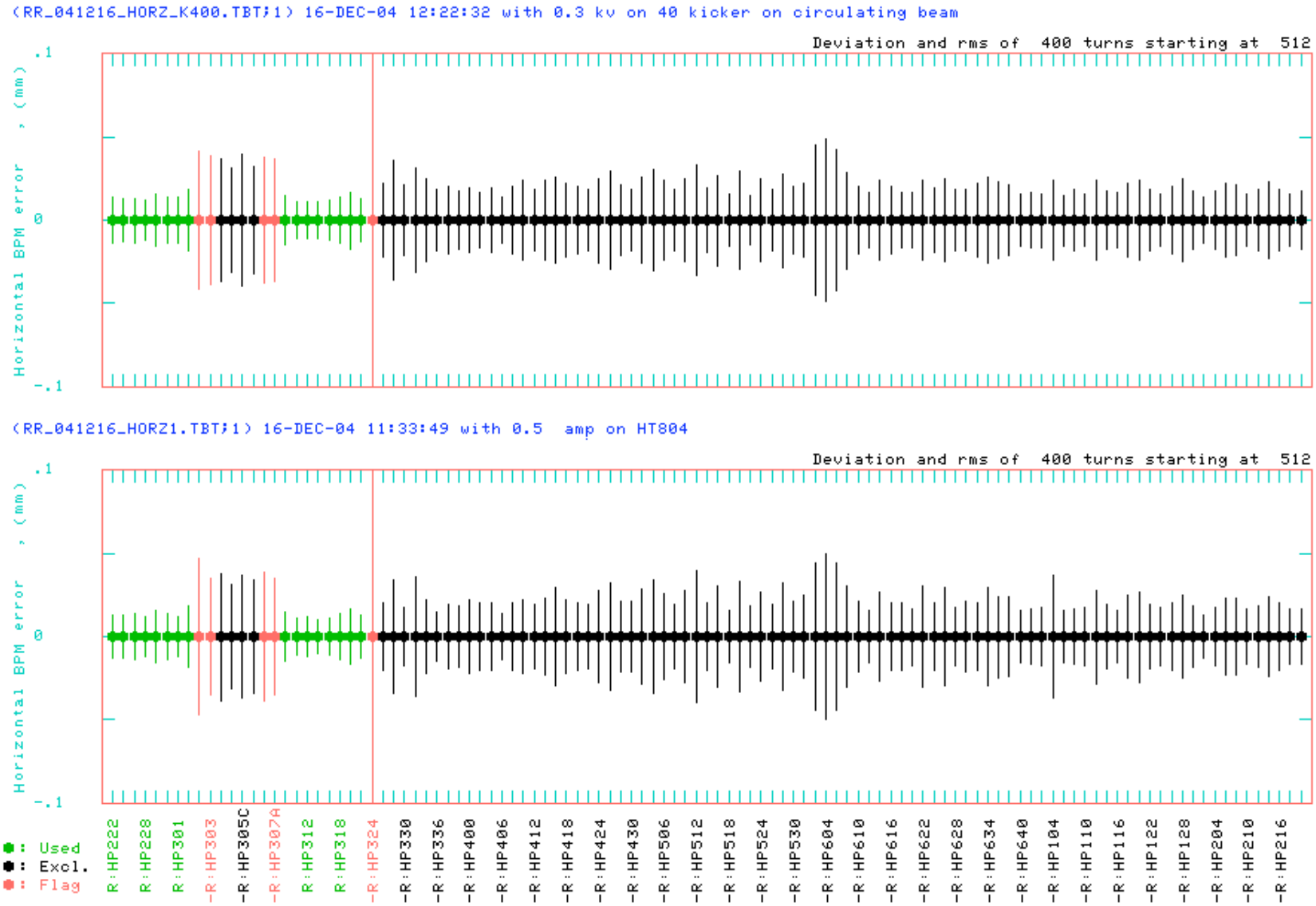
Ring-wide horizontal plane BPM data



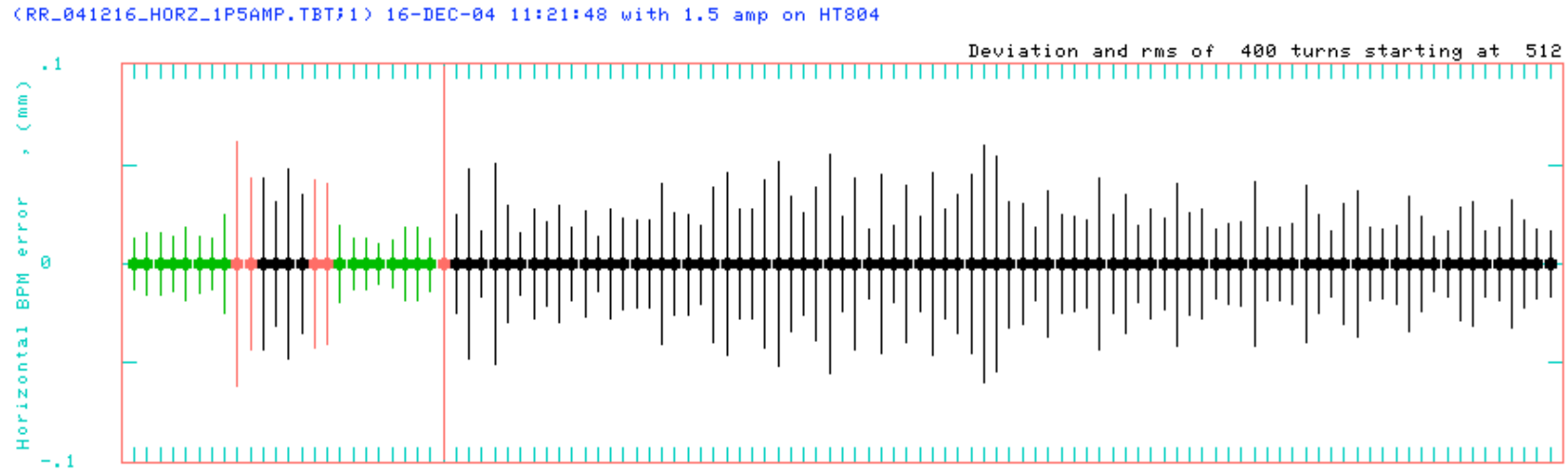
Ring-wide vertical plane BPM data

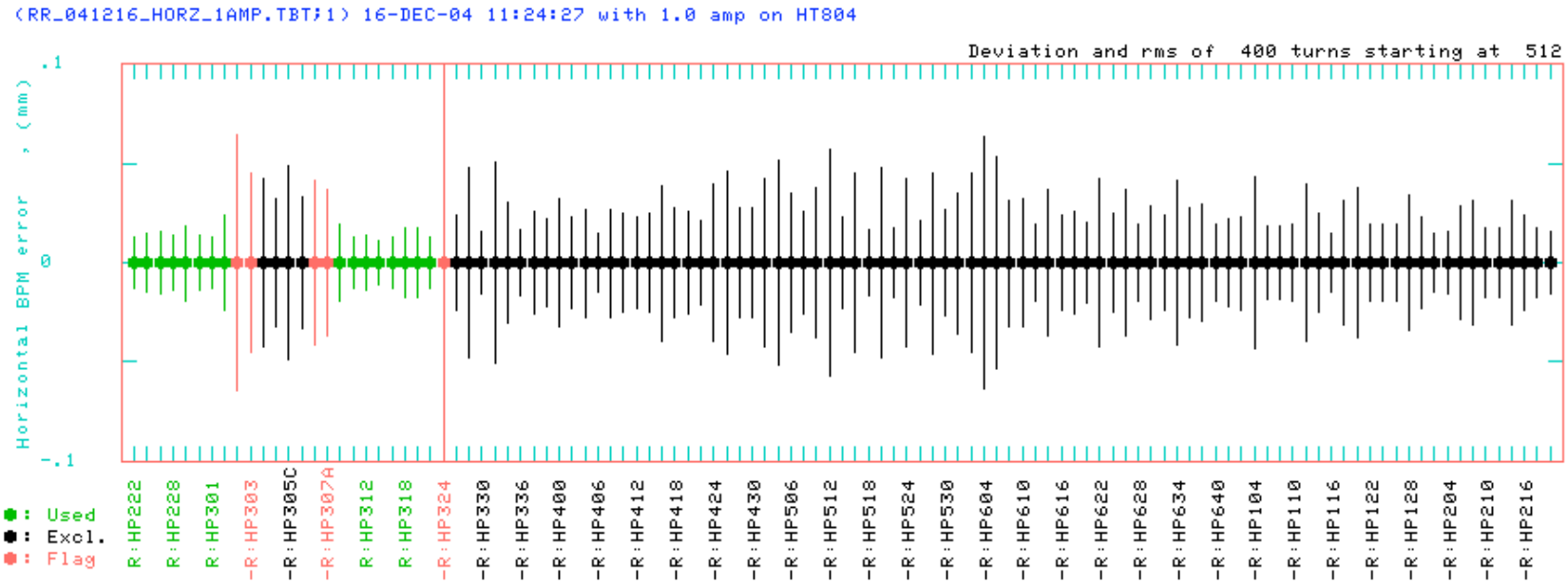


Horizontal RMS deviations, at injection & coasting beam

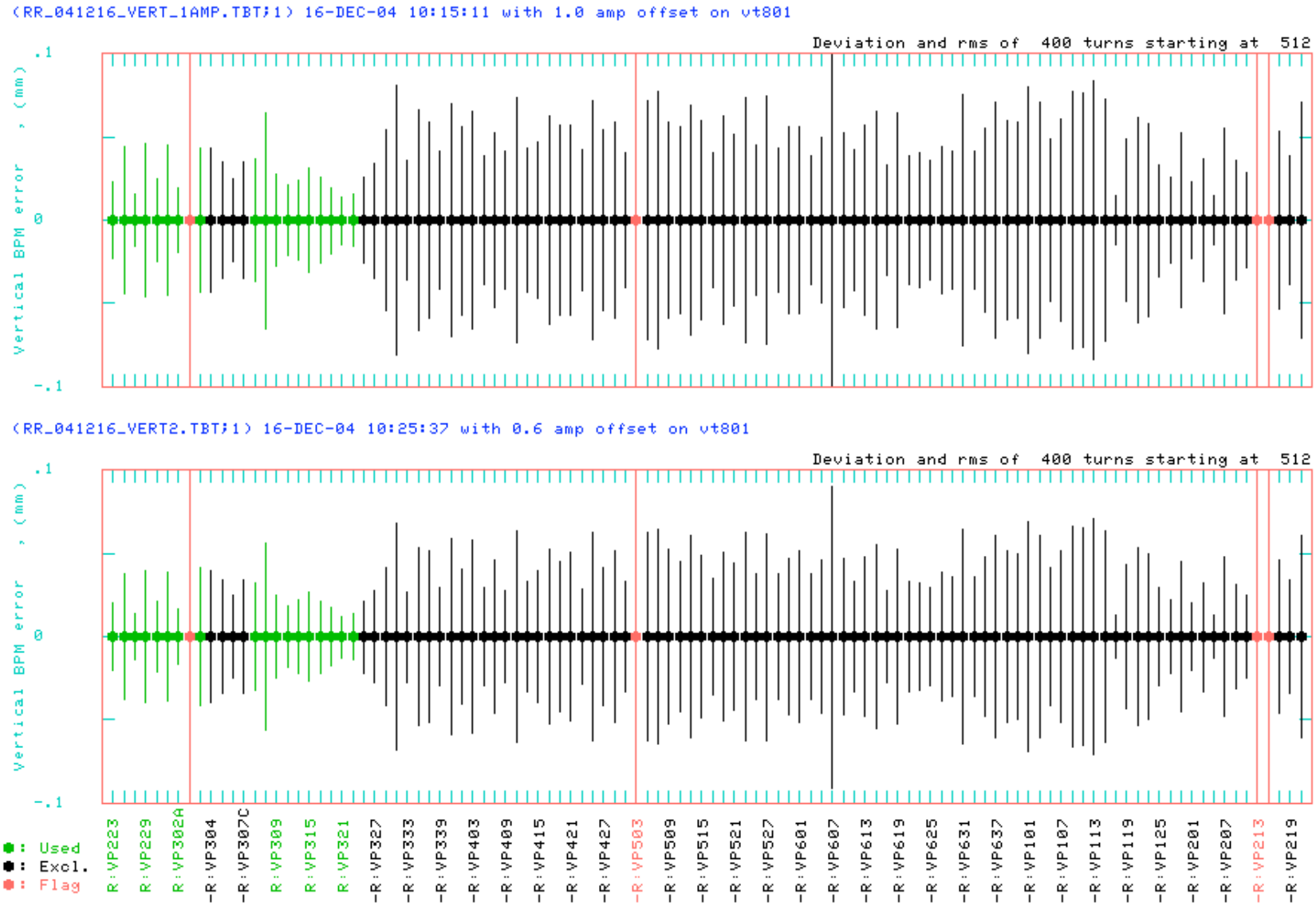


Horizontal RMS, HT804 @ 1.0 & 1.5 amps

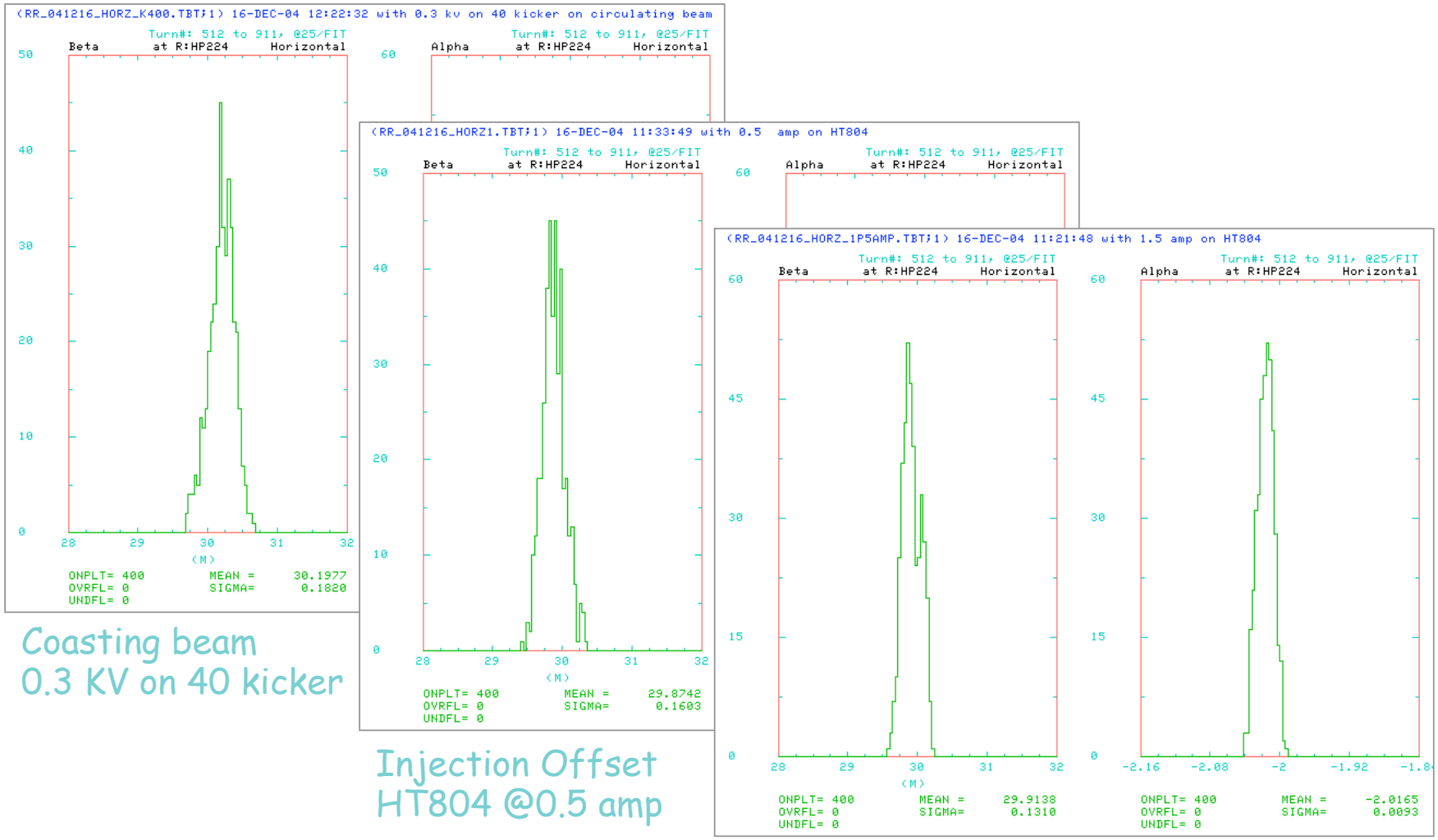




Vertical RMS deviation, VT803 @ 0.6 & 1.0 amp



Histograms of horizontal lattice function at HP224



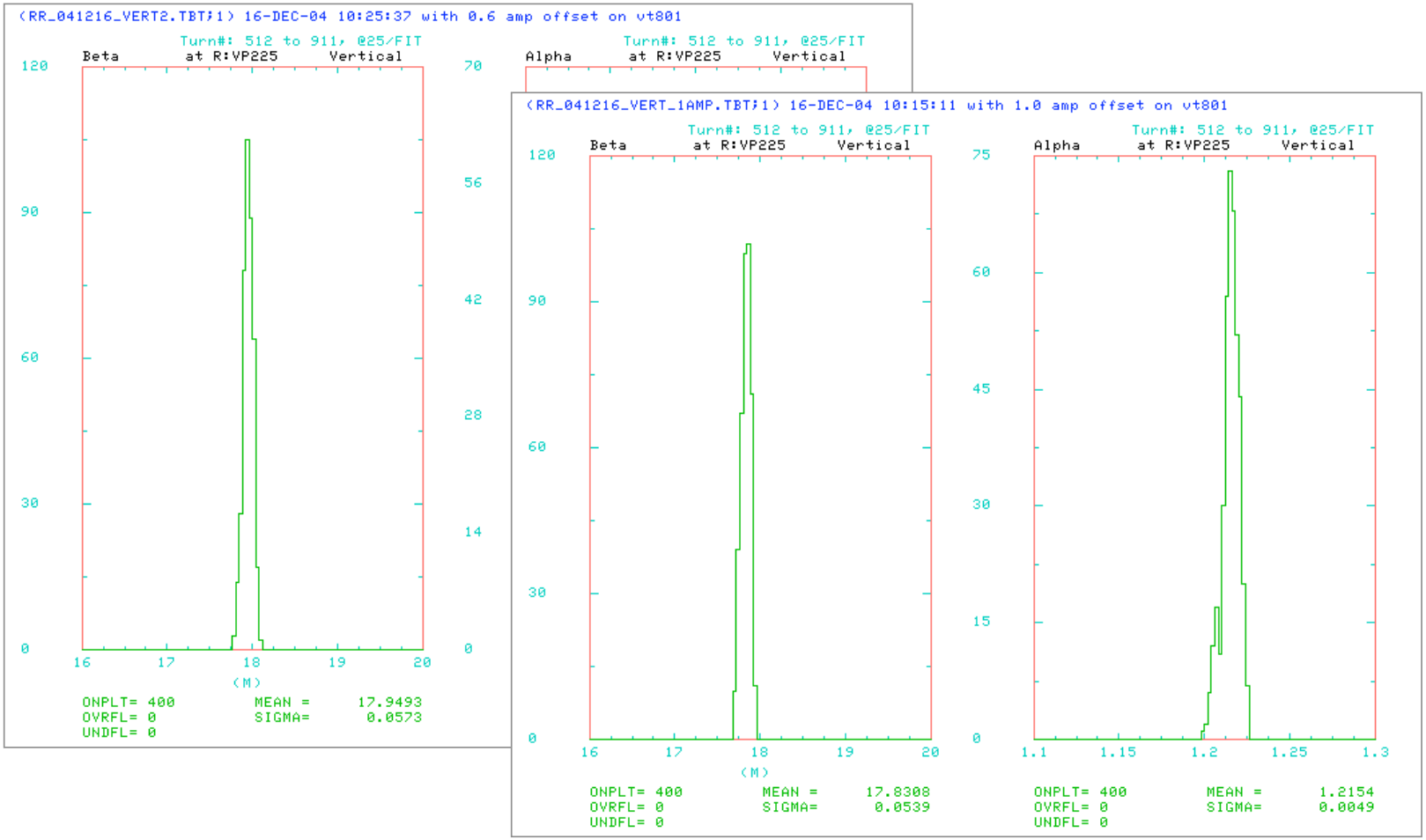
Coasting beam
0.3 KV on 40 kicker

Injection Offset
HT804 @0.5 amp

Injection offset: HT804 @1.5 amp

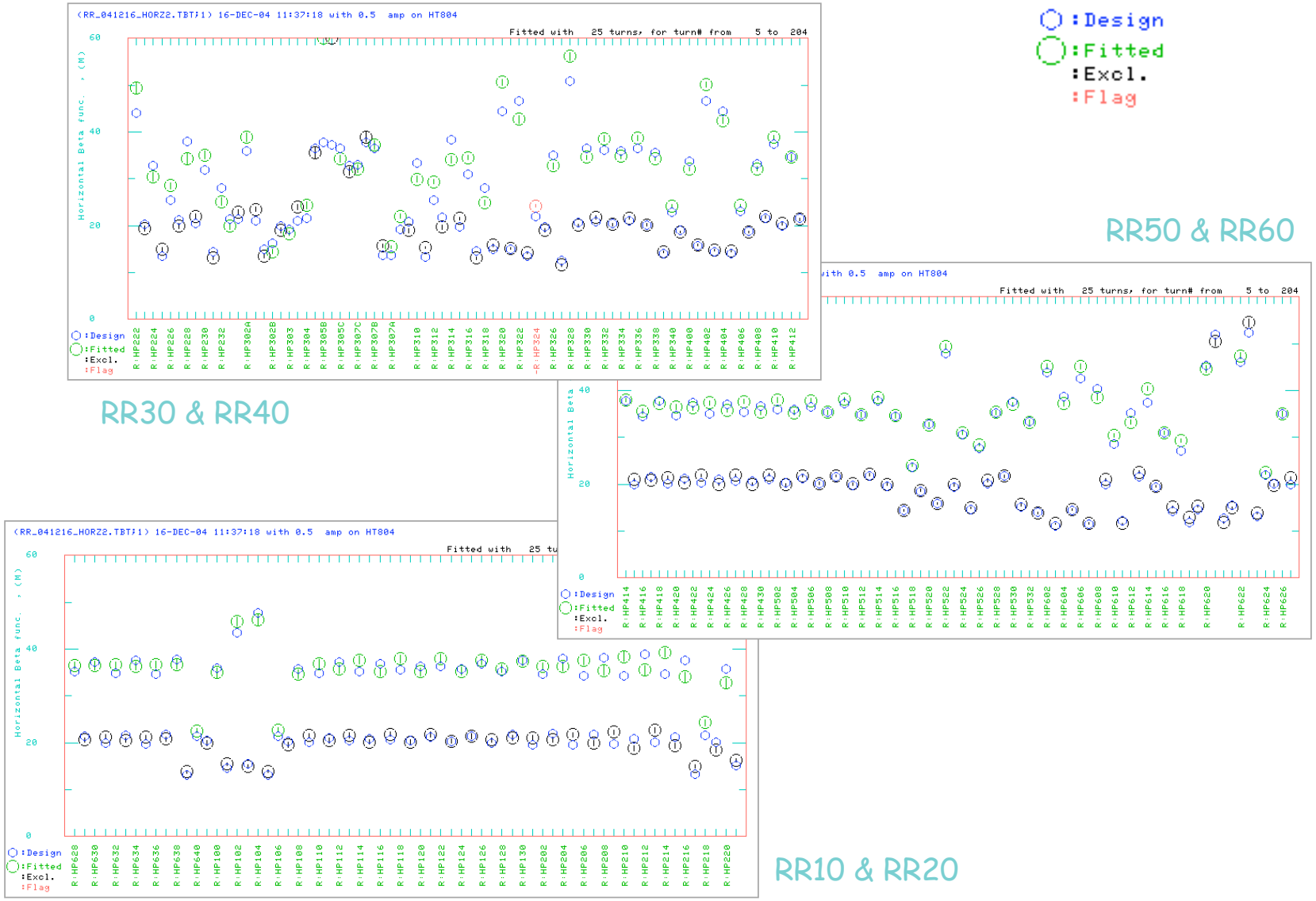
Histogram of measured Vertical lattice function @VP225

Injection offset: VT803 @0.6 amp

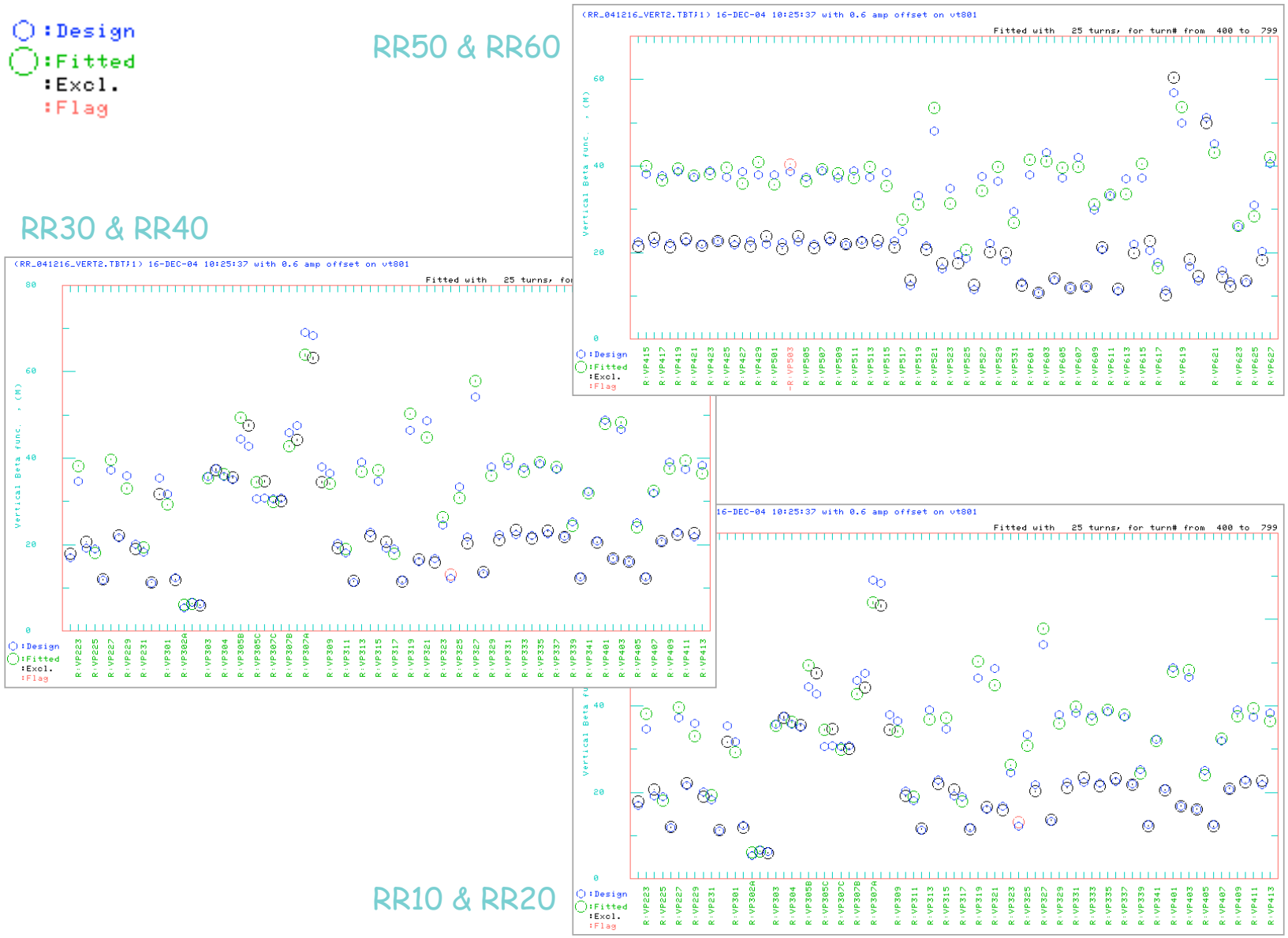


Injection offset: VT803 @1.0 amp

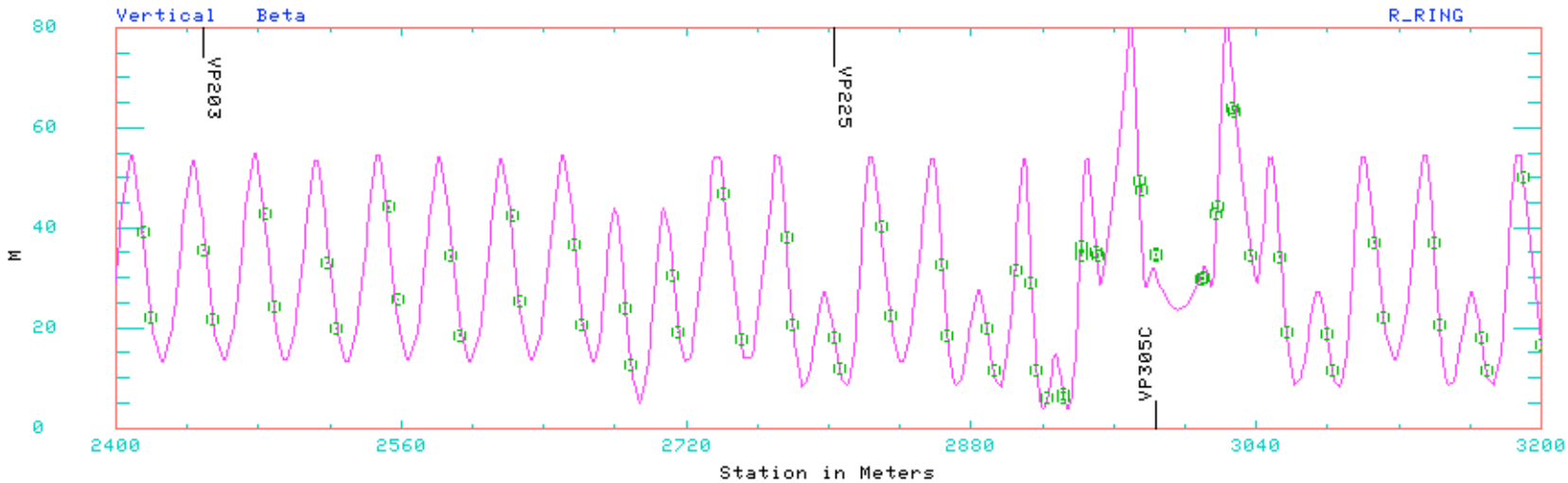
Measured RR horizontal beta, all houses

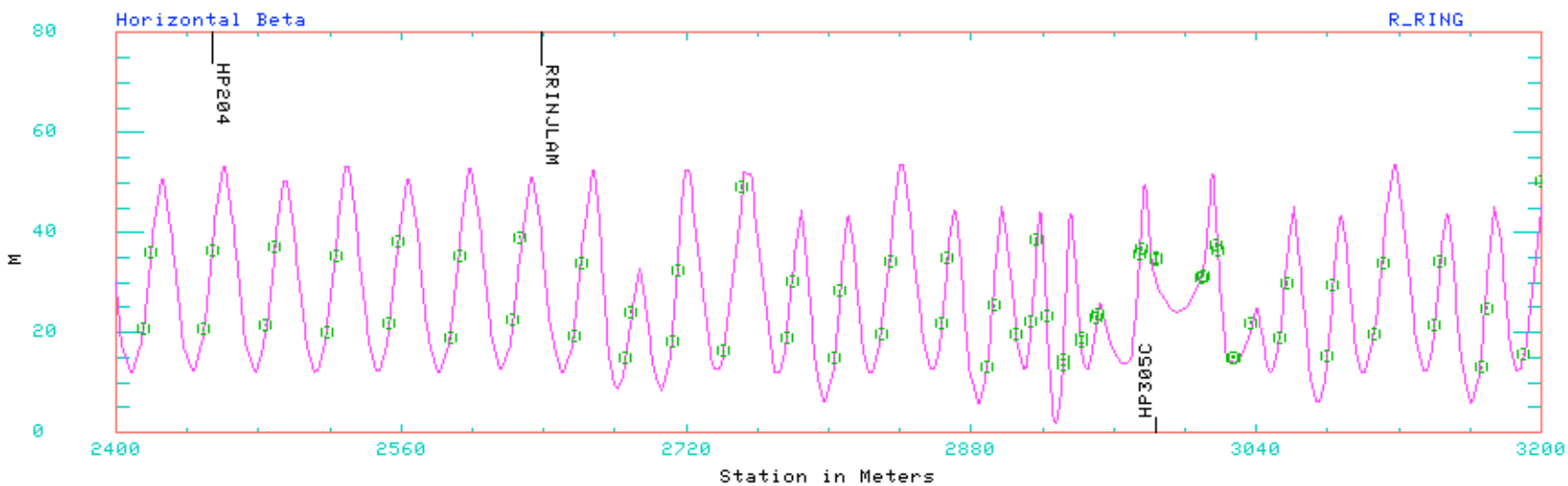


Measured RR vertical beta, all houses

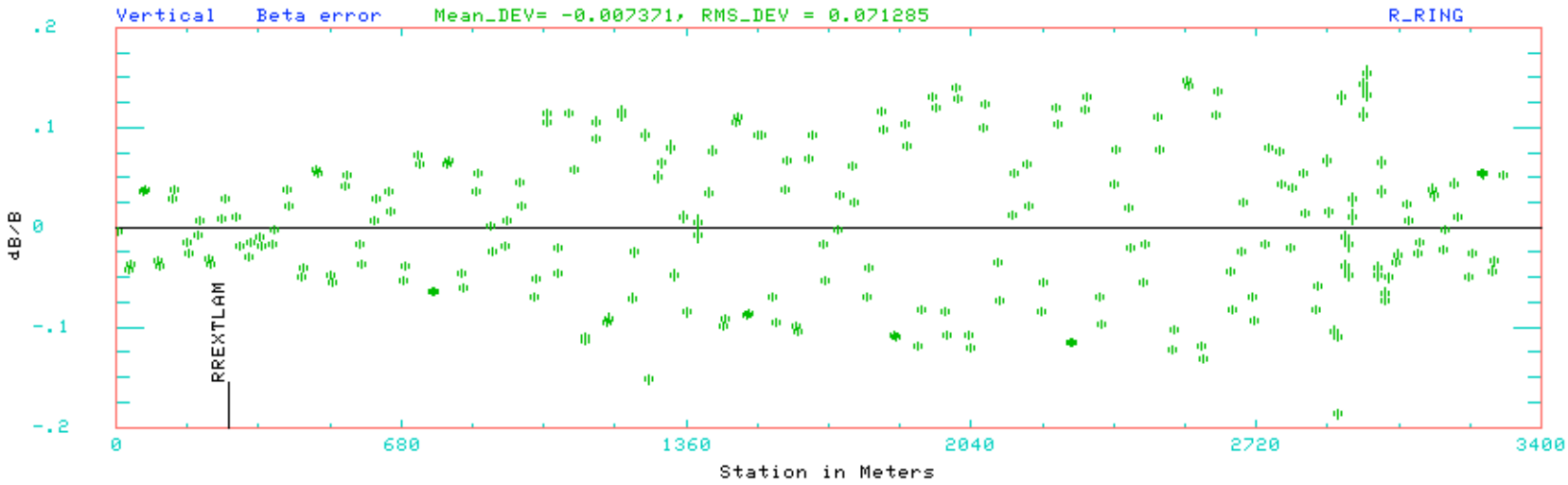


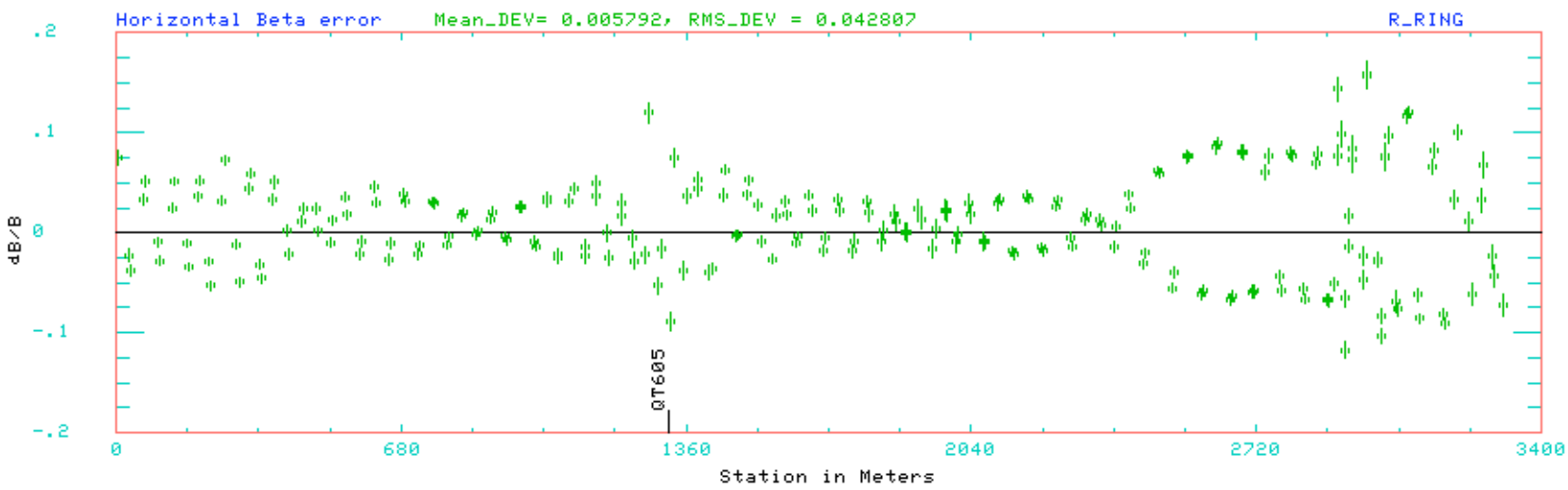
Measured beta and R90 calculation, around 30 straight



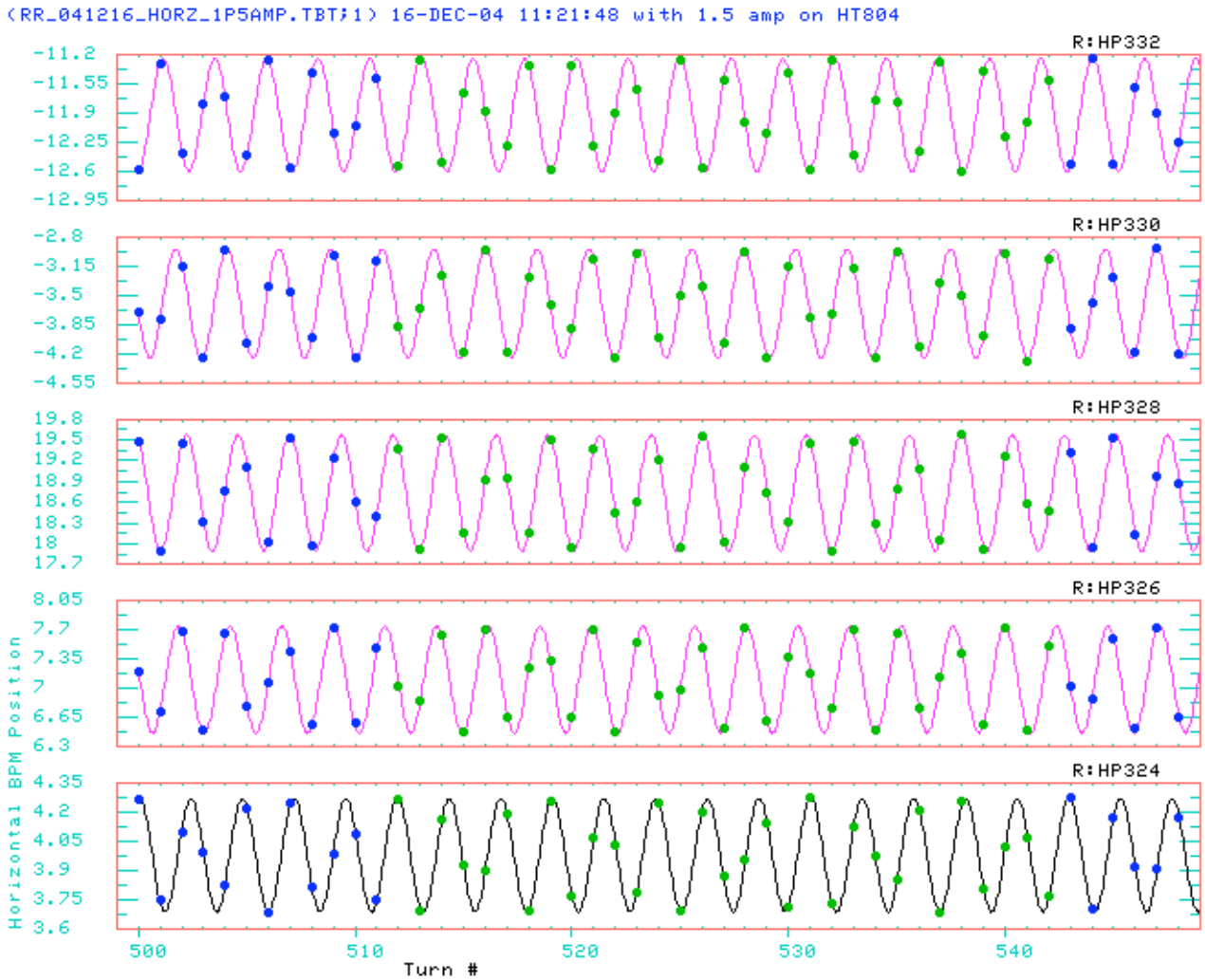


Beta error around the ring

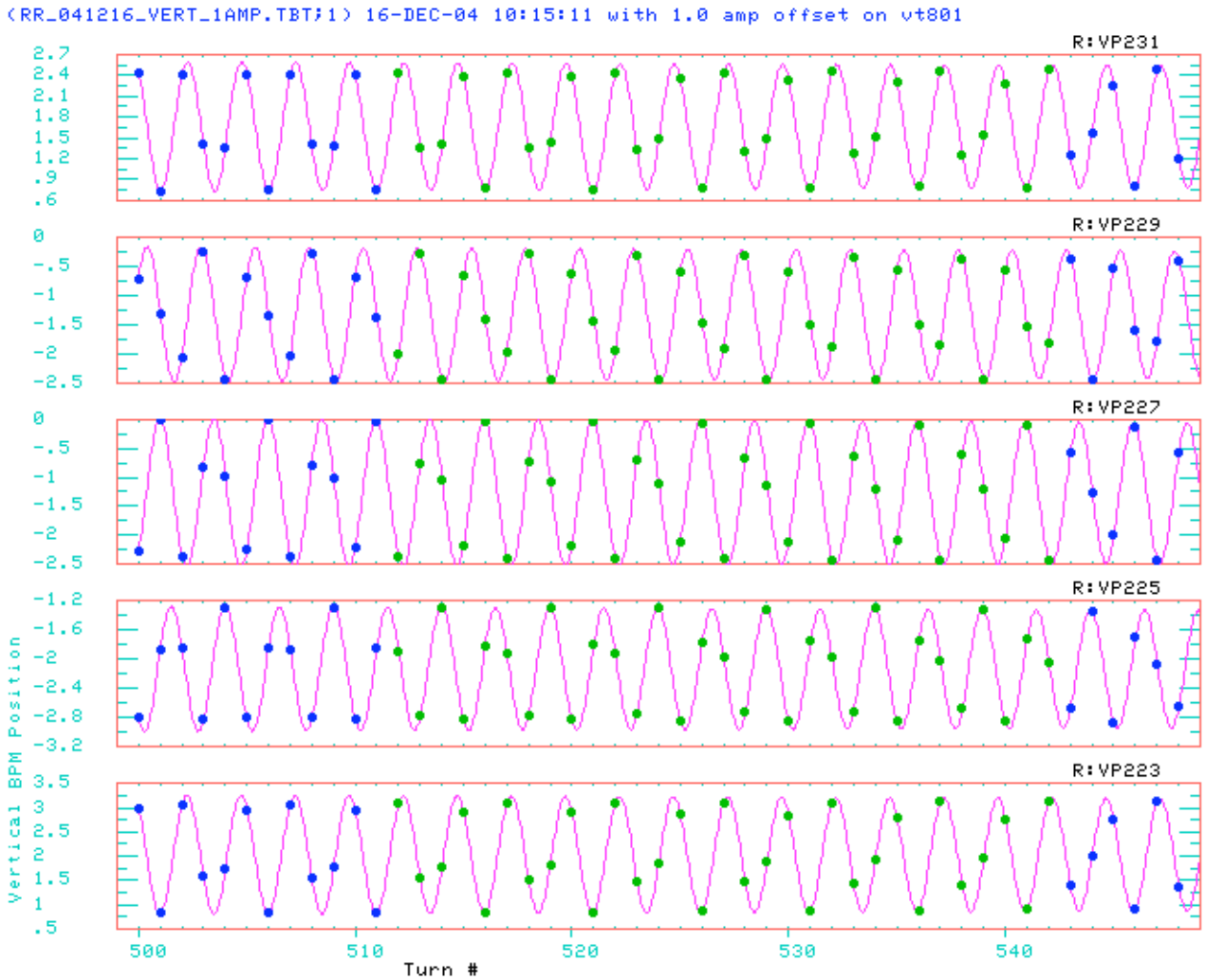




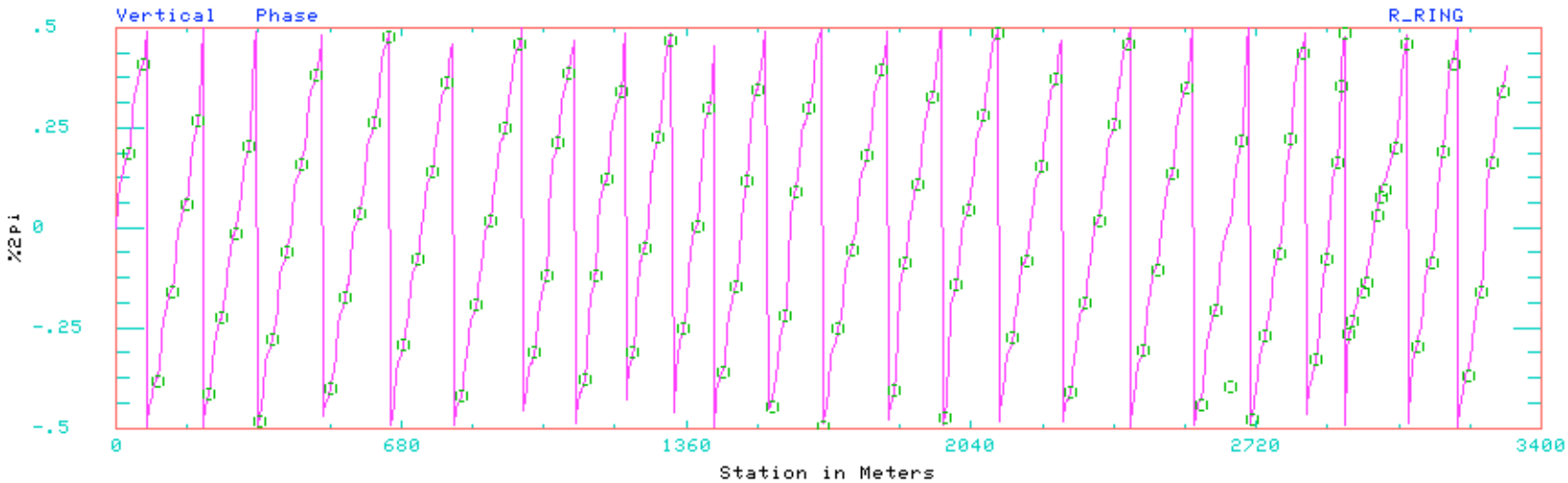
Fitting TBT phase & amplitude, Horizontal

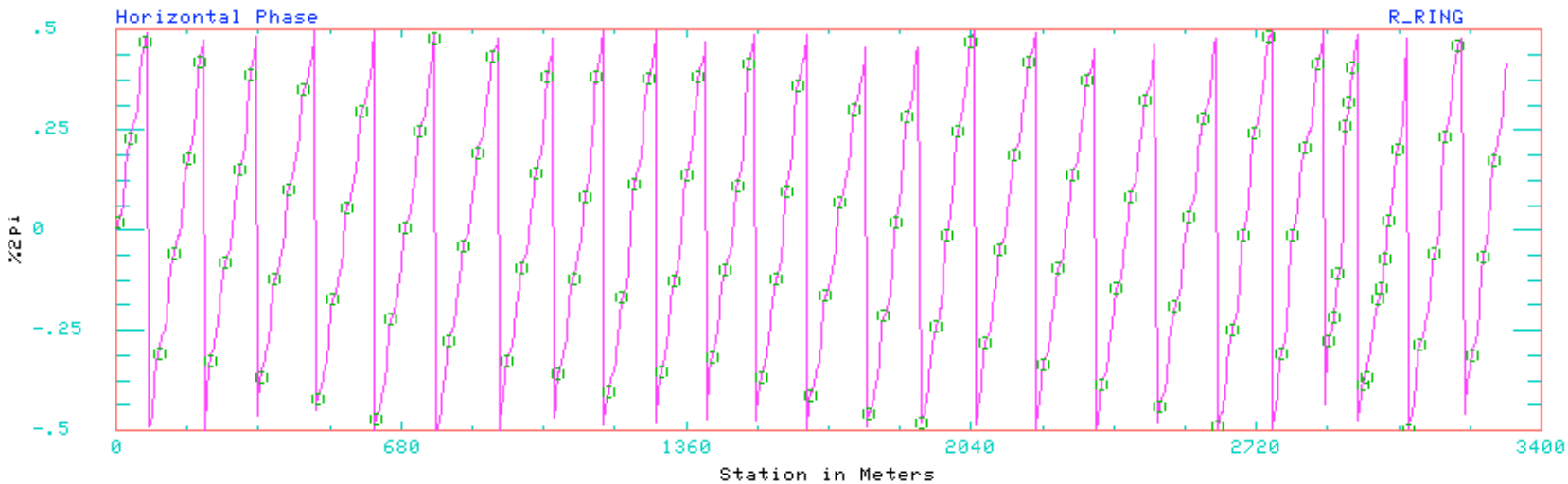


Fitting TBT phase & amplitude, vertical

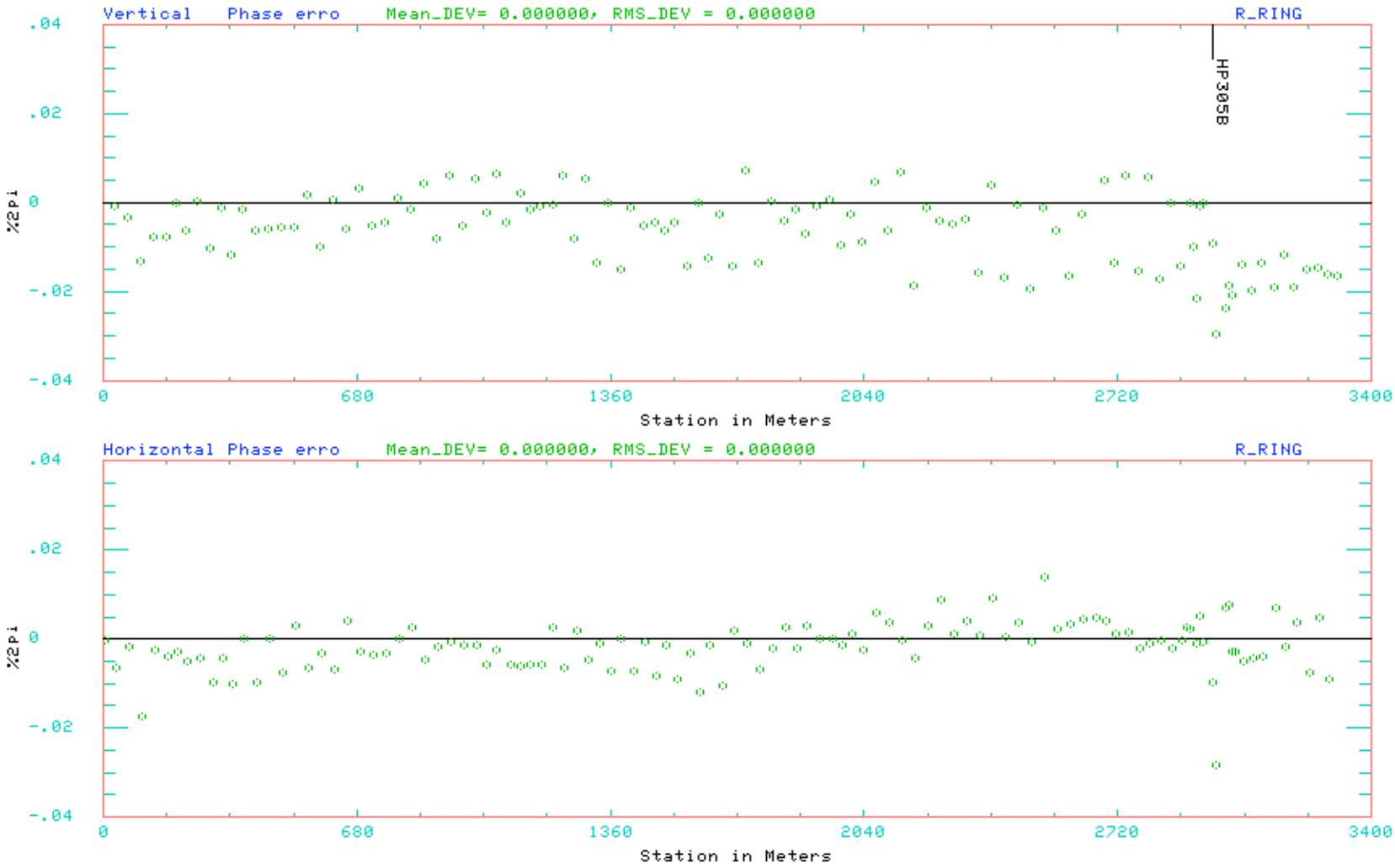


Phase advances, horizontal & vertical

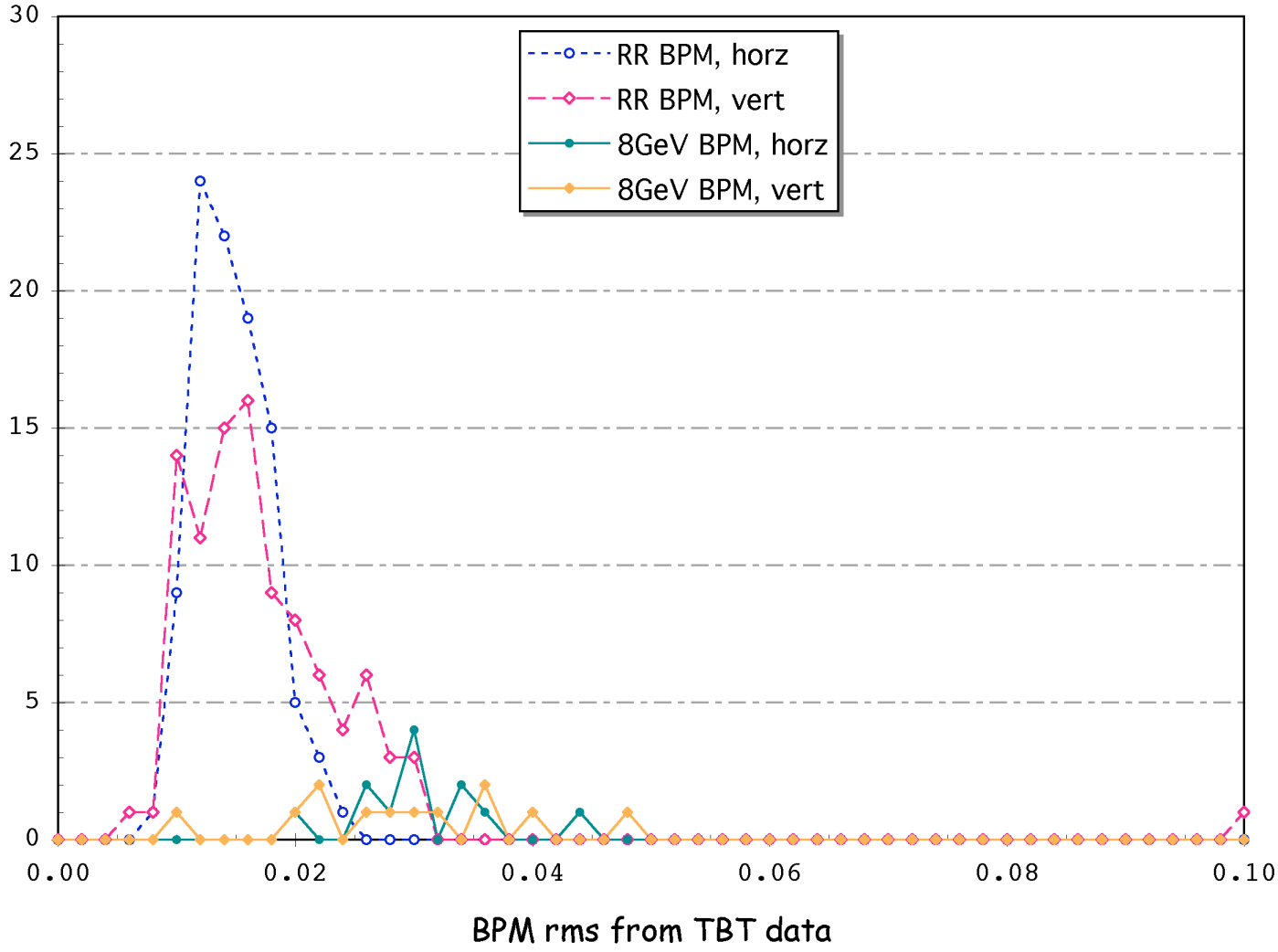




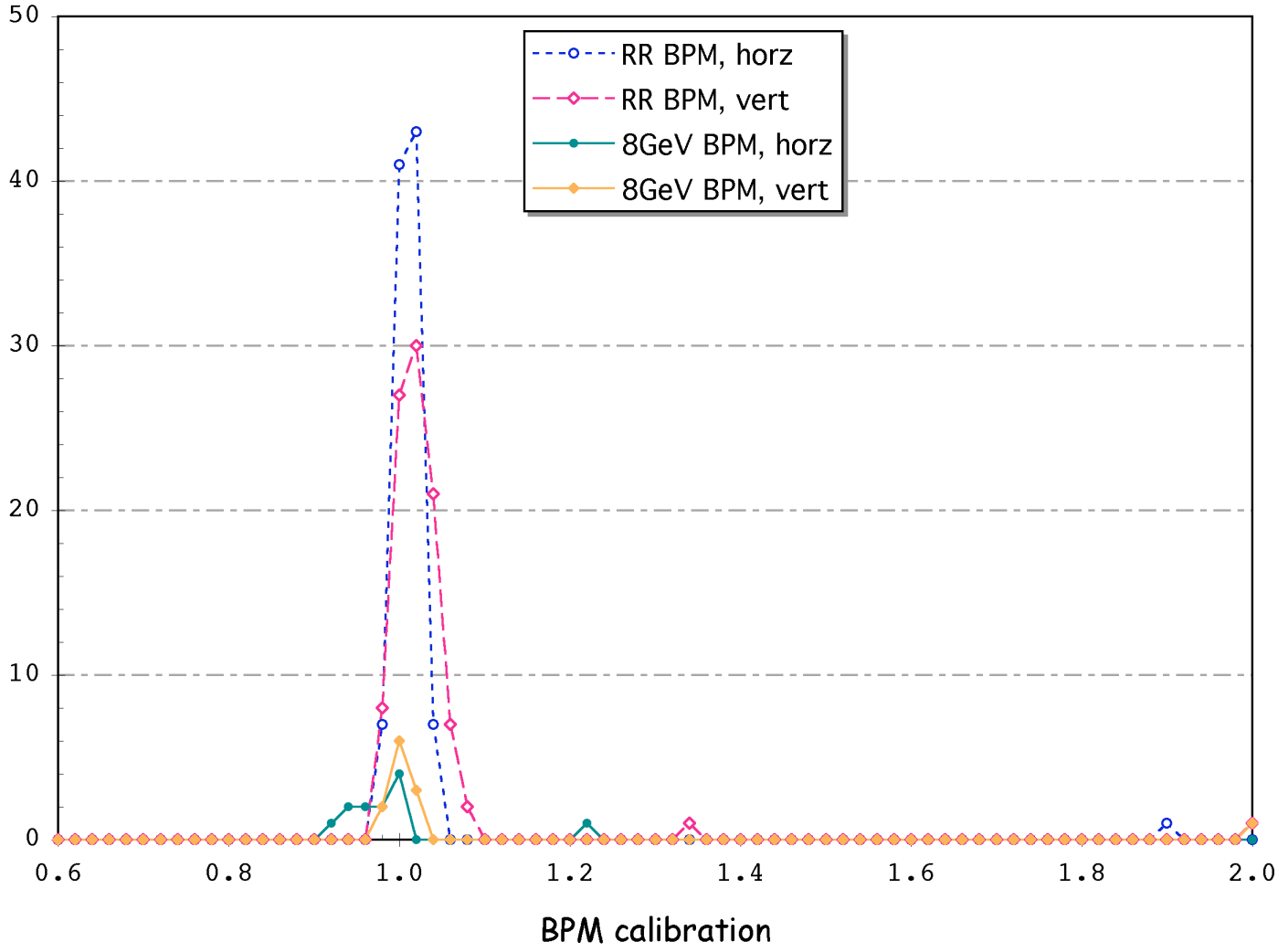
Phase advance differences in both planes, measured & R90



BPM RMS, fitting 30 turns of TBT data



Relative gain calibration from TBT analysis



Summary of study results

- Lattice
  - Beta wave:
    - ✓ Horizontal plane 10% maximum.
    - ✓ Vertical plane 15% maximum.
  - Phase advance:
    - ✓ There appears to be a jump in vertical phase advance after the 30 straight.
  - Stability
    - ✓ No difference between at injection and while coasting.
    - ✓ Not dependent on the size of initial oscillation.
- Relative BPM calibration
    - ✓ Better than before.
    - ✓ 8-GeV style still a bit off.
    - ✓ Vertical BPM RMS is worse than from previous study.