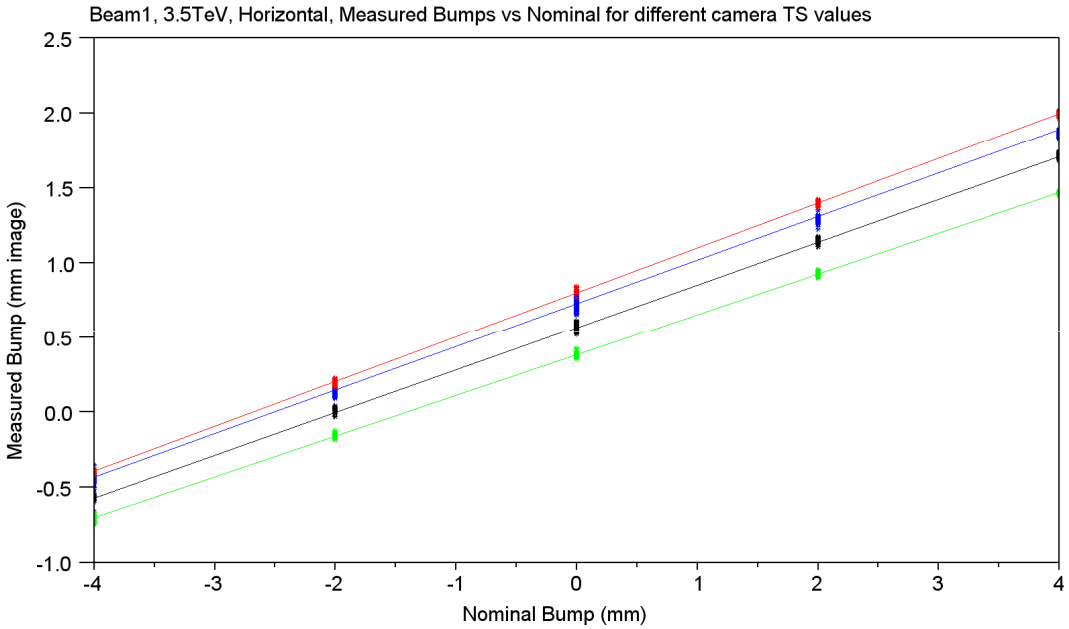
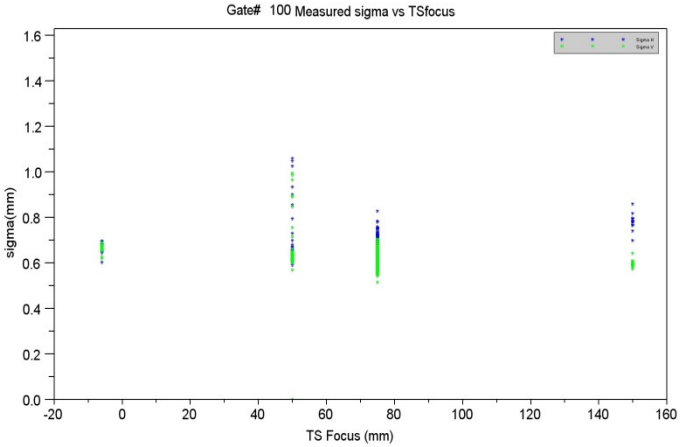
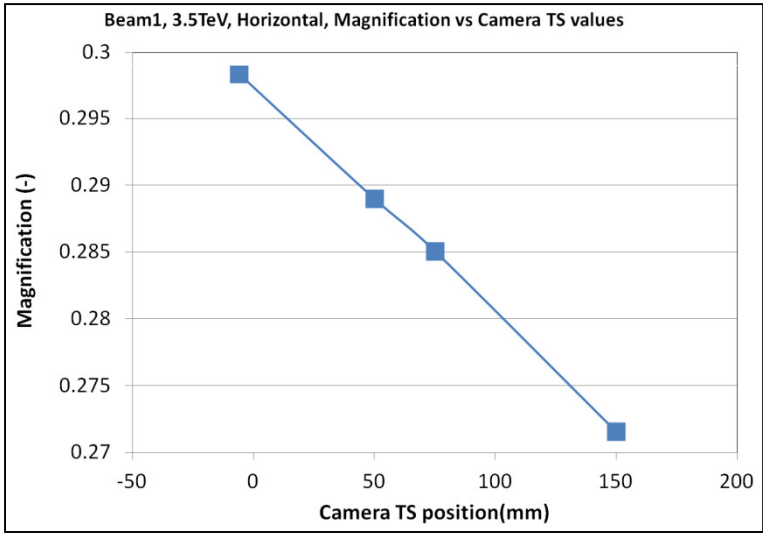
BI MD#4 05.11.2011 - BSRT Measurements

- Beam 1 and 2 @ 3.5 TeV
- 2 bunches with different emittances
- Bumps: -4, -2,0,2,4 mm







- Results: Calibration @ 3.5TeV
- Still to test:
  - -influence of camera gain setting on sigma
  - -Calibration B2 @ 450 GeV

BI MD#4 05.11.2011 - Matching Monitor Test

Goal was to validate the new system

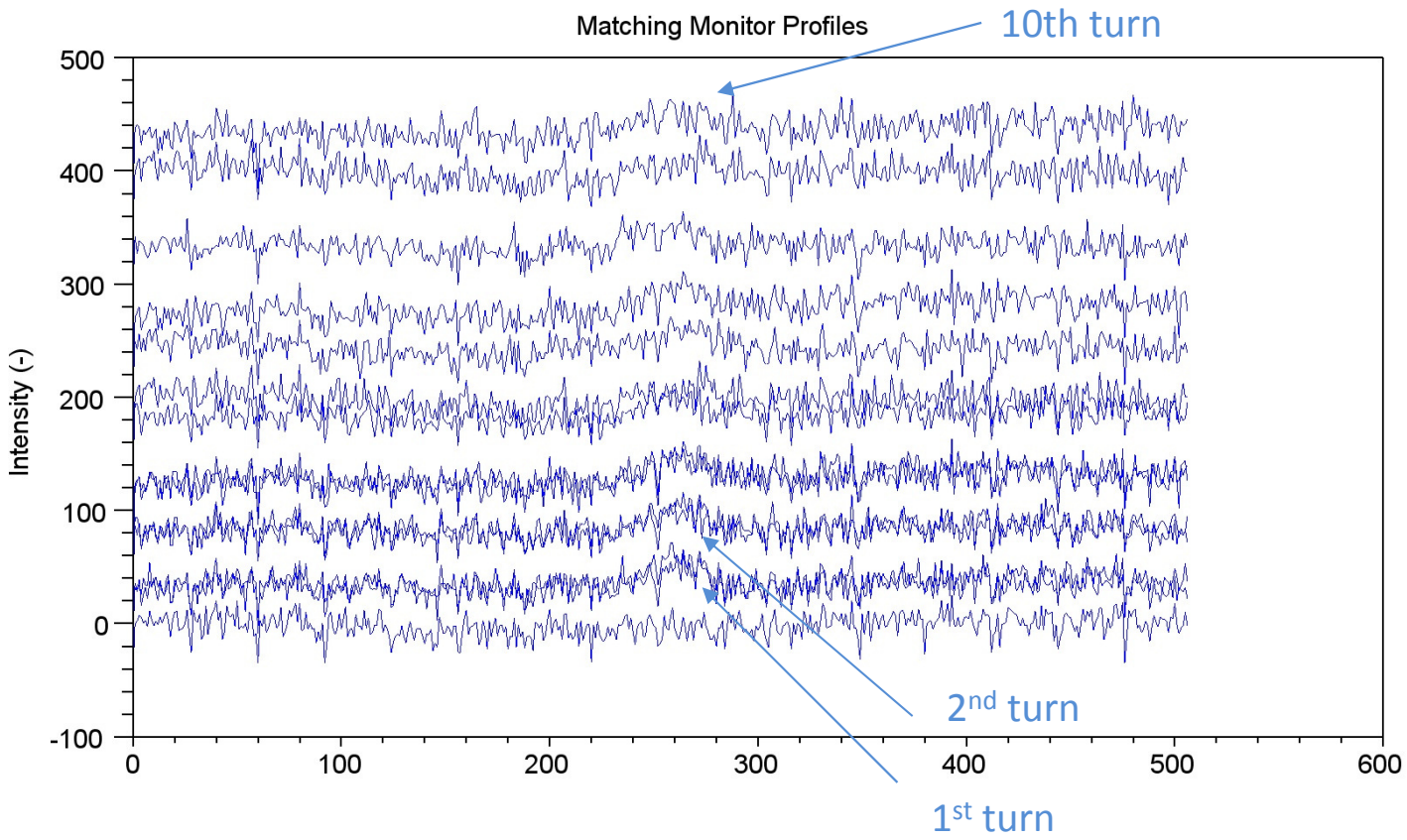
- check sensitivity of the new detector
  (scan intensity 1.2 to 8e10p)
- check timing setup
- check delay

→ 15 minutes MD instead of 1 hour

→ Beam intensity was ~ 9e9 p

→ No time for intensity ‘scan’ up to 8e10

BI MD#4 05.11.2011 - Matching Monitor Test



Beam was seen turn/turn with 9e9 p

Too close to the limit to use for measurements

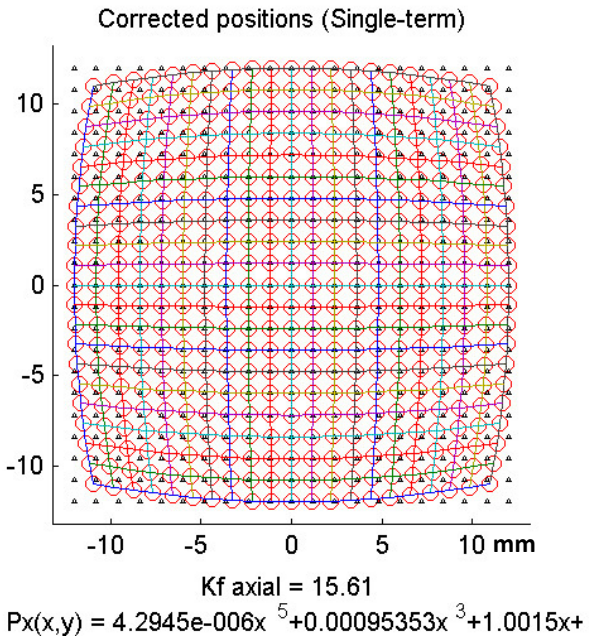
- Better signal with new optics (achromatic lenses – gain to be measured)
- With Present design, measurements could be done by increasing a bit the intensity
- Need commissioning time for timing and delay tests

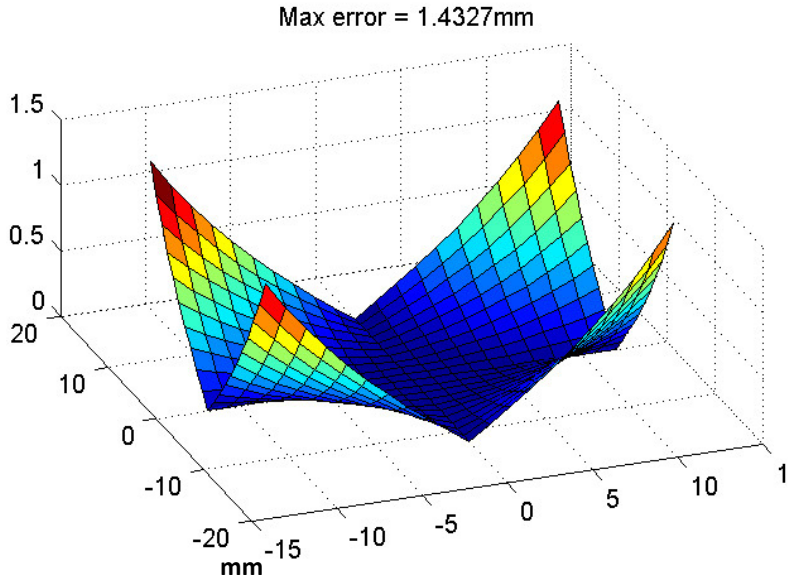
Button BPM model:
two correction methods

1. Correction with single-term polynomial: For this BPM (60mm aperture) at 4mm offset the error is around 40µm, however at 7mm the error goes up to 280µm!

The non-linearity error rises drastically with the increase of BPM aperture.

The single-term polynomials are currently used for orbit correction of LHC.

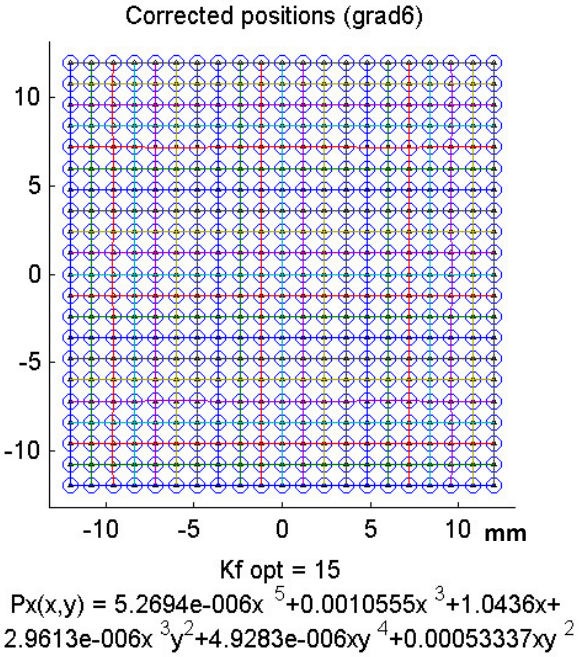


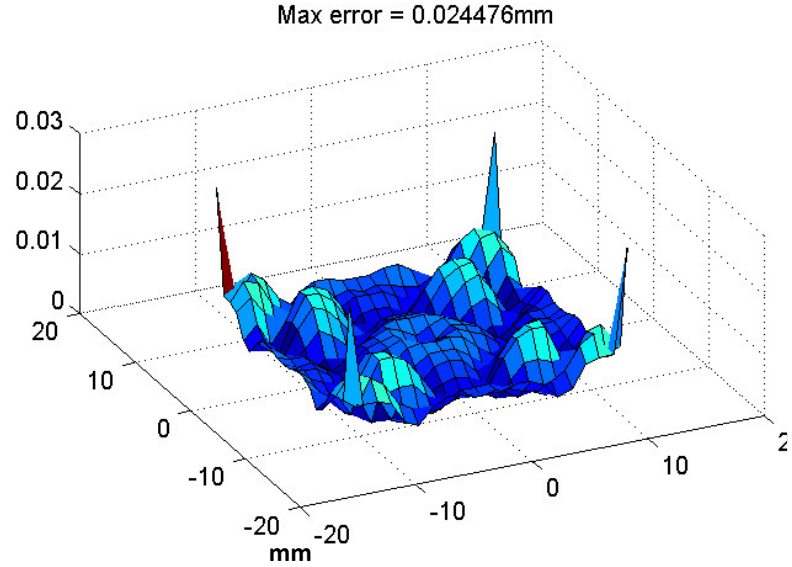


Errors between expected beam position and corrected positions

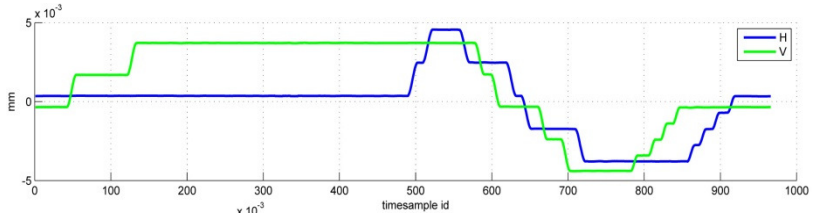
2. Correction with cross-term polynomial: it is possible to keep the error level <u>below 5 microns</u> within 50% area around BPM's geometrical center.

The cross-term polynomial can be derived through EM simulation and using various mathematical approaches.





BPMWA.A5L4.B1 scan (Nov 5, 2011)



Target: to scan a BPM to estimate the non-linearity error of existing orbit correction

Measurement: bump-map 21 points within [-4,4]x[-4,4] mm area (1mm/2mm bumps).

Initially we planned to scan the BPMS and with higher offsets, but due to time constraints we could only use BPMWA. However, this should suffice to show the difference and significance of using cross-term polynomials for accurate position correction.

Verification: the results are compatible with the model, we see similar errors at 4 mm offsets.

Mapping of BPMS/SW with larger beam offsets is desired for next BI MD.