

ATF Emittance Studies

March 3-14, 2008

Observed effects in Damping Ring of vertical orbit bump at QM7R.1

1. Check the effect of the bump in the DR.

Status of the machine: ...SET08MAR14_1114.DAT

Bump coefficients:

ZV9R=1.92889

ZV100R=-1.56217

ZV10R=-1.22152

Closing the bump in the extraction line:

ZV1X=-1.04553

ZV2X=1.52836

Bump (mm)

Saved orbit file

+0.1

08MAR14_122323

+0.2

08MAR14_122933

+0.3

08MAR14_123510

+0.4

08MAR14_124011

+0.5

08MAR14_124504

+0.6

08MAR14_125003

0.0

08MAR14_130436

-0.1

08MAR14_130540

-0.2

08MAR14_131102

-0.3

08MAR14_131646

-0.4

08MAR14_132113

-0.5

08MAR14_132647

-0.6

08MAR14_135426 (corrected ... M. Woodley)

-0.7

08MAR14_140211

Go to positive bump again:

0.0

08MAR14_140656

Save status of the machine:

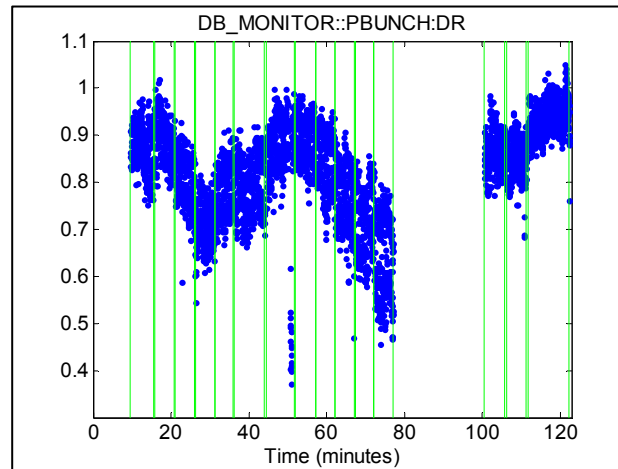
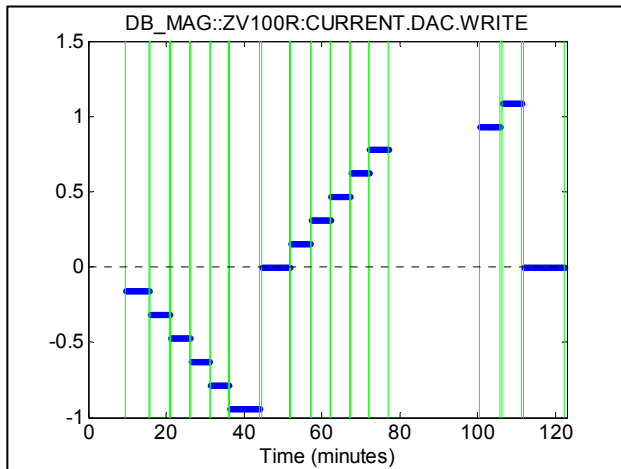
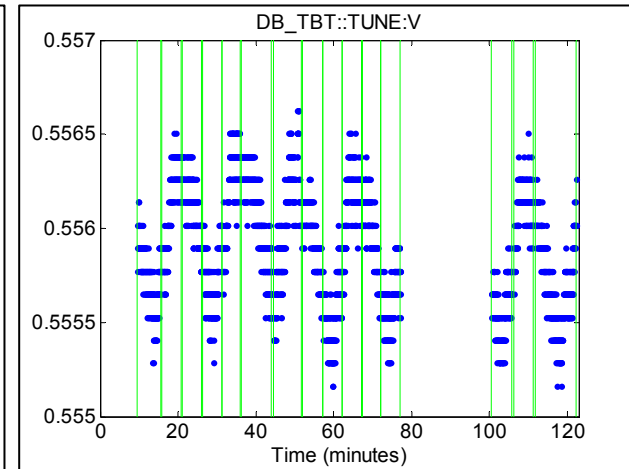
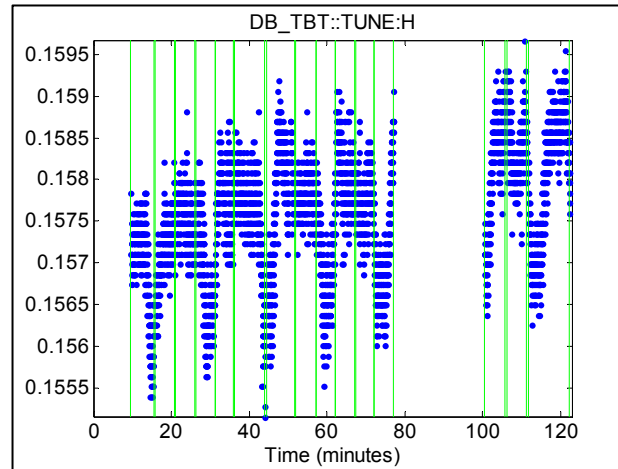
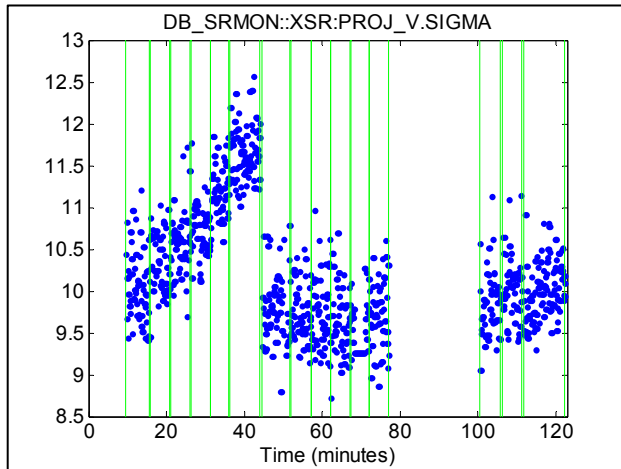
SET08MAR14_1408.DAT

Intensity, beam size and tunes saved in the file:

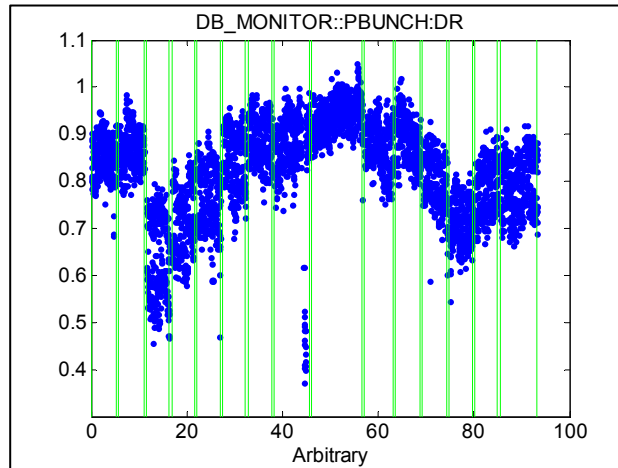
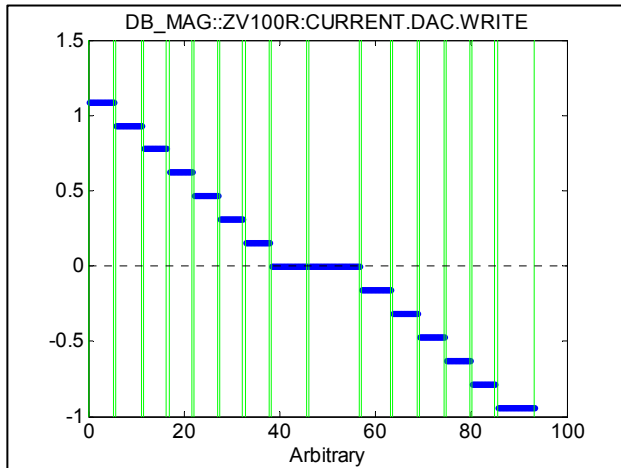
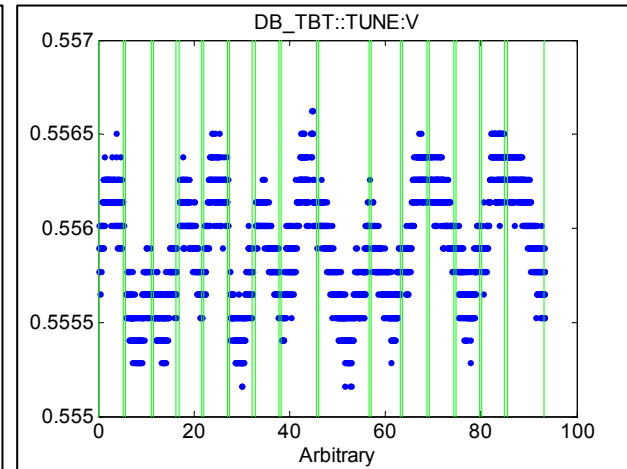
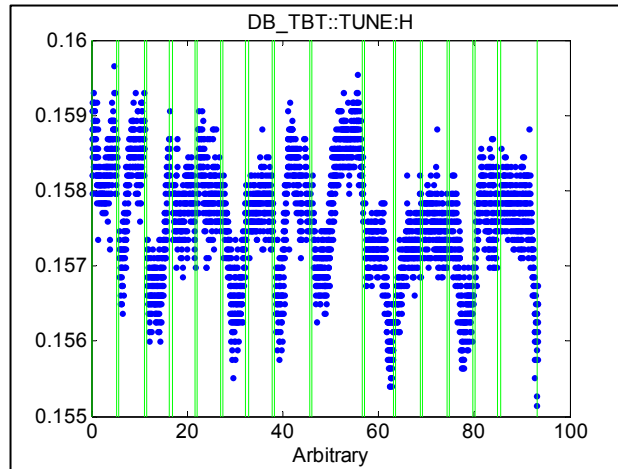
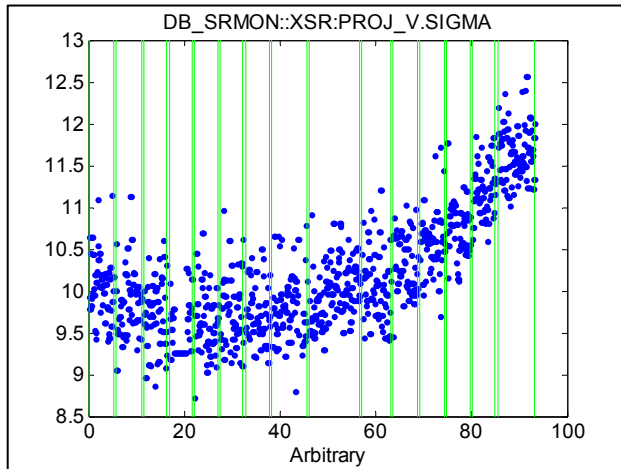
VLOG\$SRMON:LOG_TBTXSR080314.vtab

from: <http://www.slac.stanford.edu/~mdw/ATF/BeamStudies/20080314/ShiftReportAlabau.doc>

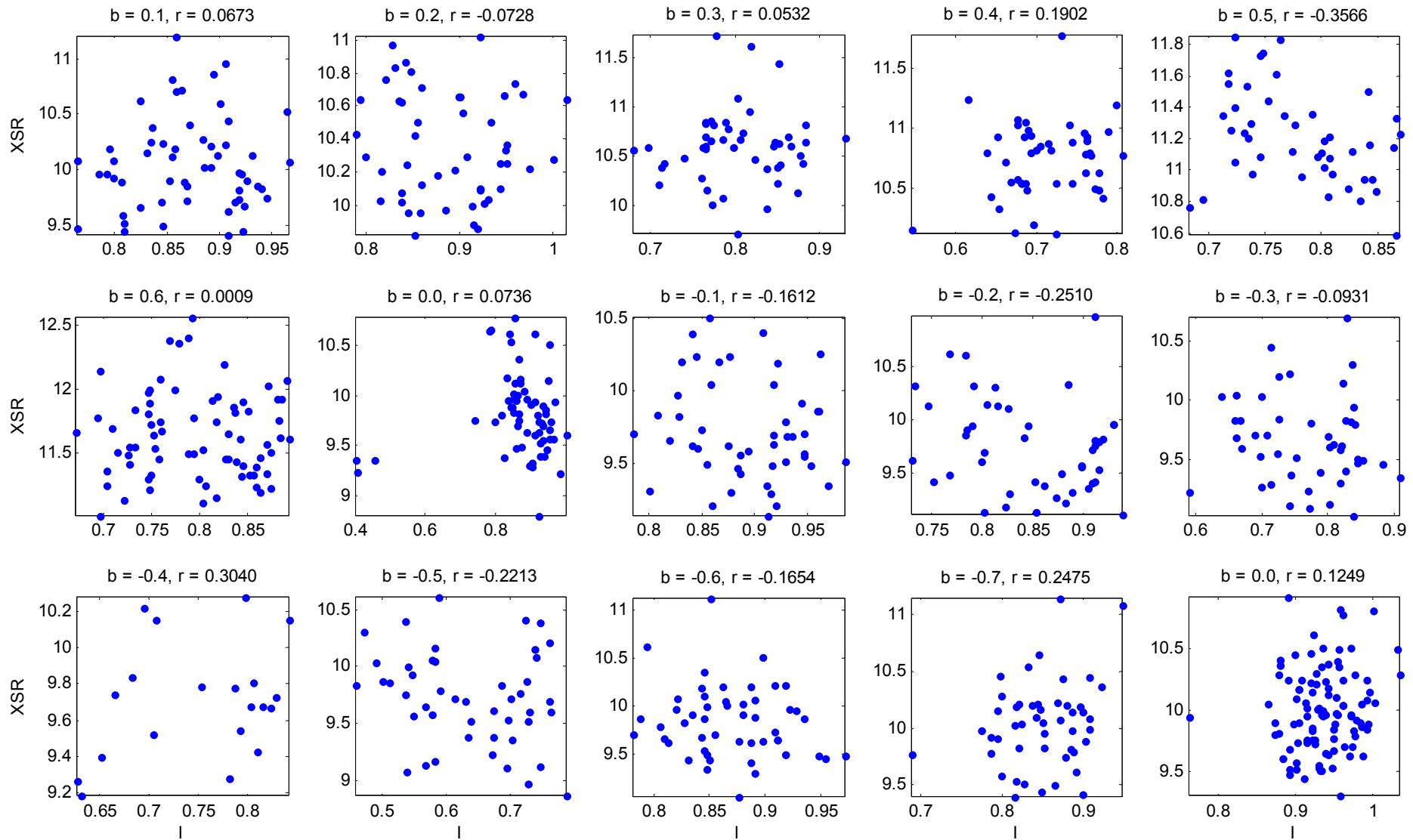
Selected VLOGGER Data: Temporal Order

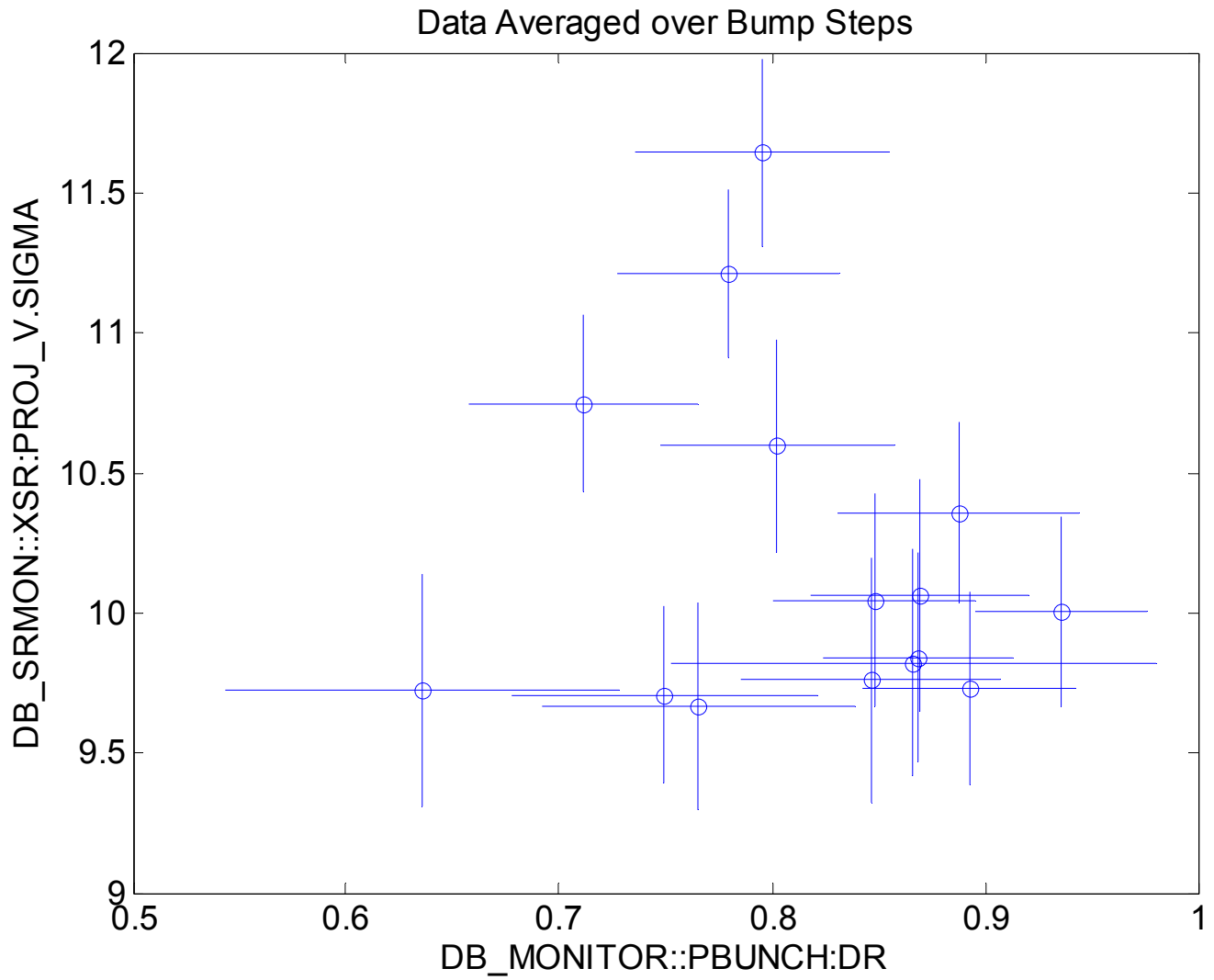


Selected VLOGGER Data: "Bump" Order



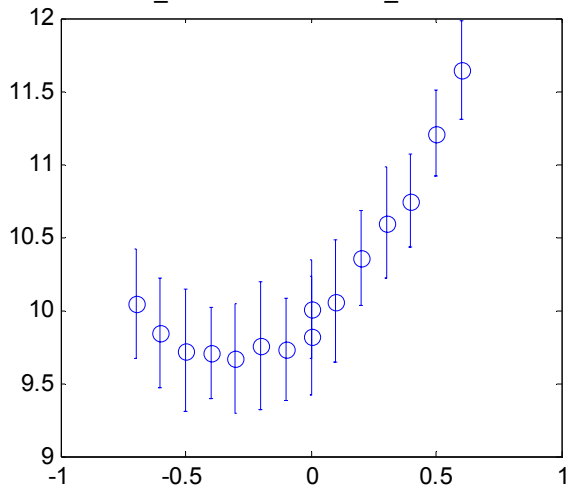
XSR vs I: linear correlation at each bump step



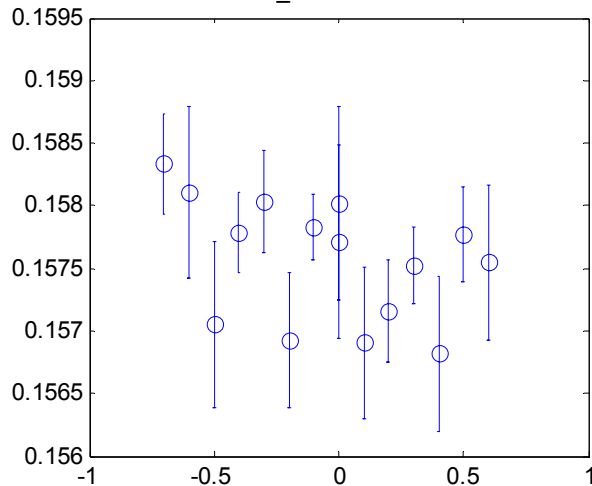


Data averaged over each bump step

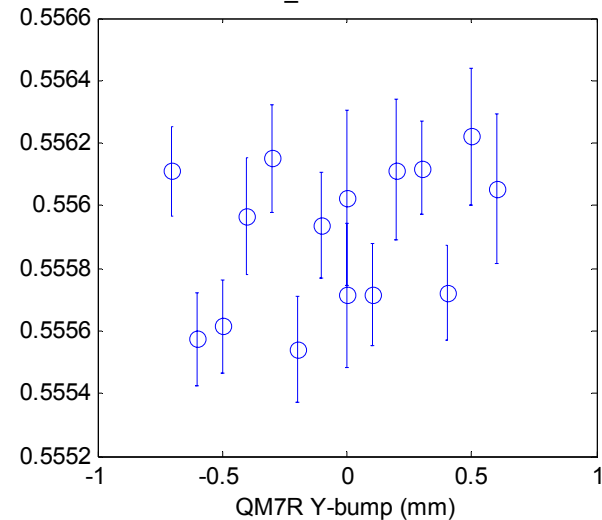
DB_SRMON::XSR:PROJ_V.SIGMA



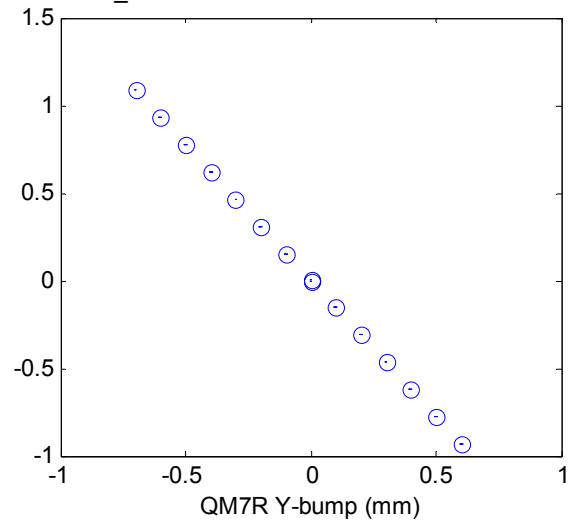
DB_TBT::TUNE:H



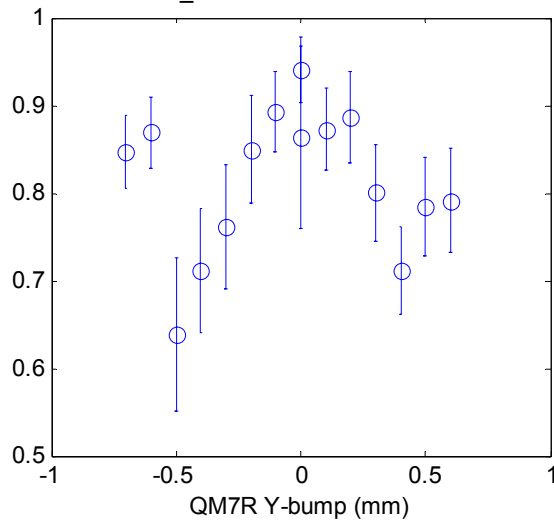
DB_TBT::TUNE:V



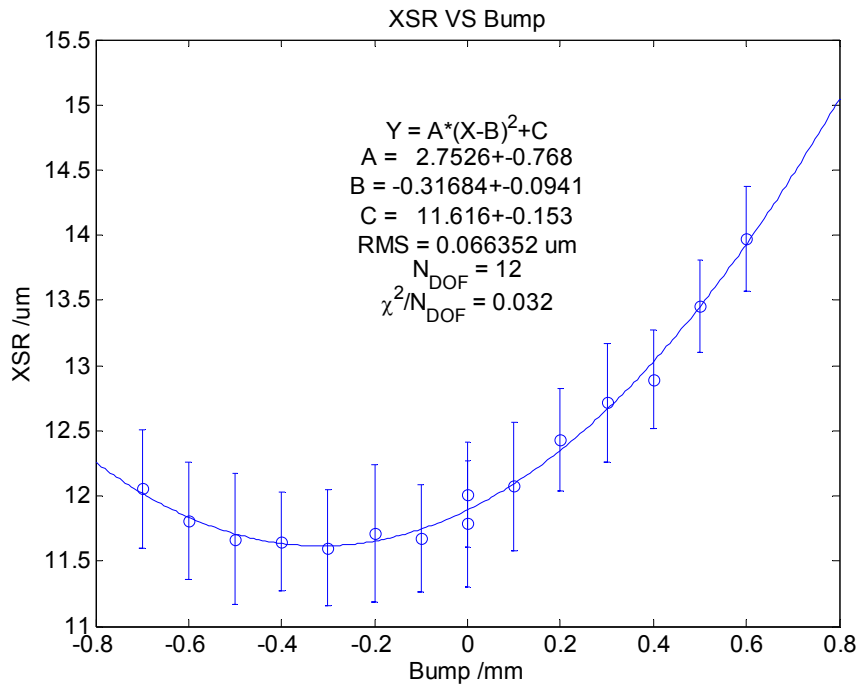
DB_MAG::ZV100R:CURRENT.DAC.WRITE



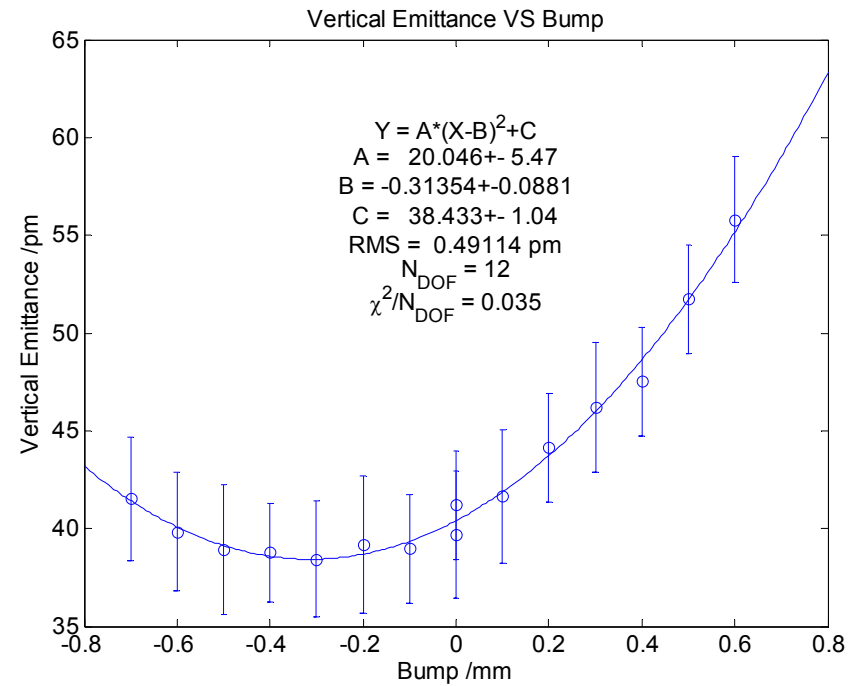
DB_MONITOR::PBUNCH:DR



Data averaged over each bump step (XSR repeats removed)



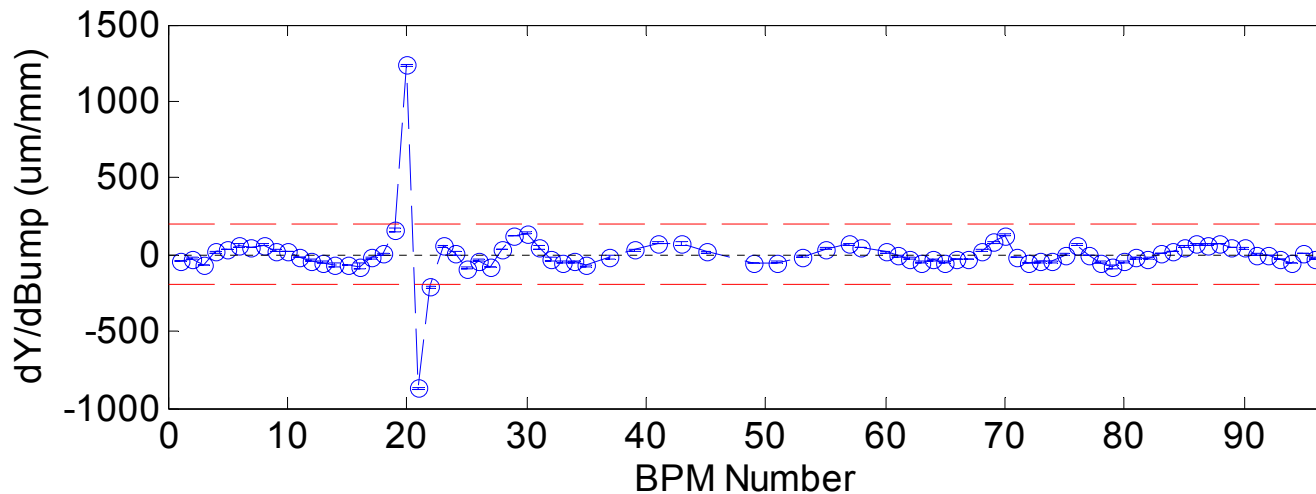
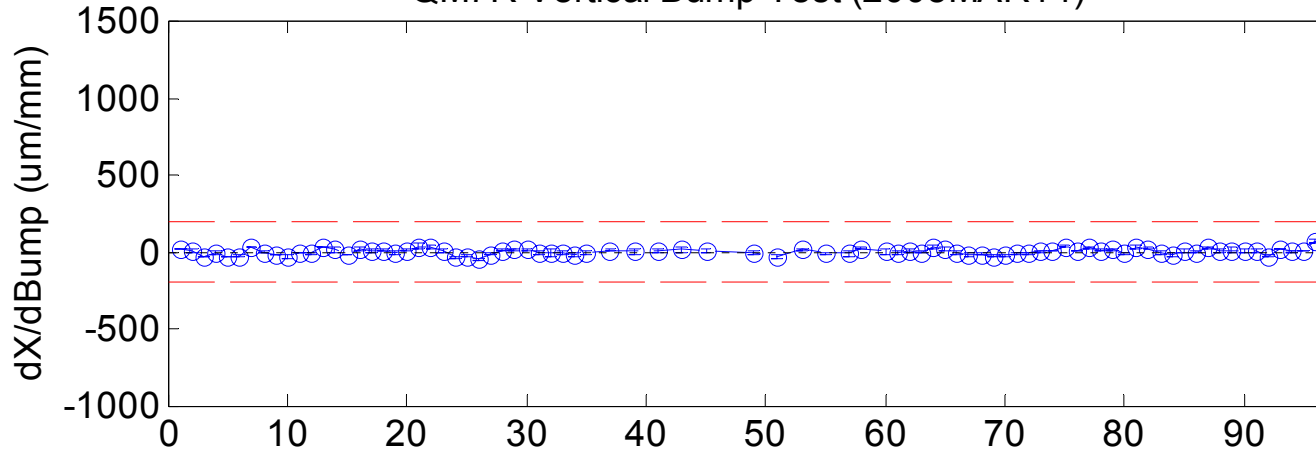
XSR data converted to μm
using 1.2 μm per channel



emittance computed assuming
 $\beta_y(\text{XSR}) = 3.5 \text{ m}$

Linear fits to position vs bump (current dependence not corrected)

QM7R Vertical Bump Test (2008MAR14)



“leakage” $\leq 200 \mu\text{m}$
per mm of bump

note: Echotek BPMs in crate 1 were “latched”

Analysis To-Do List

- simulate effect of bump “leakage” on vertical emittance
- simulate effect of bump vertical dispersion on vertical emittance
- use EXT BPM data vs bump to estimate strength of QM7R (R_{34})
- cross-check and compare emittance calculations
- simulate dispersion measurement in EXT ... are the parabolic responses of BPMs in the diagnostics section to be expected?
- try to identify/quantify the optics error observed in EXT (near laserwire?) ... what to do for May?