

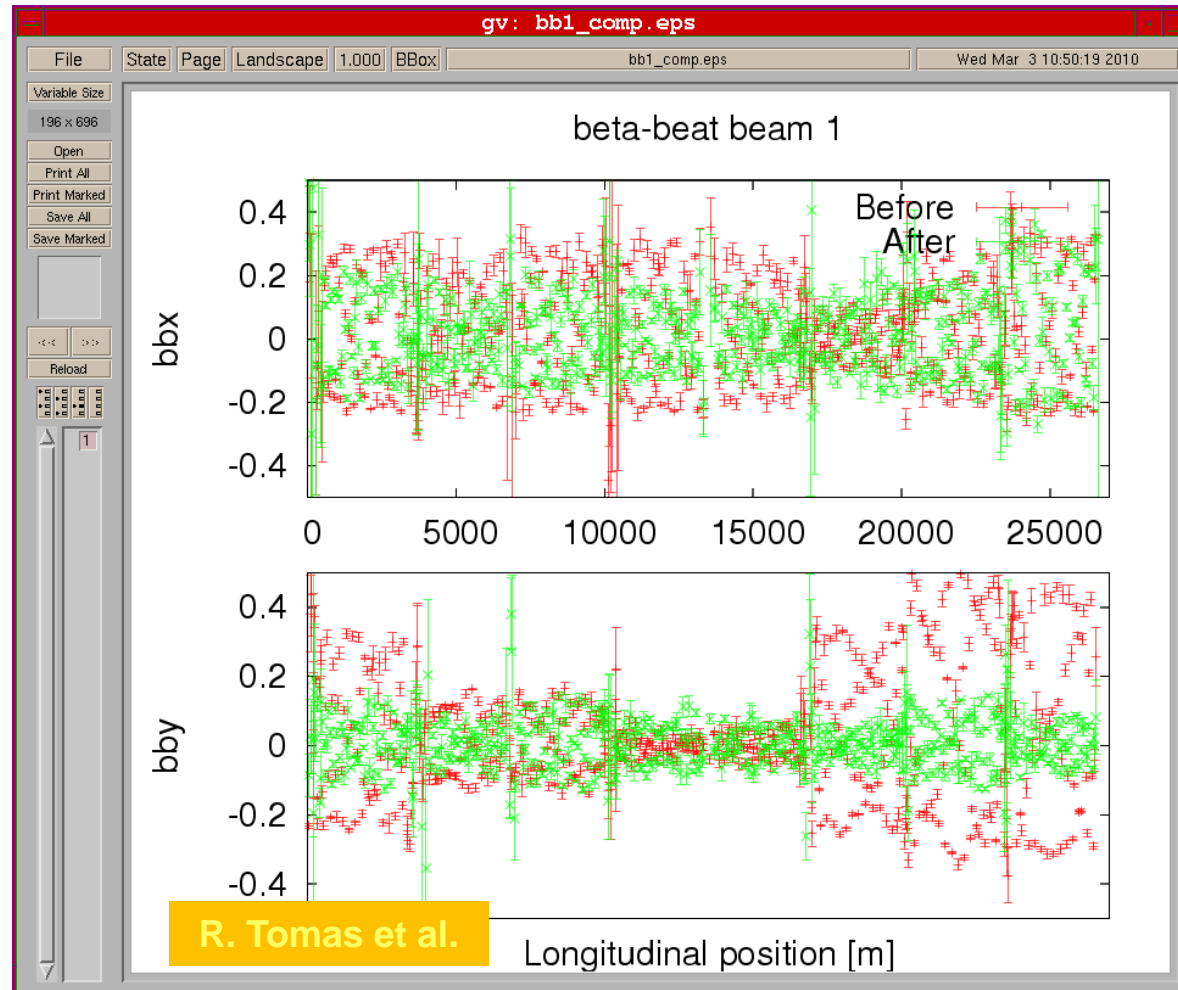
- Beta beating measurements until 09:00 Rogelio and team

- Impressive results of first attempt to correct beta-beat simultaneous on both beams.

B1: H beta-beat peak
~30% - V beta-beat peak
~15%

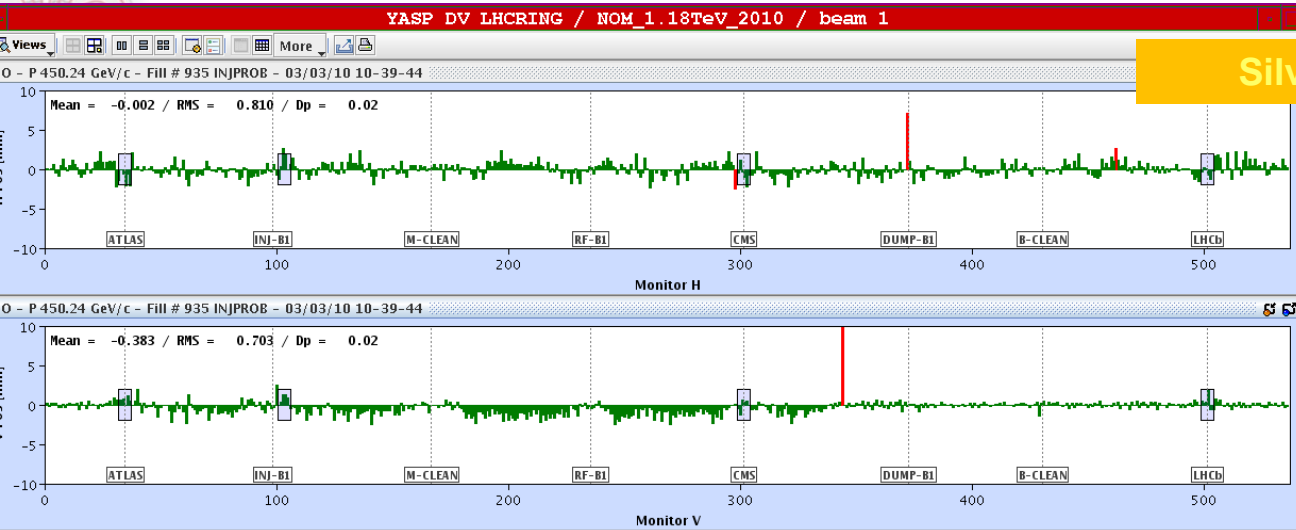
B2: H beta-beat peak
~30% - V beta-beat peak
~30%

- Analysis of results ongoing and implementation for next round of measurements

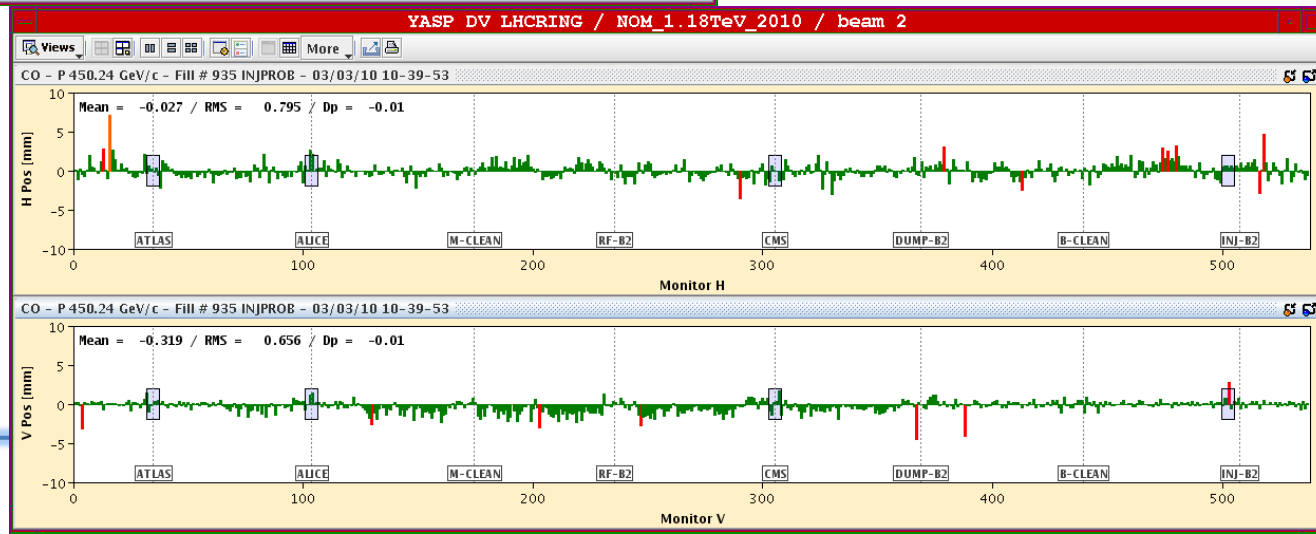


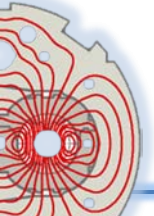
03/03/2010


09:00 - 10:30: Orbit studies: Much better in IRs, CMS offsets collision point offsets down from ~2 mm to ≤ 0.6 mm - Jorg Wenninger and team

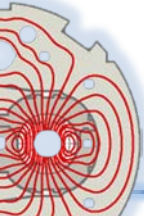


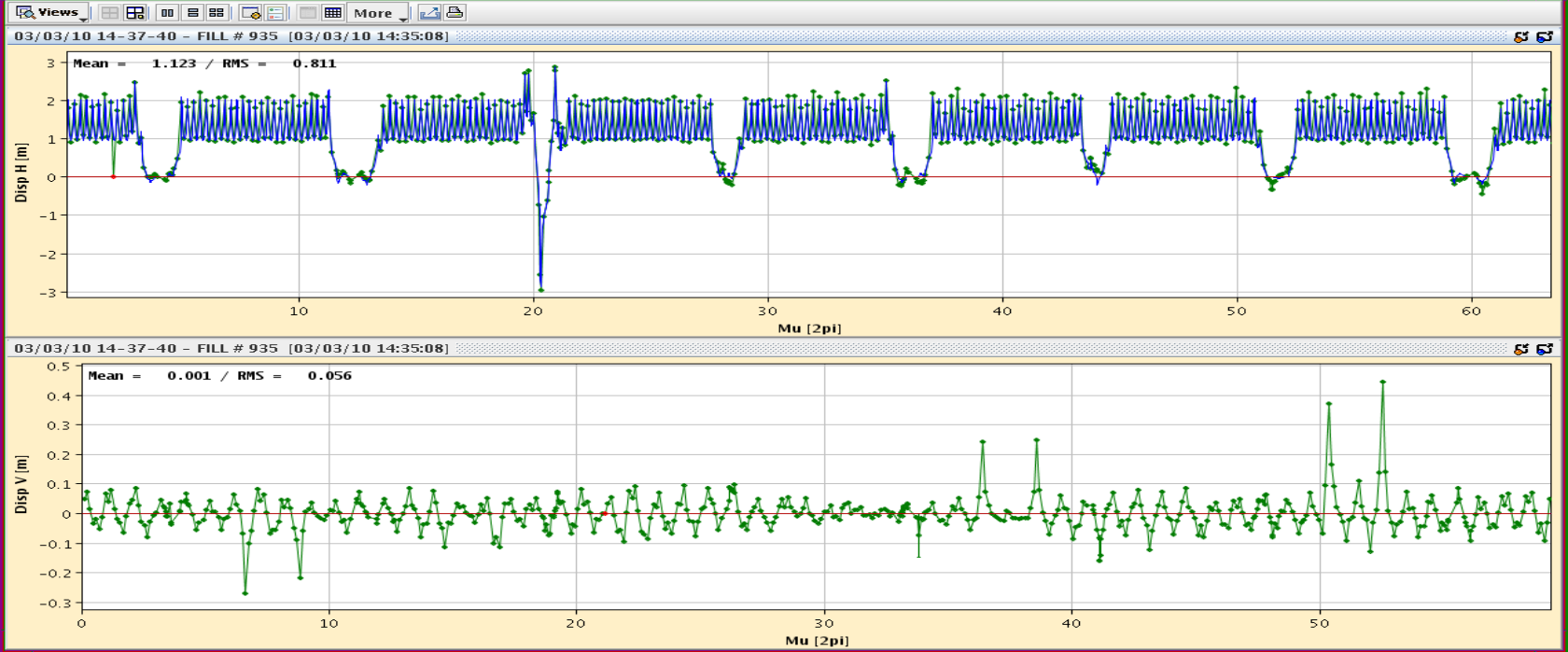
Silver Plated Iron – J. Wenninger



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- 10:45: Beams dumped
 - Machine mode changed to “machine development” - **RBAC activated**
 - BLM intervention : Added two optical fibre splitters in crates SR6.C and SR7.L.
 - Preparation for pre-cycling started
 - Sequence modified to avoid U_res calibration while power converter ramping
 - **QPS crate RQTL11.L5 B1/B2 and RQTL12.L5 B1/B2 requires systematically a reset → solution should be found (crate replacement?)**
 - 11:45 : Cycling of all sectors launched
 - 13:00 : Cycling completed - Preparing for beam
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- Beam 2 injected
 - Tunes found at 0.20 - 0.28 (as a result of beta-beating correction)
 - Tunes corrected to 0.28 - 0.31 (trimmed by 0.07 0.04)
 - Chromaticities found at 1.2 and 4 (resolution of 1-2-units) → corrected to ~ 1 and 2
 - Coupling C- 0.002
 - Dispersion measurements done
 - Hump reference spectrum saved - one beam - damper off
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- Beam 1 injected
 - Tunes found at 0.20 - 0.28
 - Tunes corrected to 0.28 - 0.31 (trimmed in V by 0.04)
 - Chromaticities found ~ 2 and 3.5
 - Coupling C- 0.002
 - Dispersion measurements done
 - Hump reference spectrum saved - one beam - damper off
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3-4/03/2010

Injection studies

- 21:00 - 04:00 : Injection studies : Impressive programme covered - Brennan Goddard and team
1. Provided a dozen shots on TDI for ALICE
 2. Over-injection studies B1 & B2 - again losses on Q3 above threshold
 3. Setting-up of protection devices
 - TCDQ B1: consistent alignment and movement of TCDQ and TCSG
 - TCDQ B2: couldn't move TCDQ, jaw stayed armed --> to be fixed
 4. Checked and adjusted injection kicker fine synchronisation of kick delays for B1 and B2 - fine adjustment of pulse length still to do.
 5. Checks of the abort gap keeper limits (limits: 25 ns before end of abort gap, and about 100 ns before start of abort gap) - No jitter of AGK seen
 6. IQC thresholds adjusted for new MKI delays, and also for measured BLM signals for clean injection (latches if beam on TDI).
 7. Checked synch and time stamping of injection inhibit from LBDS for B1 and B2 - now looks good to the nearest ms, with no sign of the 70 ms error which was previously there -to check with CO if they fixed something.
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04/03/2010

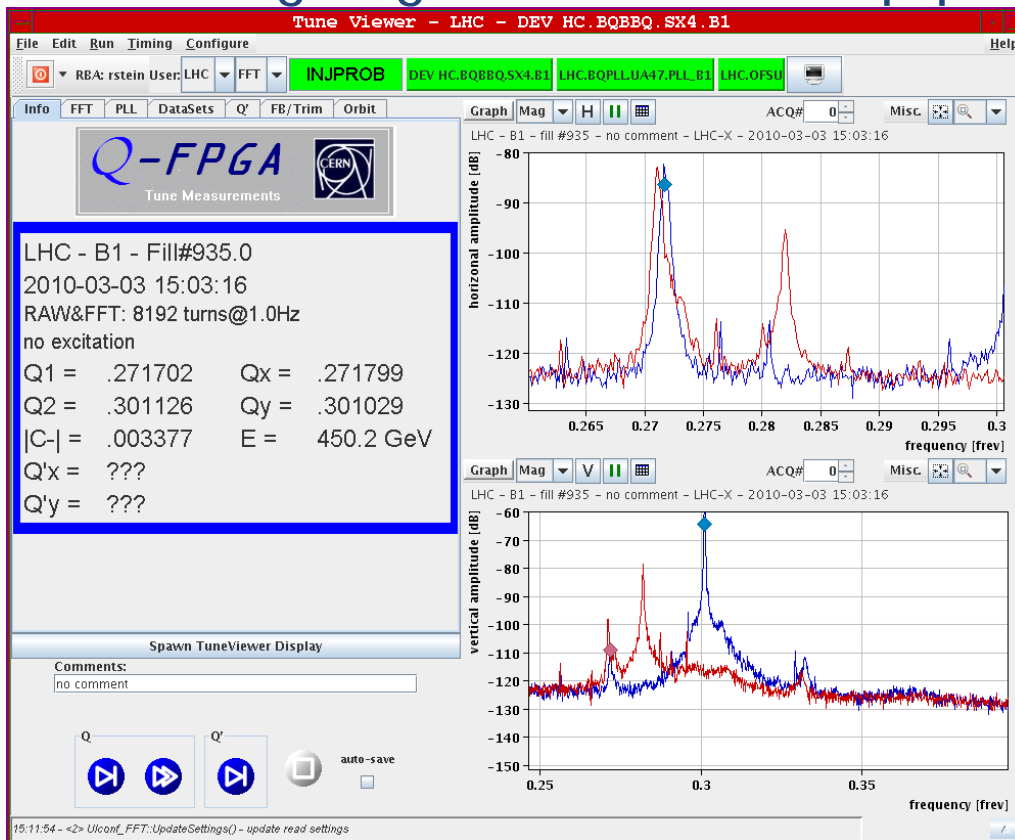
Injection studies

- Checked Injection and Dump on turn zero for B1 and B2 - does not work correctly - beam extracted on falling MKD edge - needs adjustment with RF.
 - Checked MKD kick synch with beam - looks good for I&D on turn 1 and above.
 - Measured B2 beta beat to crosscheck TDI and WS scans.
 - Checked rotating bumps at ends of TI 2 and TI 8 for later aperture measurement - OK within interlock limits.
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Hump studies

- Beam 1 injected

Starting the vertical tune scan while observing the lifetime while going across the hump position - Ralph Steinhagen



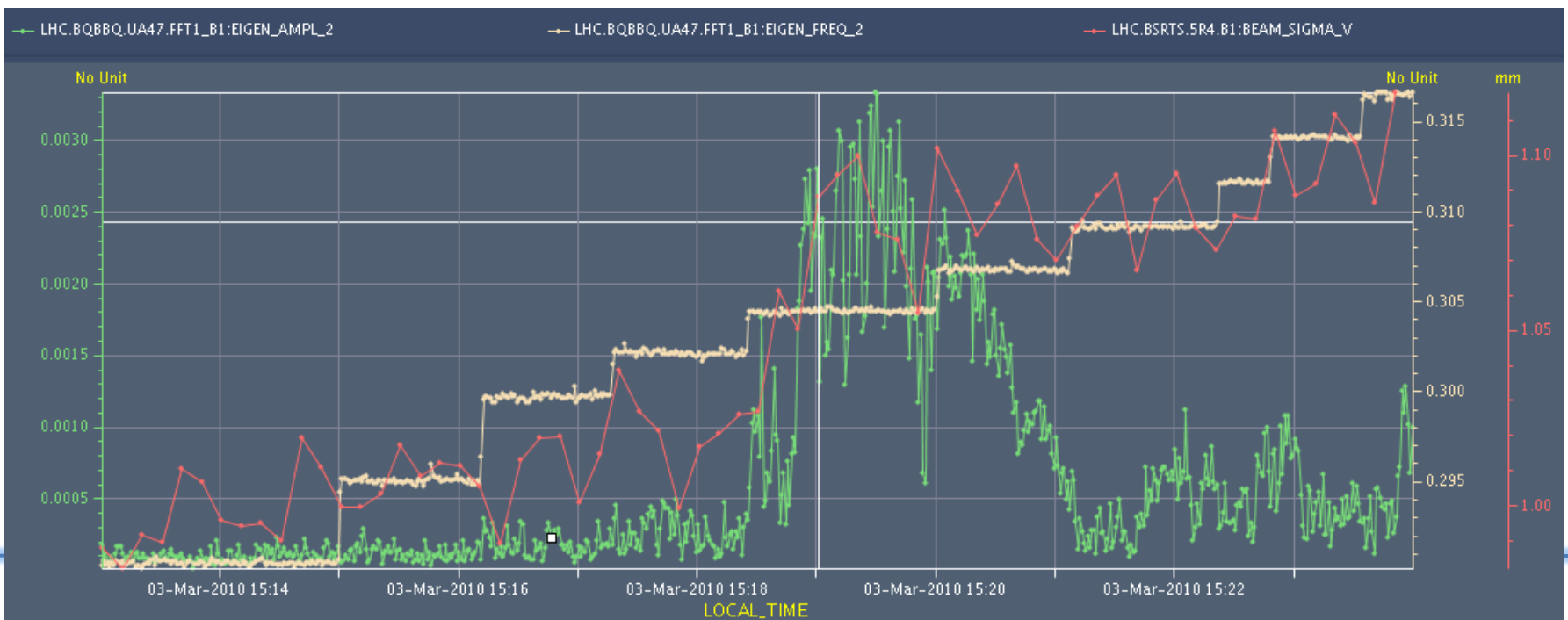
Record amplitude of the tune spectra and beam lifetime FBCT

Hump studies

- Beam 1 injected

Starting the vertical tune scan while observing amplitude of the tune signal and the vertical beam size from the BSRT, while going across the hump position

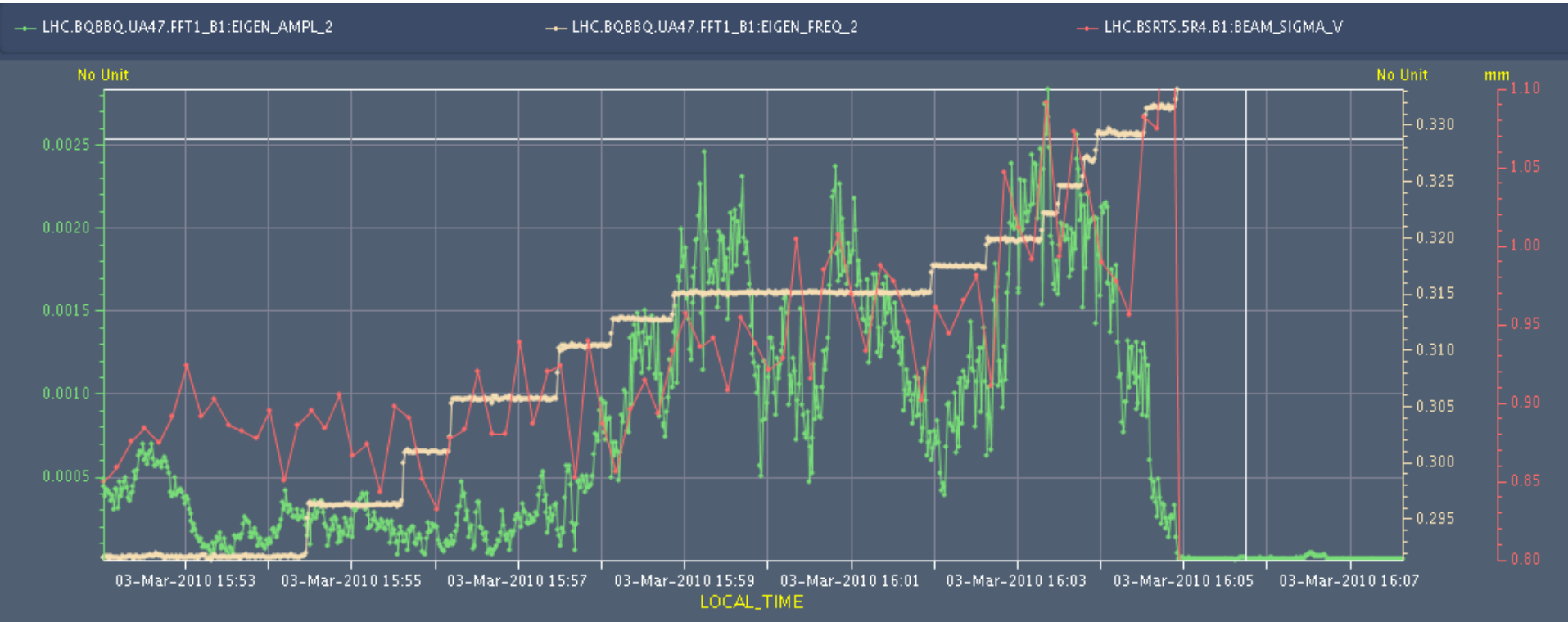
The increase in amplitude and vertical beam size is visible as soon as the tune hits the hump



Hump studies

- Beam 1 injected

Another tune scan, this time starting with the vertical beam tune spectra less wide -> moving frequency!



Hump studies

- 04:00 - 07:00 : Continue systematic hump investigation - Ralph Steinhagen, Alick Macphersen and OP team
 - hump remained regardless of B1 or B2 only operation/similar spectra for single and two beam operation
 - no effect on the hump for following circuits: MSI's, transfer lines, RSS, RCO, RCD and vertical 60A orbit correctors
 - no effect on hump if B1/B2 RF frequencies are unlocked
 - no effect on hump if B1/B2 RF frequencies are set apart
 - while seen on both beams, hump effect on beam-life time is more apparent for B2
N.B increasing the bunch intensity increases the hump discovery potential
 - Dependence of hump amplitude on total RF voltage studied
-> **should investigate this further with RF experts**
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Hump measurement list

- List of elements ON/OFF for hump checks: PC OFF not only 0 current - one beam at a time.
 - TL magnets incl. MSI - **DONE**
 - Damper OFF (power-wise) - **DONE (reference humps)**
 - Orbit correctors after establishing an orbit with minimum number of correctors - **DONE → No effect on hump**
 - Spool pieces RCO - RCD - RSS - **DONE** - RCS - to be done
 - AC dipole - is OFF
 - Spectrum of BLM data at the primary collimator with RF ON and RF OFF (get value of the emittances, and all longitudinal parameters) **DONE → No evident effect on hump**
 - Measurements with experts:
 - Spectral analysis of the radial pick-up and damper pick-up data - **started**
 - Vary He flow of the beam screens - block all the valves regulating the flow on the beam screens - saved actual settings first
 - Make the measurements with different sets of RF modules ON while keeping the RF voltage constants
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Hump measurements

- Inject both beams: B1&B2
 - Take reference for the hump (save spectrum) - **DONE**
 - Measure correlation e.g. after disconnection of Beam1/Beam2 frequencies, change B1 frequency and observe effect on hump on both beams - **DONE** -humps are on the same frequency.
- With single beam:
 - Measure lifetime as a function of tune w.r.t. hump position (tune scan) -
 - Measure emittance blow-up as a function of tune w.r.t. hump position (tune scan) → **DONE. Clear effect on emittance blow-up when vertical tune is close to hump**
 - Measure tune response amplitude as a function of position w.r.t. hump position (tune scan) → **DONE. Clear effect on tune signal amplitude when vertical tune is close to hump**
 - Measure hump position vs. energy offset → **DONE**. No evident effect



Plan - 04/03/2010

- 07:00: Switch OFF all sectors
 - 07:00 - 15:00 : HWC tests. In parallel access to point 6 and possibly 7 for BLM intervention. During this time access to experiments is possible
 - 15:00-17:00: pre-cycle and injection
 - 17:00-24:00: Hump investigation continued
 - Overnight: beta beating measurements and correction
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