Loaded-Q studies at NML / CM1

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Q loaded scan procedure

– keeping the VS Gradient at 13MV/m

– sweeping the Qs starting from 3e6 in

- steps of 1e6 towards its specific maximum

– frequency tuners are used after every Ql step

- tuning goal $\rightarrow$ minimum detuning during FT
- start and end of FT phase same level

– Ratio will be adapated

– Setpoint trajectory adapted -> closed loop measurements

– for each measurement point two data set are stored

- including all controller parameters for 10 pulses
- calculated Ql and corresponding motor position is stored
- sets are done by LFD compensation off and on

– LFD compensation coefficients are scanned before application
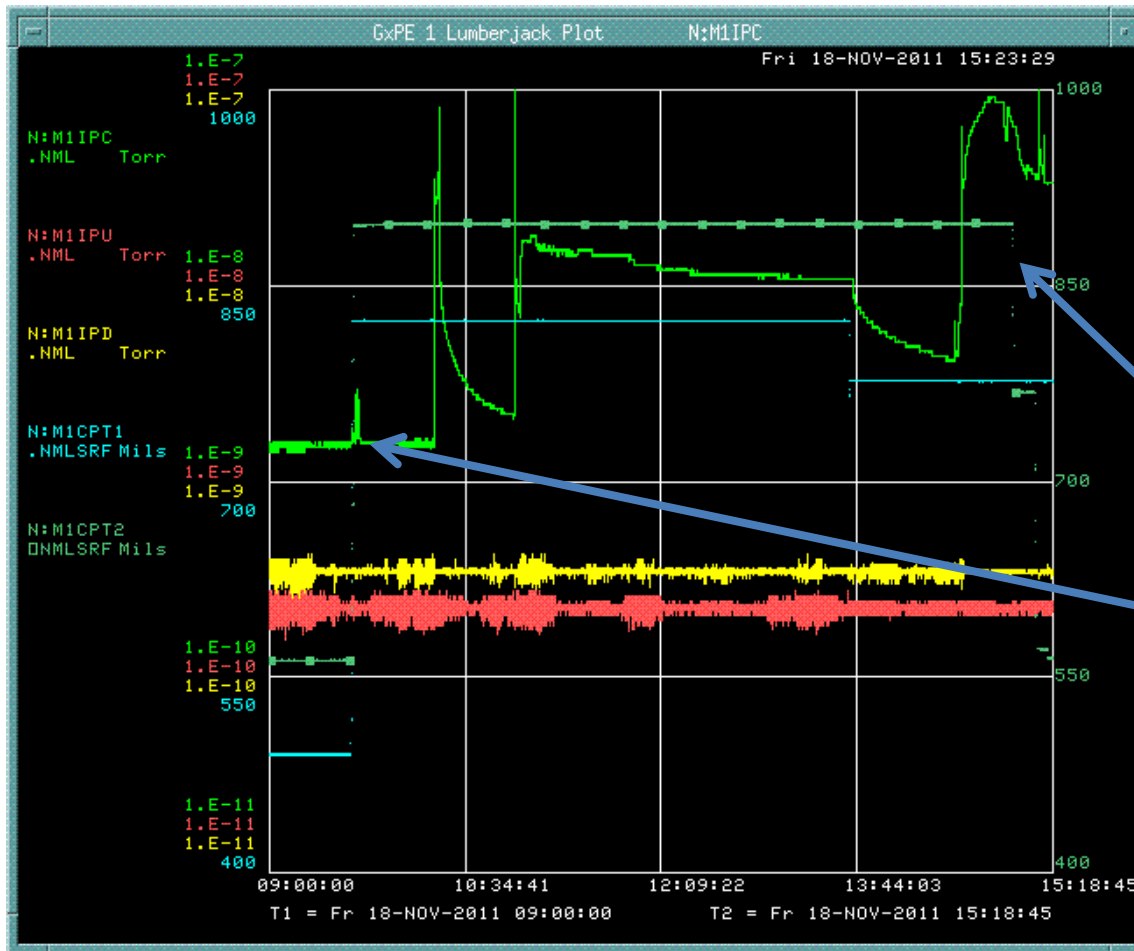
Expected behavior

- Higher microphonic sensitivity
  - To be evaluated from stored datasets (200 pulses taken for min / max values)
- Power consumption changes
  - Check forward and reflected signals
- LFD compensation
  - Working for different Qls
- Different Ql min/max levels for individual cavities
- Influence on neighboring cavities
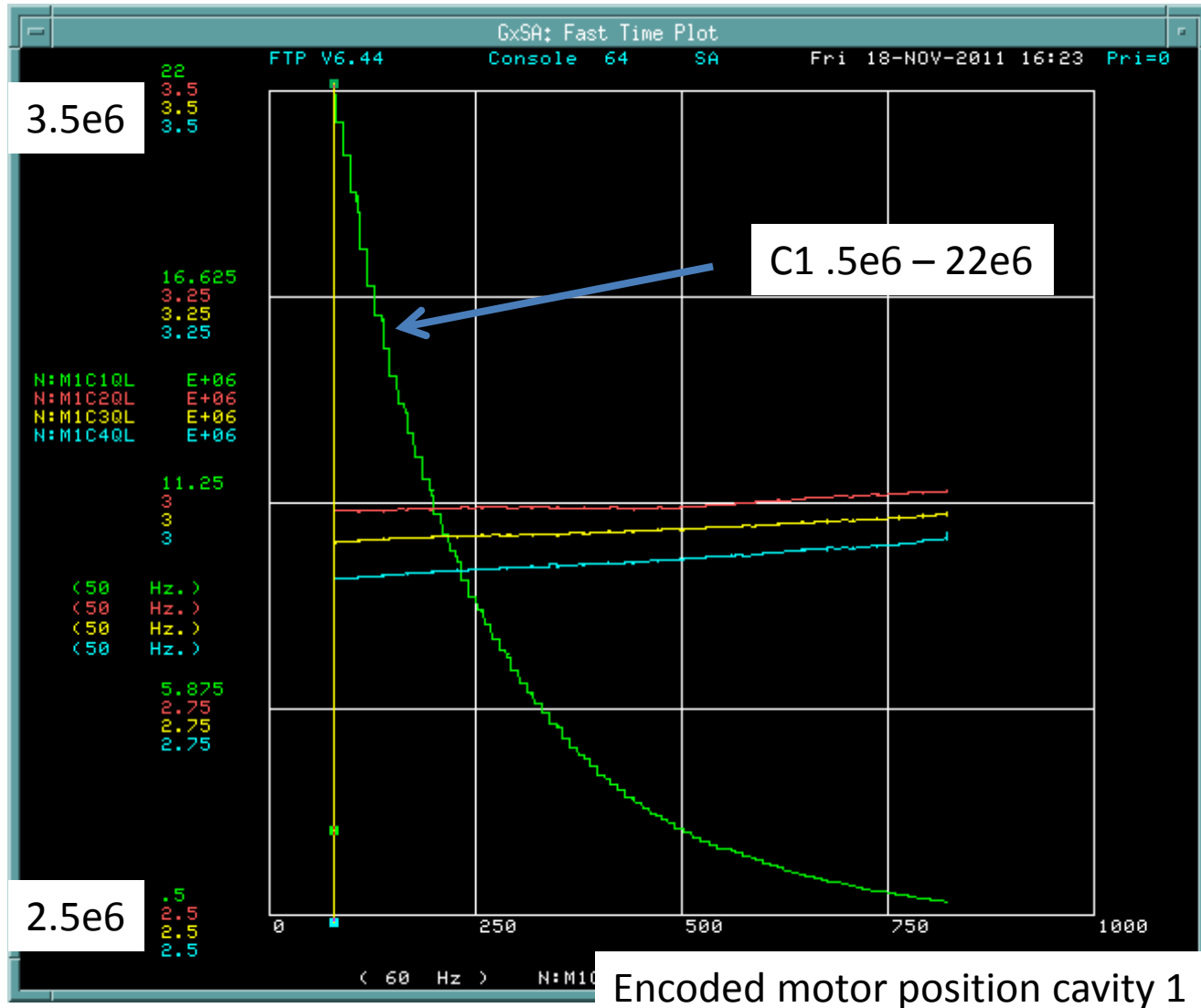
Cavity 4 shows strong Ql drifts
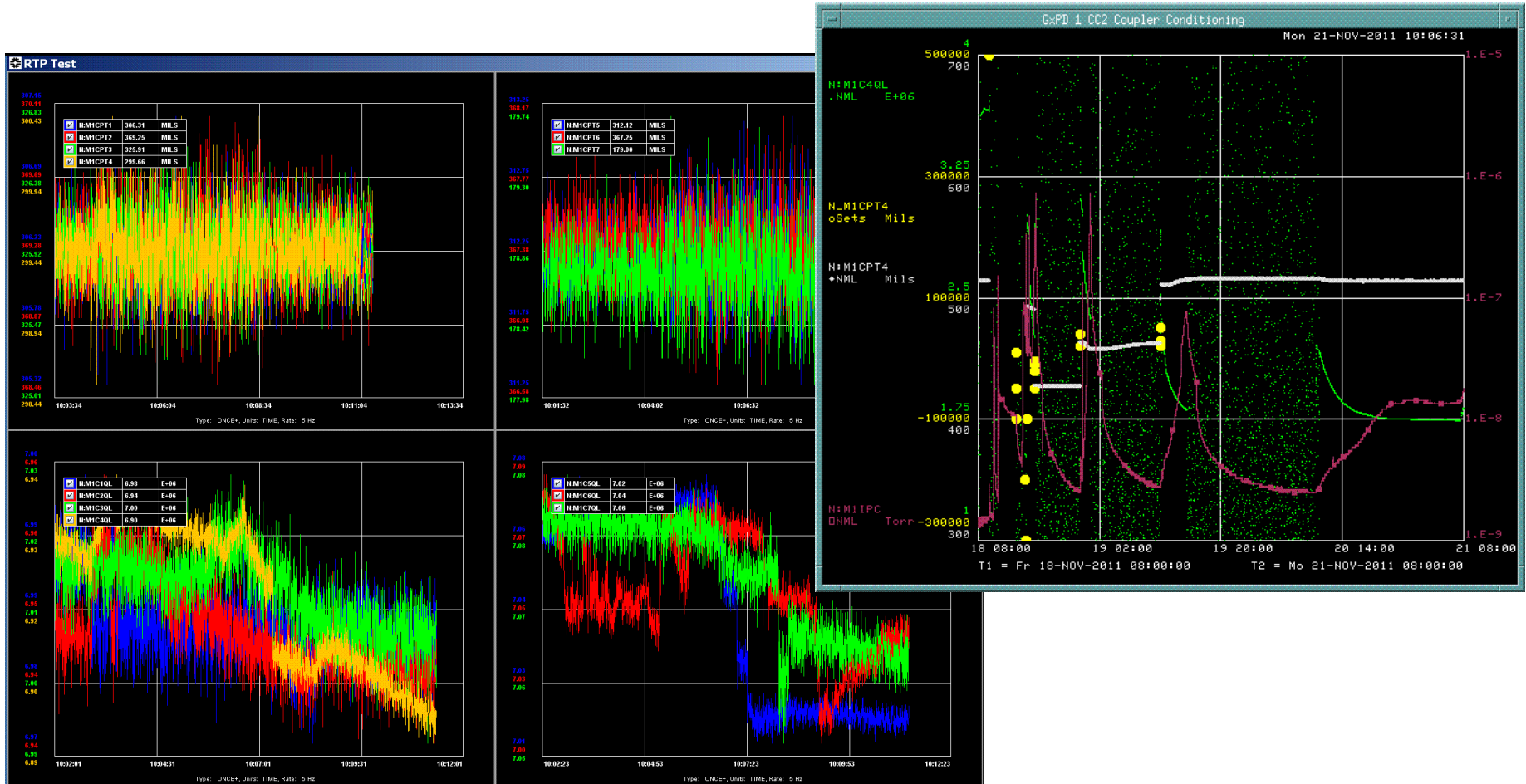
- Cavity 4 drifts over time in the Qls
  - Without touching the motor
  - Motor encoder shows also position changes during the weekend
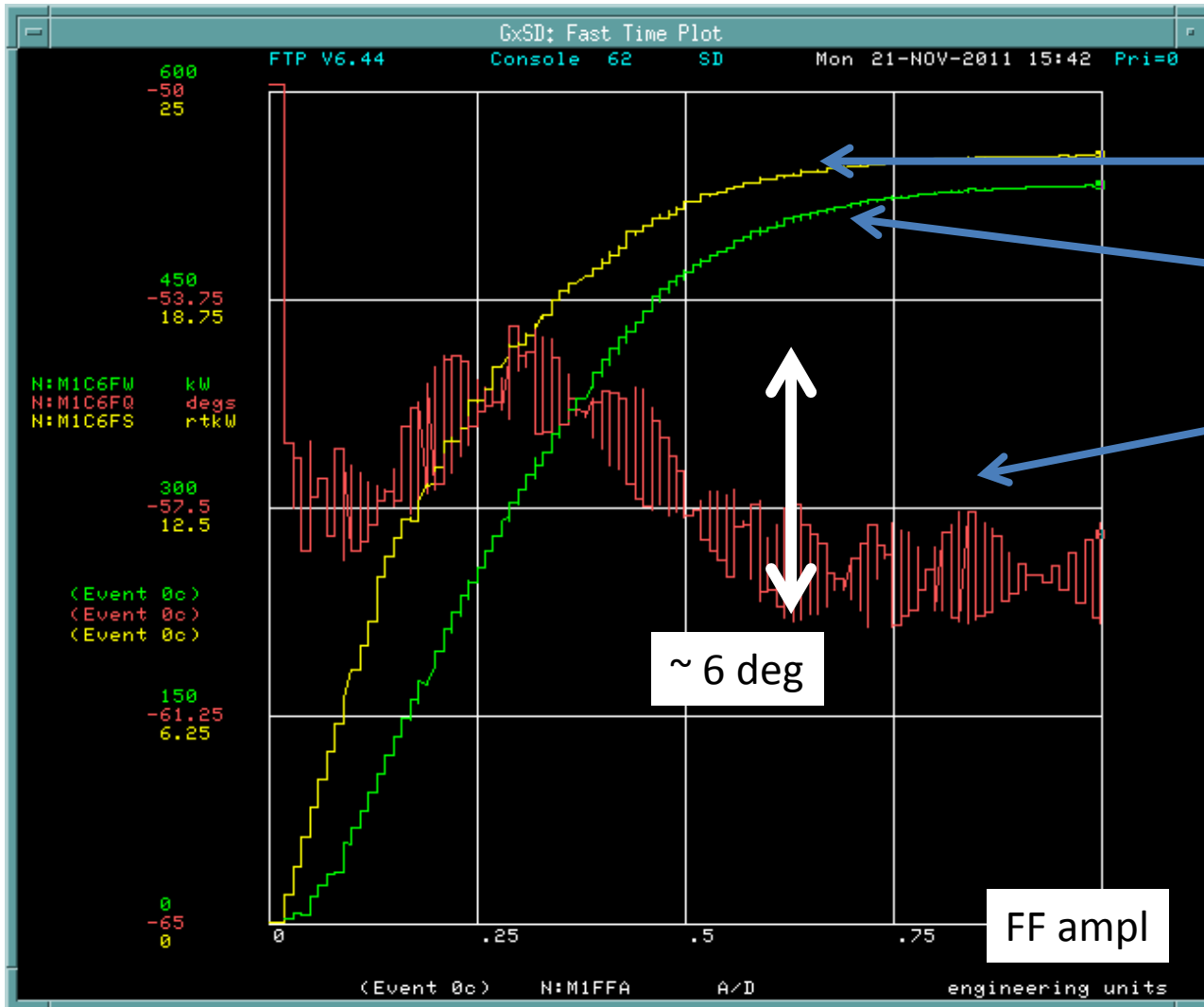
Vacuum activity due to motor tuning

Motor movements

Influence on other cavity Qls

GxSA: Fast Time Plot

FTP V6.44   Console 64   SA   Fri 18-NOV-2011 16:23   Pri=0

3.5e6

C1 .5e6 – 22e6

2.5e6

Encoded motor position cavity 1

Klystron saturation scan

To be investigated

- Cavity4 behavior
  - Drifts in measured Ql and also motor position changes
- Vacuum problems while moving motor tuners
  - Conditioning effects?
- Correlation between piezo activity and measured Ql
  - Oscillations during system scanning procedure C6
  - Bias changes stronger then oscillations
    - Reflected power miscalculation?
- Crosstalk of measured Qls
- Microphonic sensitivity
- Forward and reflected power changes