



# X-Box 1 commissioning status - First T24 results -

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## Status of X-box1

- Hardware installation finished
- Development of control and DAQ software on-going
- Control software now tunes and stabilizes PC power output
- Waveguide network including pulse compressor conditioned up to 20MW av., 1.5us, 50Hz into compressor, 170ns, 30MW, 50Hz out of compressor into structure. Pulse compressor needed about 200h of rf cleaning to reduce outgassing (chem. cleaning/baking not possible)
- SC solid state modulator is running without major problems, pulse-to-pulse stability is excellent ( $10^{-4}$ )
- Klystron runs without any problems (after being resurrected twice a year ago!)
- Experience from X-Box1 triggered new developments for X-Box2, especially in the LLRF part

**24/7 operation only limited by CTF2 access and software changes!**



# Screenshot of X-Box controls (Mid Dec 2012)

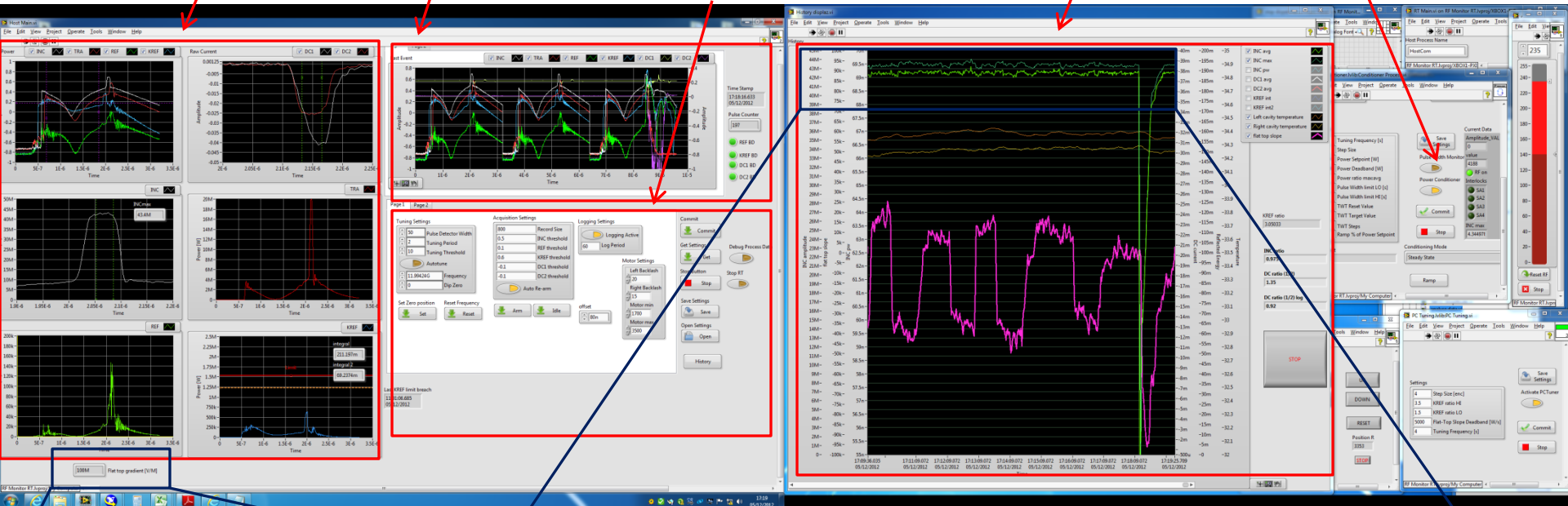
50dB log detector into 14bit  
250MSps/s ADC for controls

Last interlock event display  
(plus two previous pulses)

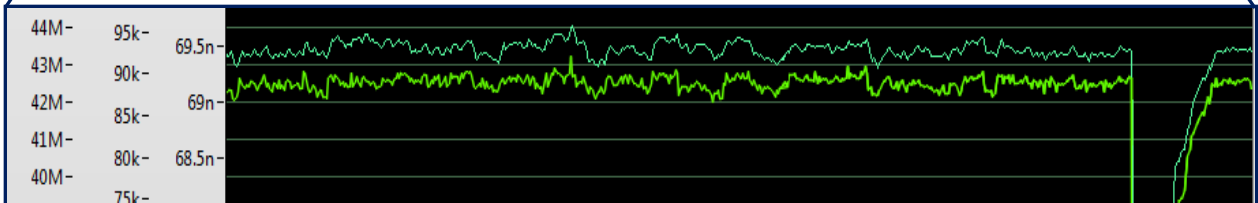
Controls for tuning,  
power, motors etc.

Interlock levels,  
calibration etc.

Configurable history plot



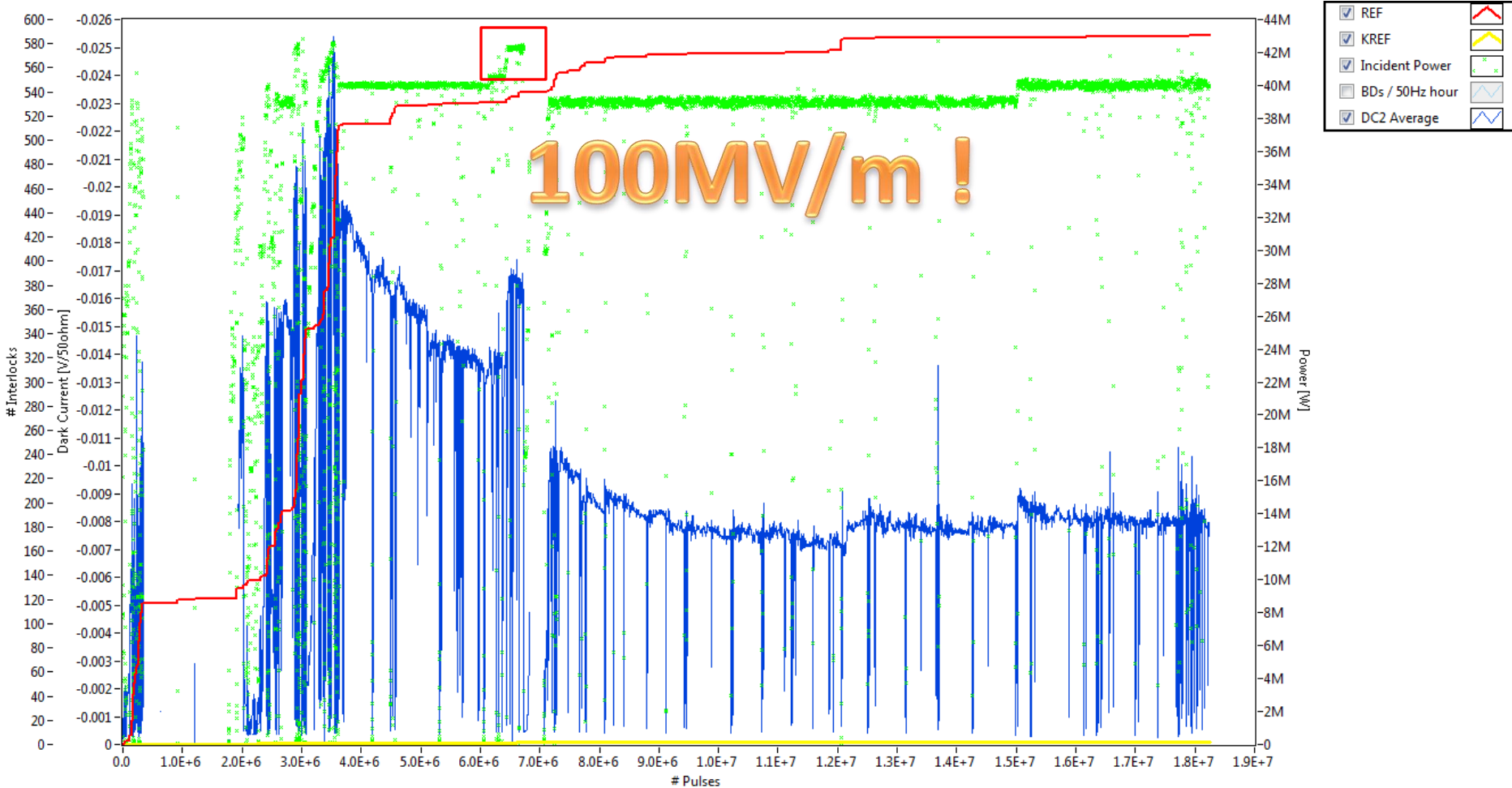
Real-time gradient display



Power history plot (peak and average)



# Status of the first CLIC T24 structure tested at CERN



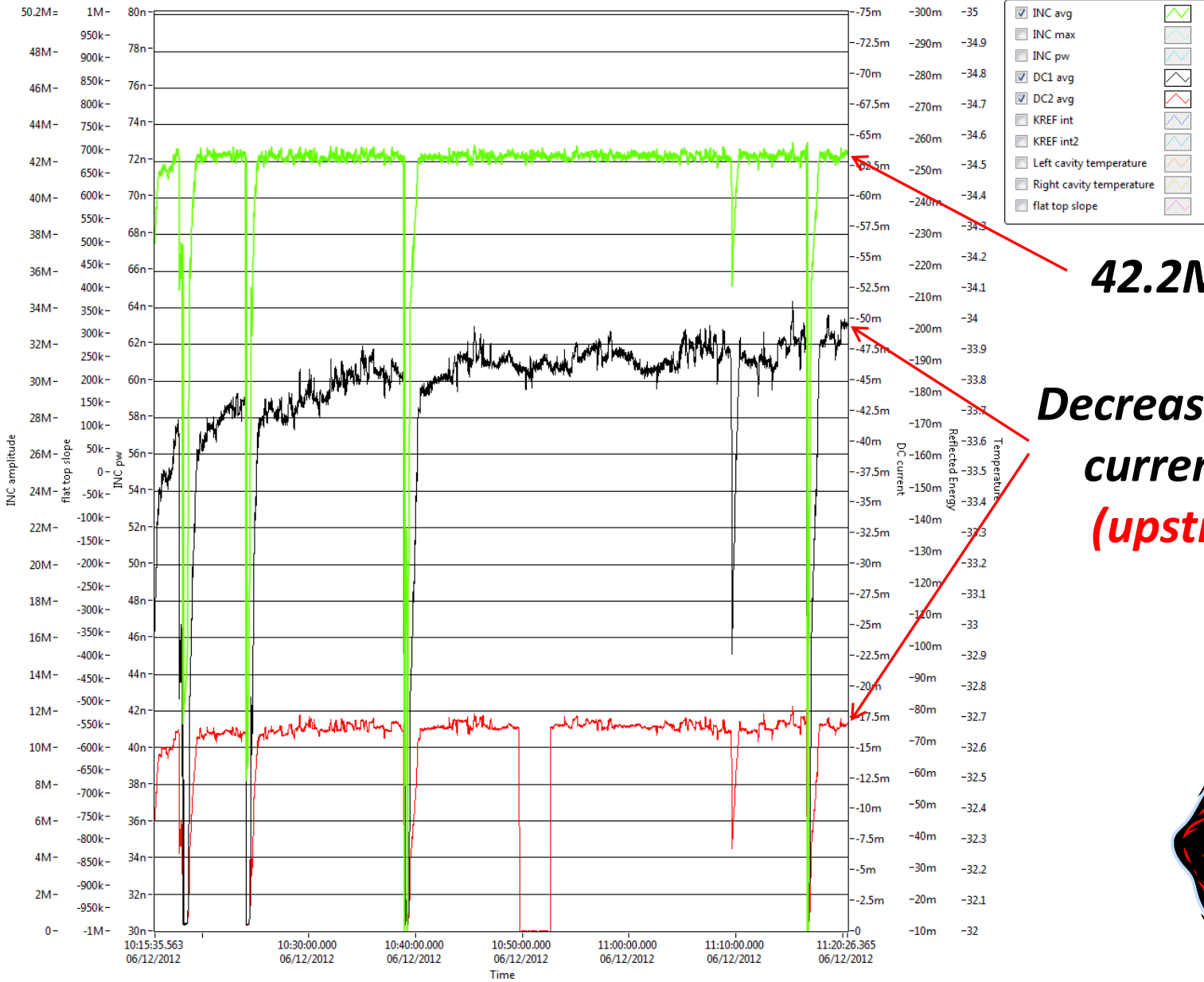
Run 7.12.2012 to 10.12.2012

- Stable pulse compressor output power due to constant automatic tuning and gain control
  - Reached 100MV/m stable operation for ~1.5h
  - Observed decreasing dark current for the first time



History

# The first 100MV/m at 50ns in detail (operator display)



**42.2MW**

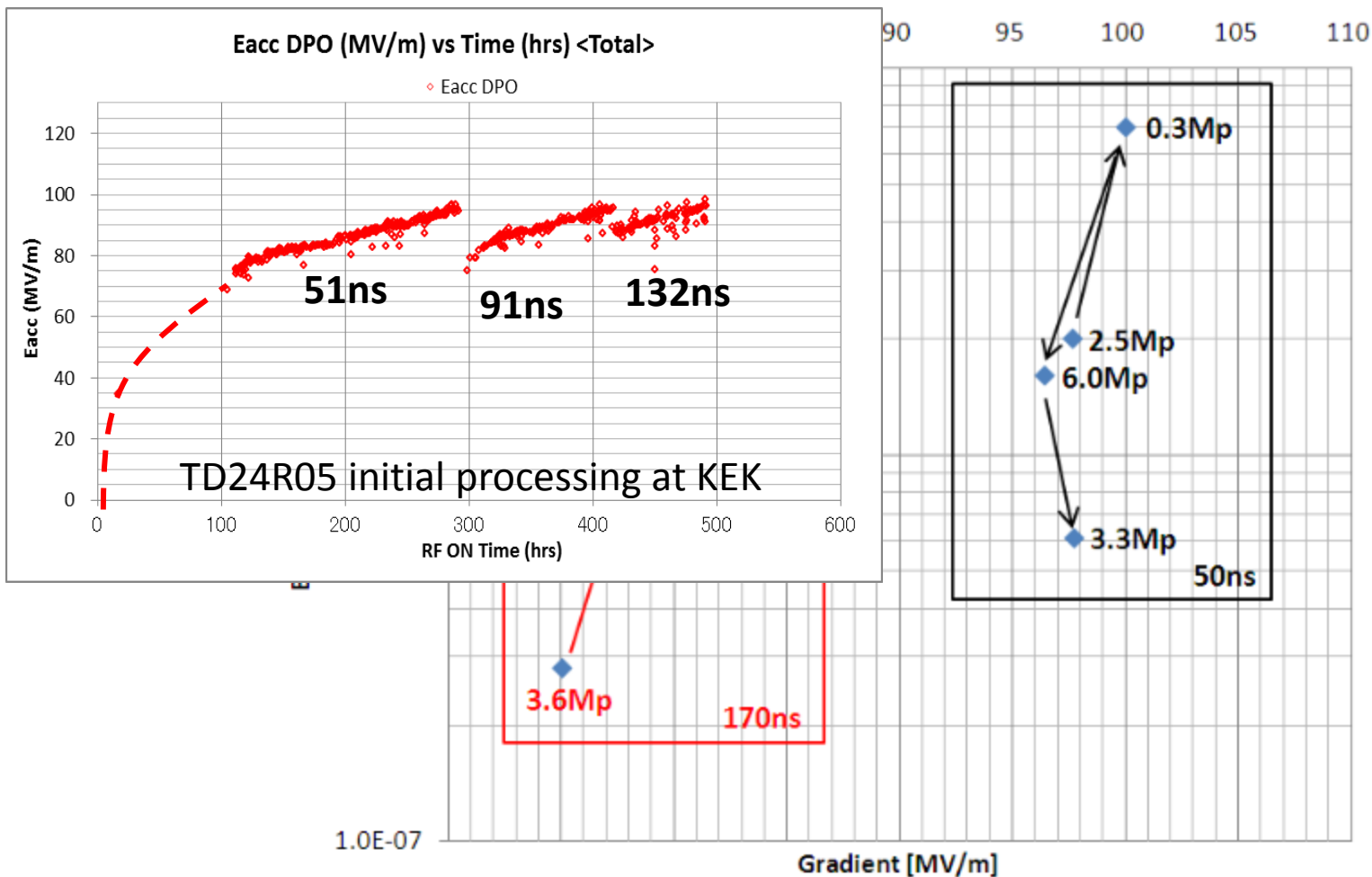
**Decreasing dark current (e-!) (upstream)**





# Status of the first CLIC T24 structure tested at CERN

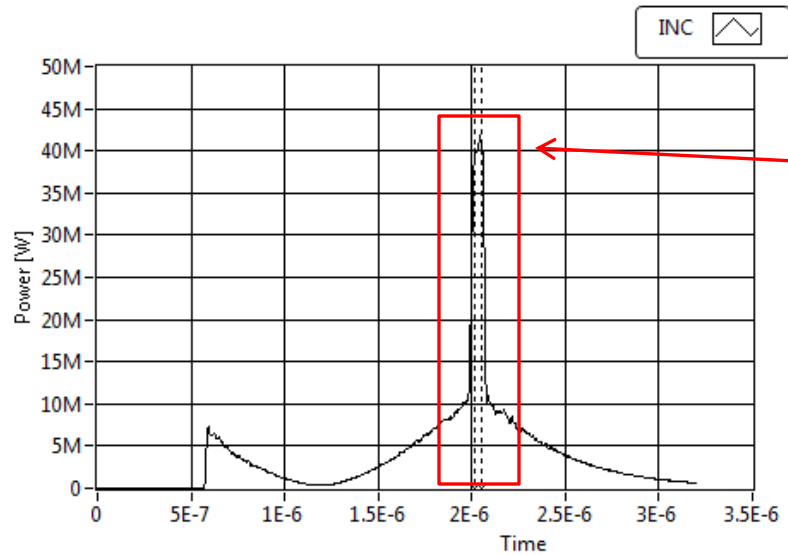
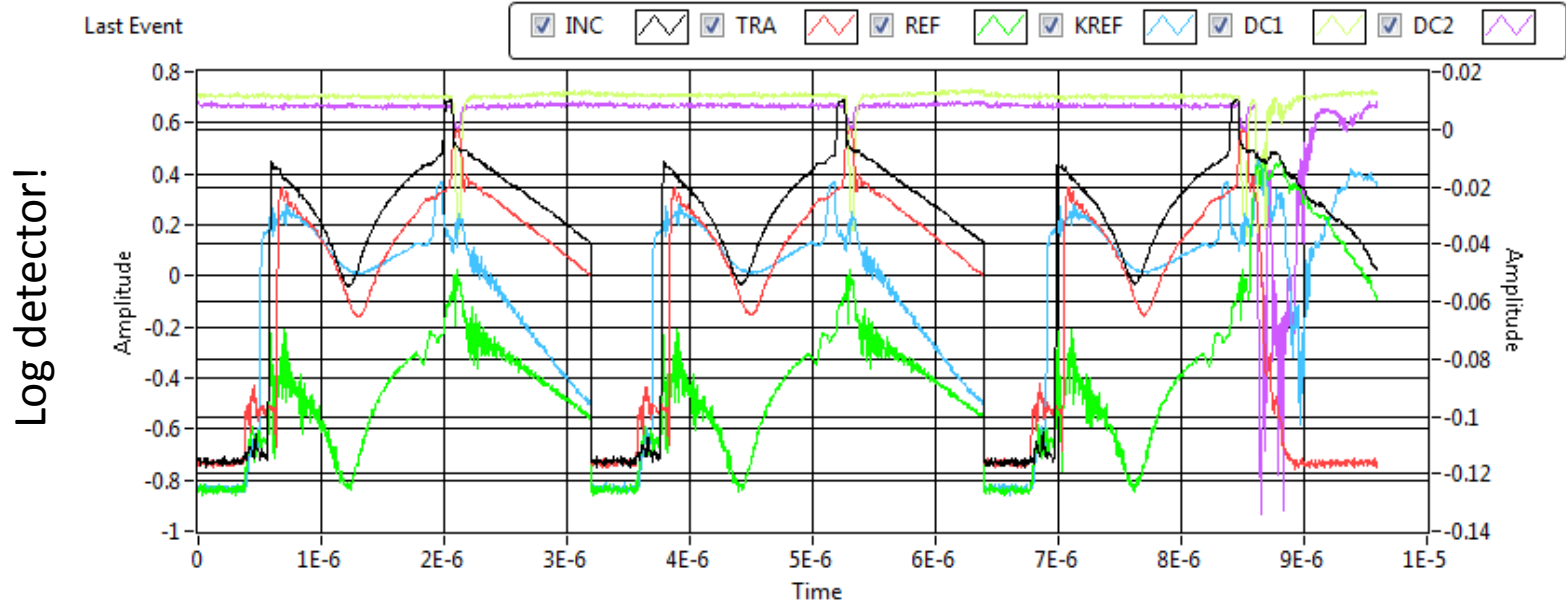
## CERN T24



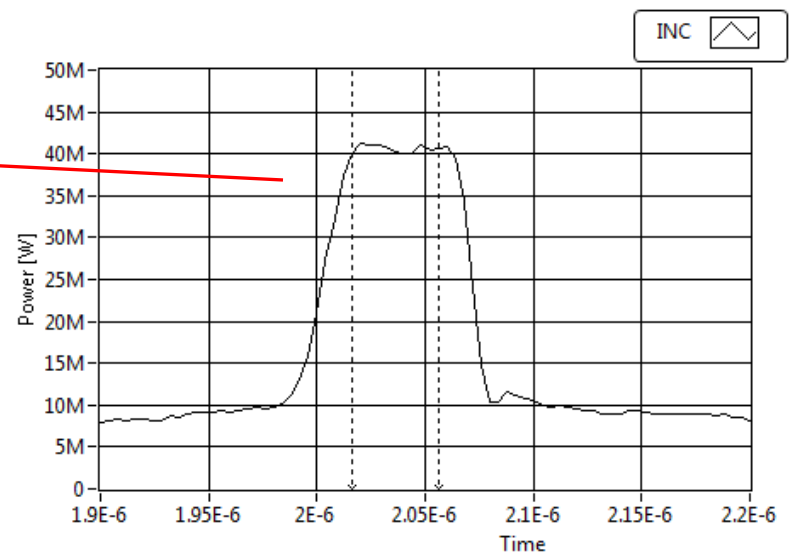
Total conditioning time at 50ns ~ 300hrs



# Some example waveforms at 50ns



Compressed INC pulse into structure

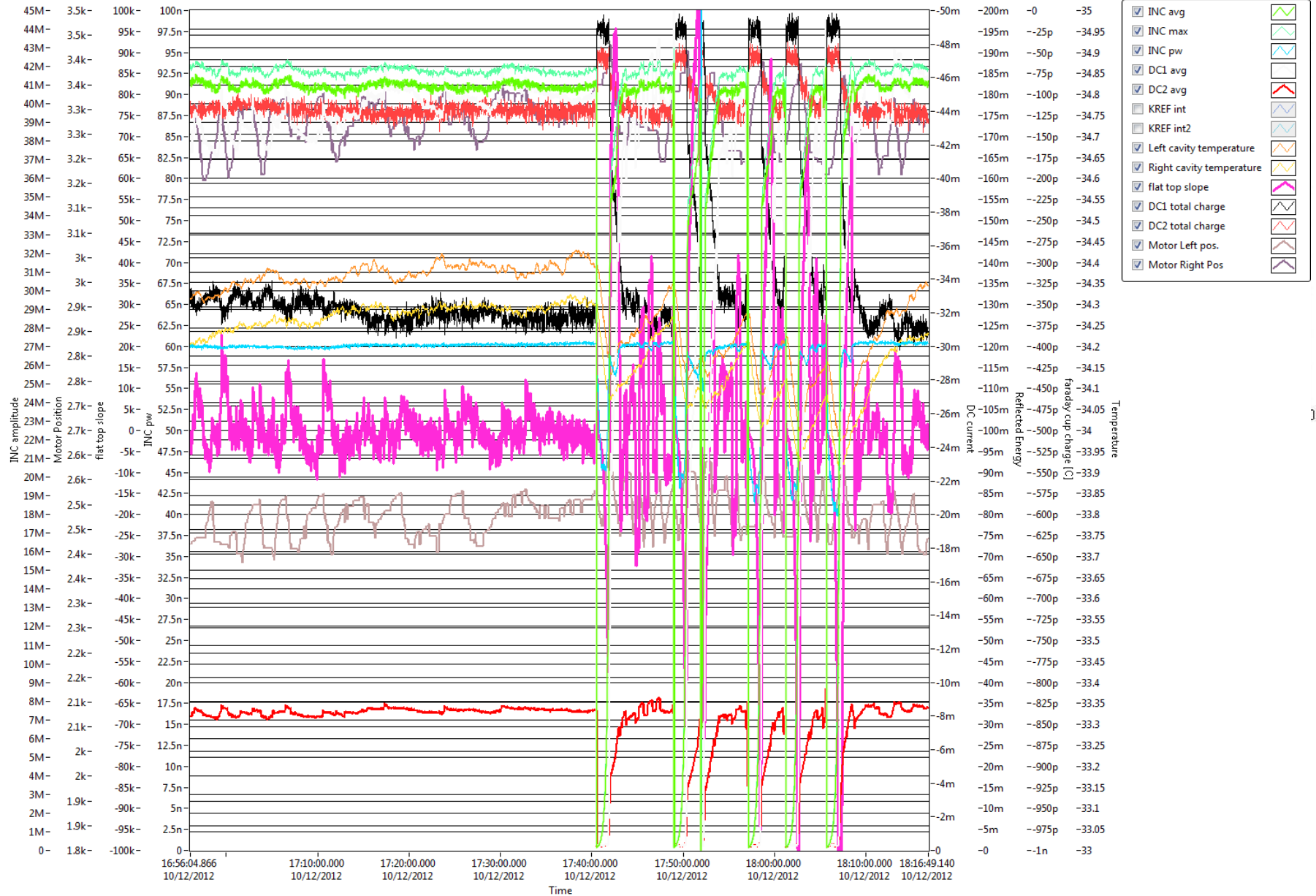


50ns flat top pulse into structure



# Started data analysis on 170ns data (Wilfrid Farabolini)

History







## Conclusion

*Still quite some work to be done, but we are testing a structure right now!*

*You are welcome to visit the test stand!*

*Thank you!*