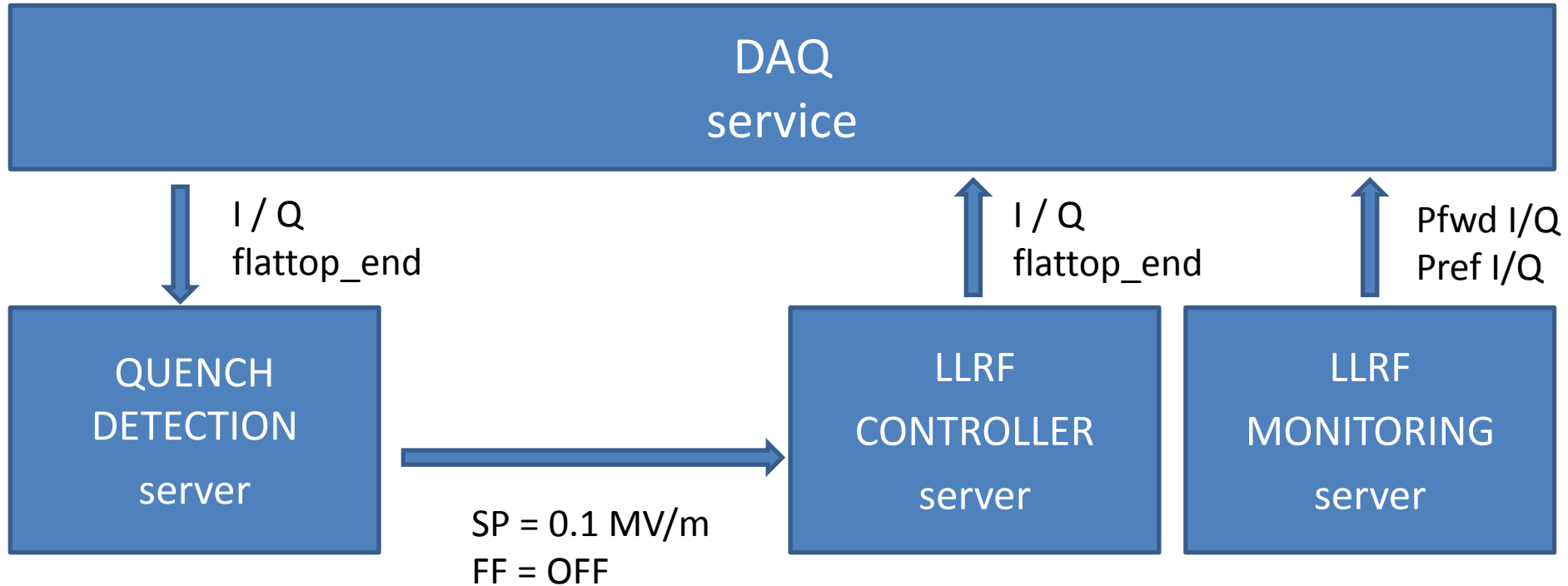


Quench detection server

Analysis from CMTB tests (Dec. 2011)

J. Branlard, O. Hensler, C. Schmidt
10.01.2012

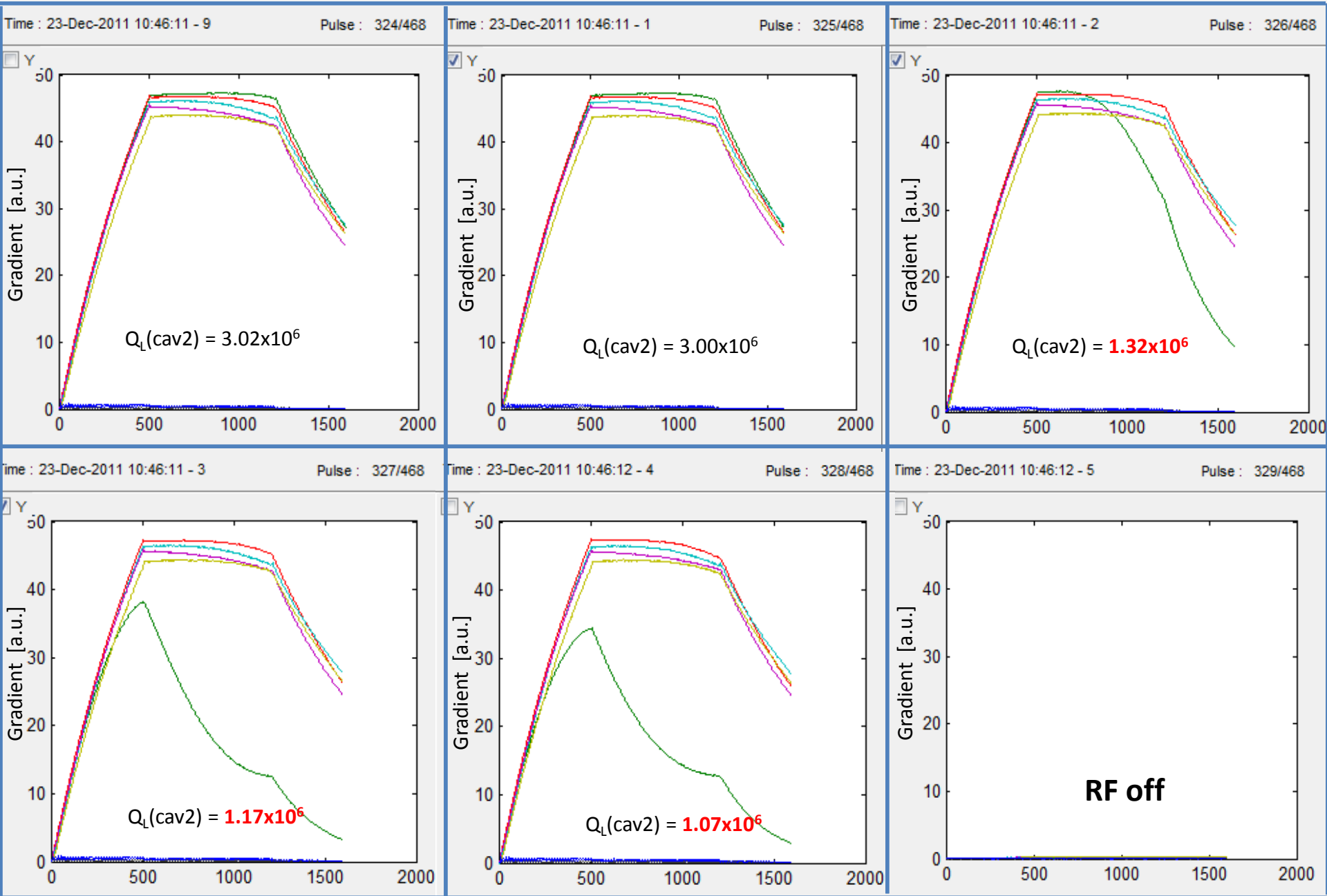
Server overview



1. Compute QI
2. Look for exceptions
 - Gradient too low
 - Artificial QI jumps
 - Etc...
3. Compute QI average over N pulses (10)
4. Compare instantaneous QI to mean
5. Take action

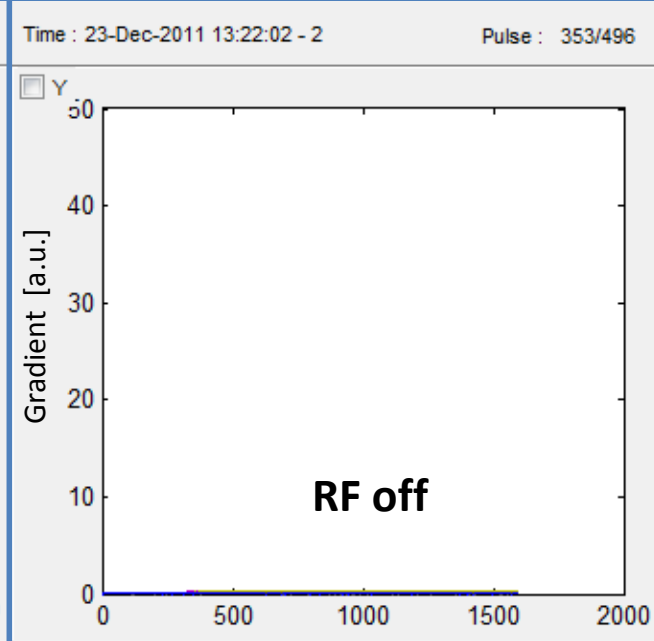
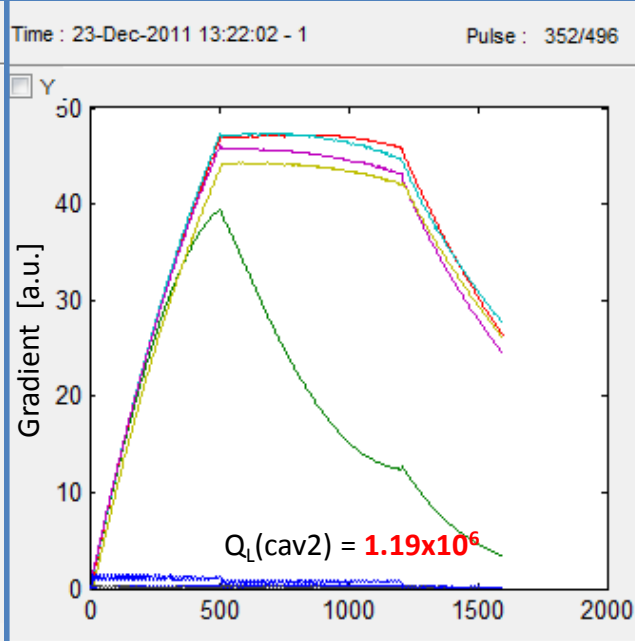
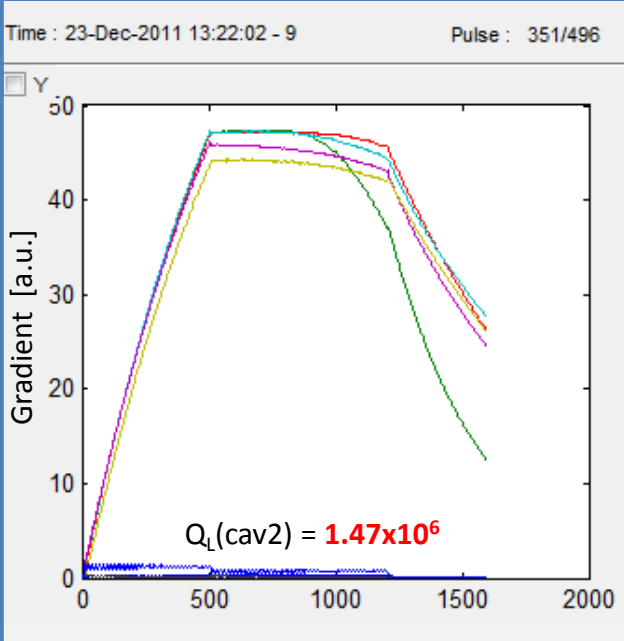
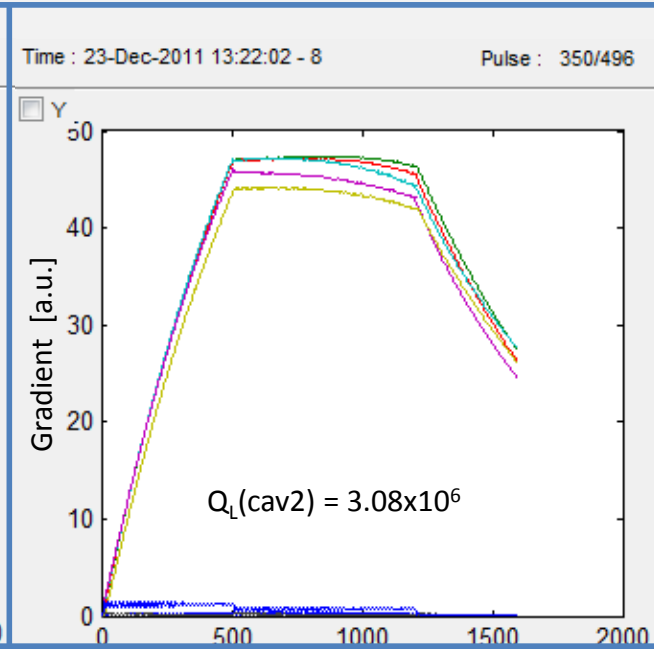
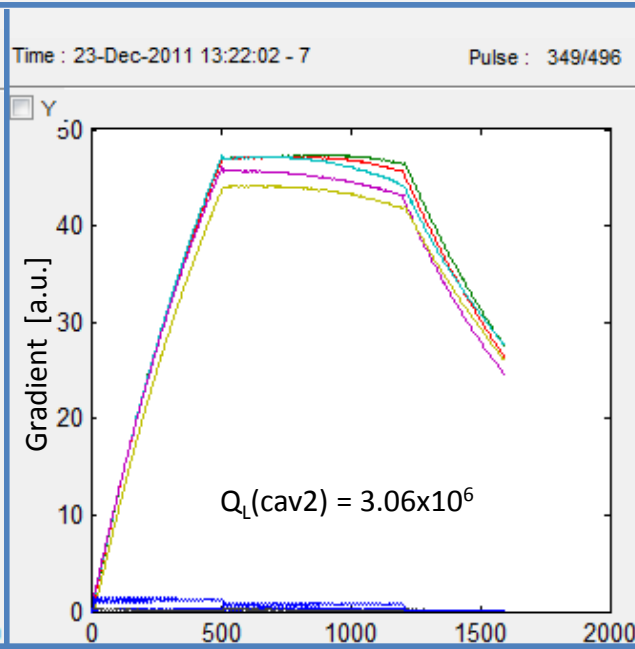
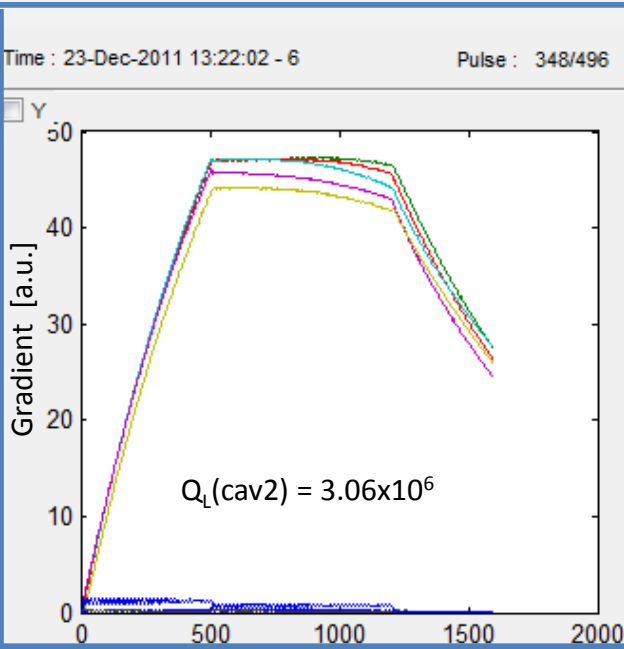
Cavity 2 Hard Quench

No FB
Threshold = 5×10^5



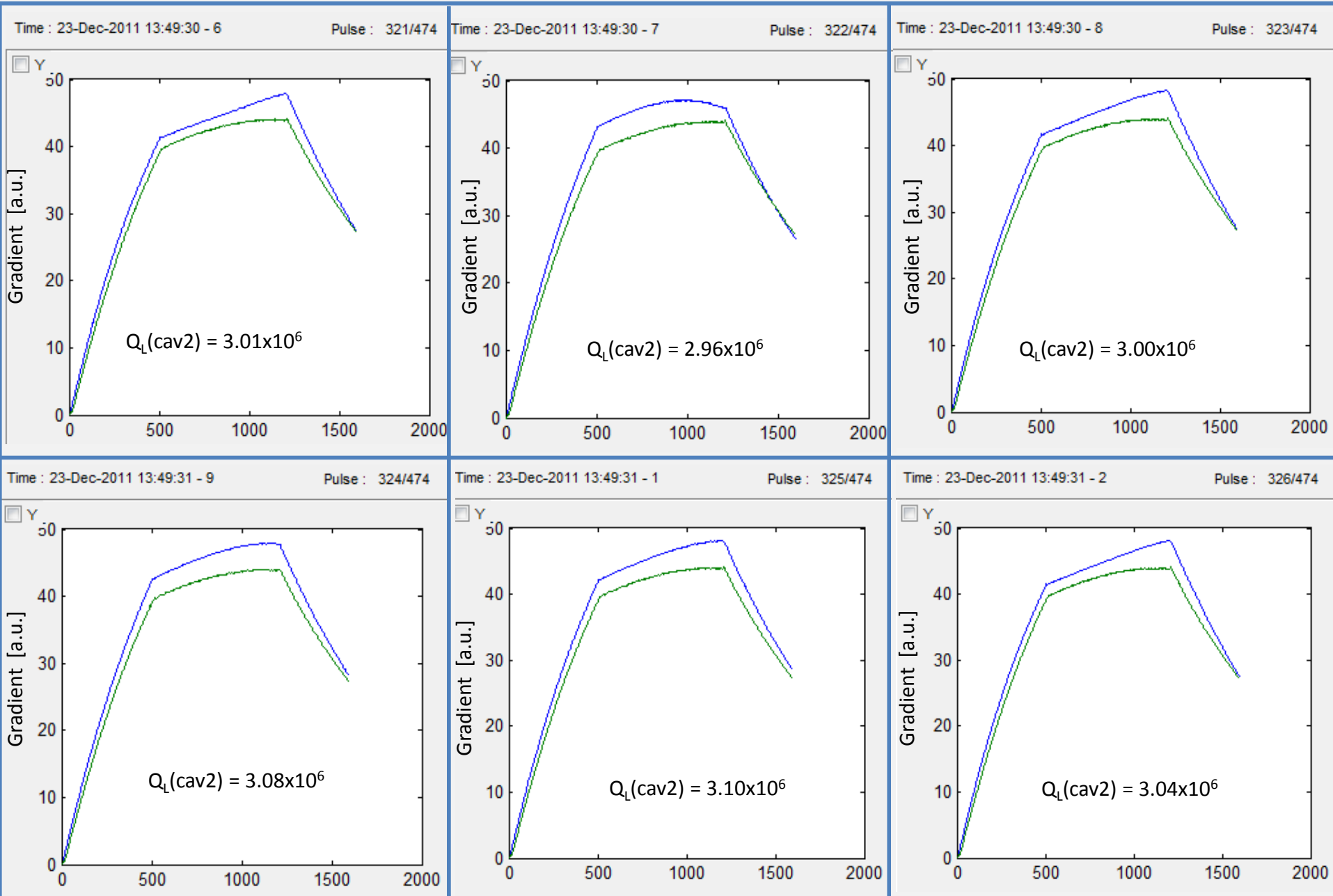
Cavity 2 Hard Quench

No FB
Threshold = 5×10^5

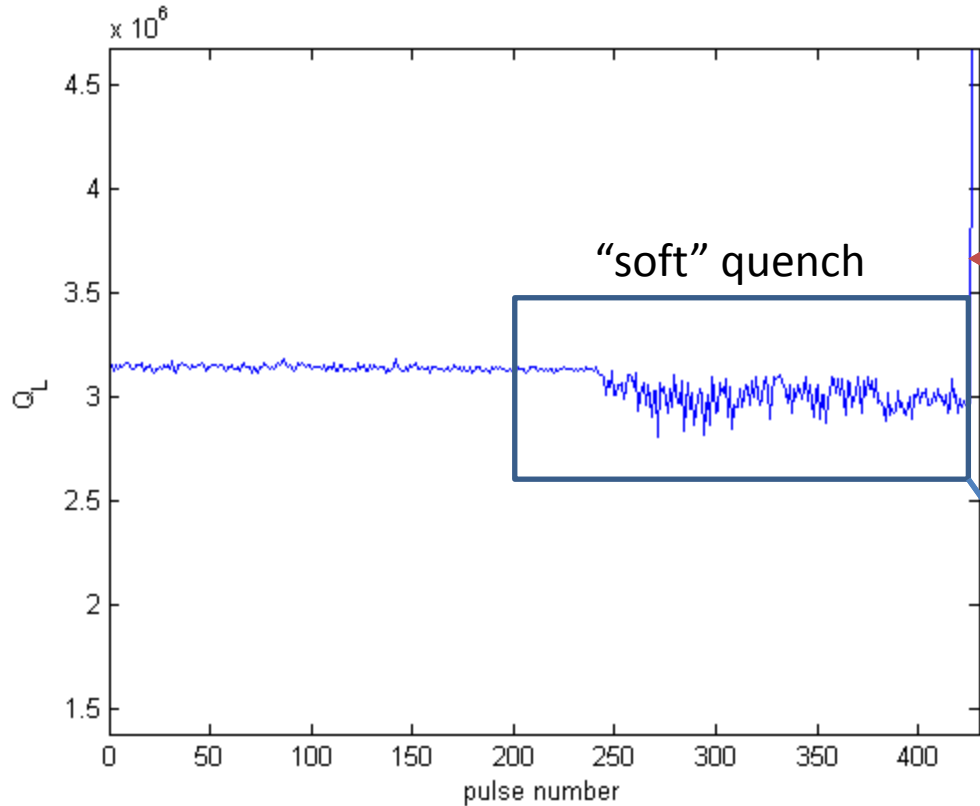


Cavity 2 Soft Quench

No FB
Threshold = 5×10^5

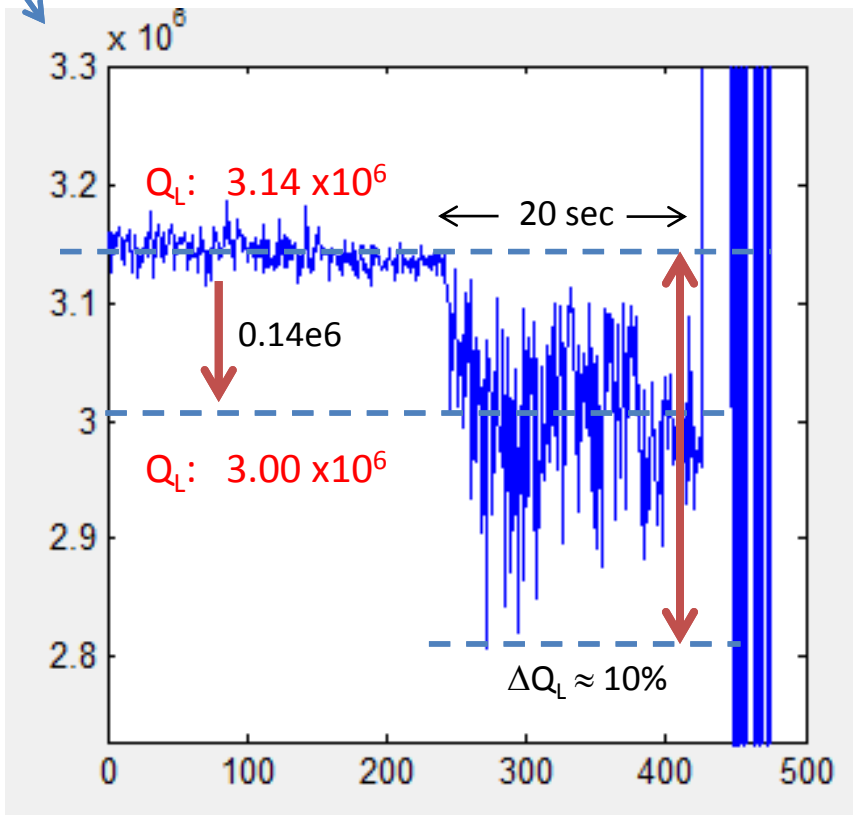


Cavity 2 "Soft" Quench



He trip

No FB
Threshold = 5×10^5



	normal	quench
MAX [$\times 10^6$]	3.19	3.13
MIN [$\times 10^6$]	3.11	2.81
MEAN [$\times 10^6$]	3.14	3.01
P2P [%]	2.3	10.6
STD	1.24	6.45

Partial conclusions

- Quench detection server works
- For **hard quench**, a threshold of $2e5$ is enough
- For **soft quench**, one can trigger on :
 - A **small** but **sudden** drop in QL ($\sim 1-2e5$)
combined with
 - A **sustained** (>5 seconds) pulse-to-pulse peak-to-peak QL error larger than 5%
- We need to test this when QL motors and tuners are exercised