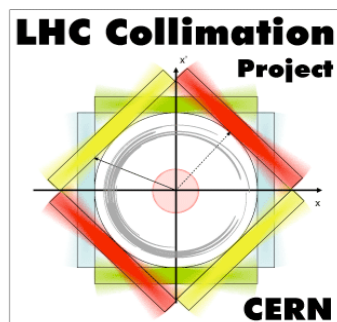


Feedback from operation

Stefano Redaelli, AB-OP

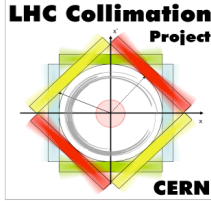
one behalf of the Collimation team

Special thanks for the LHC-OP team



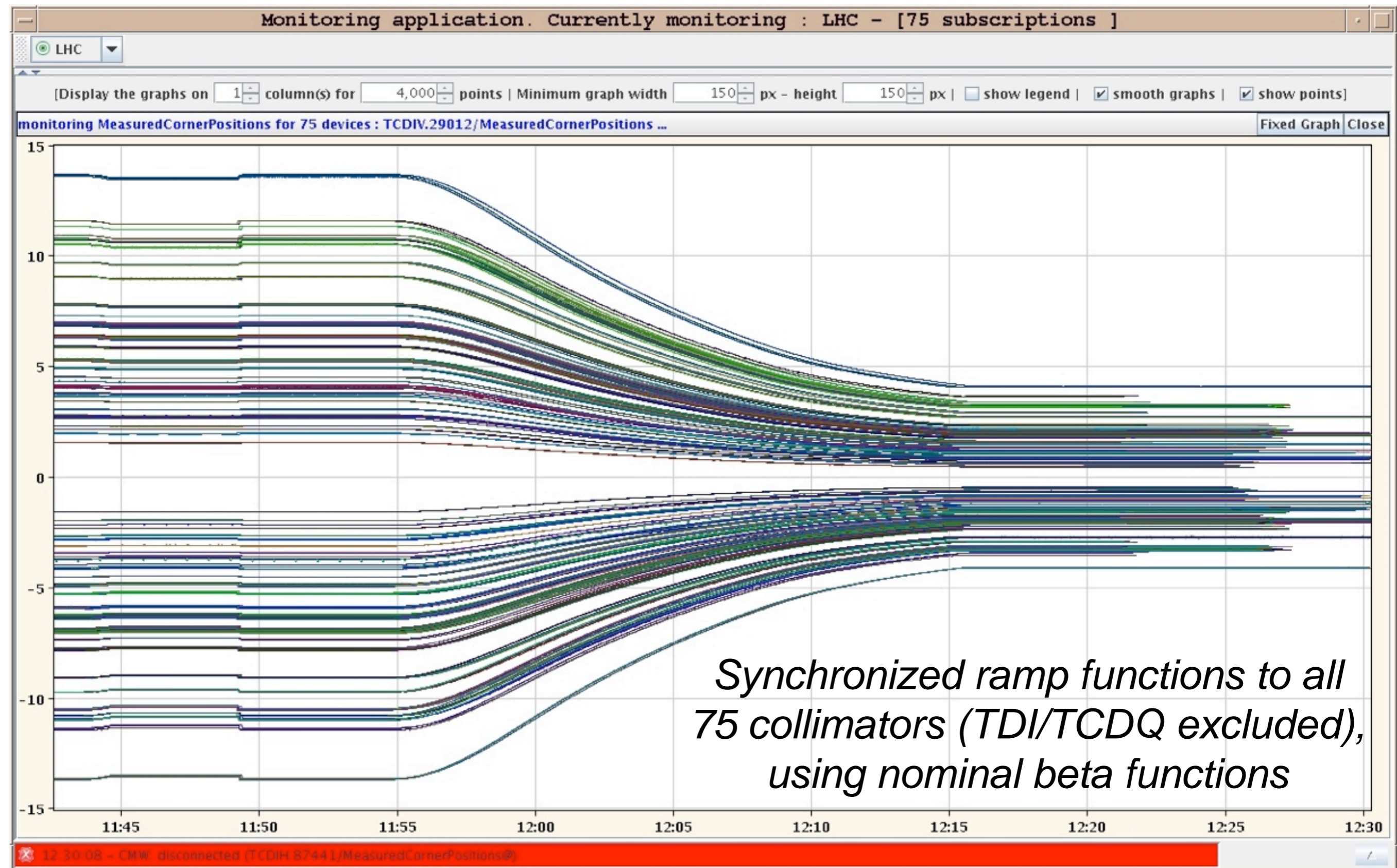


Outline

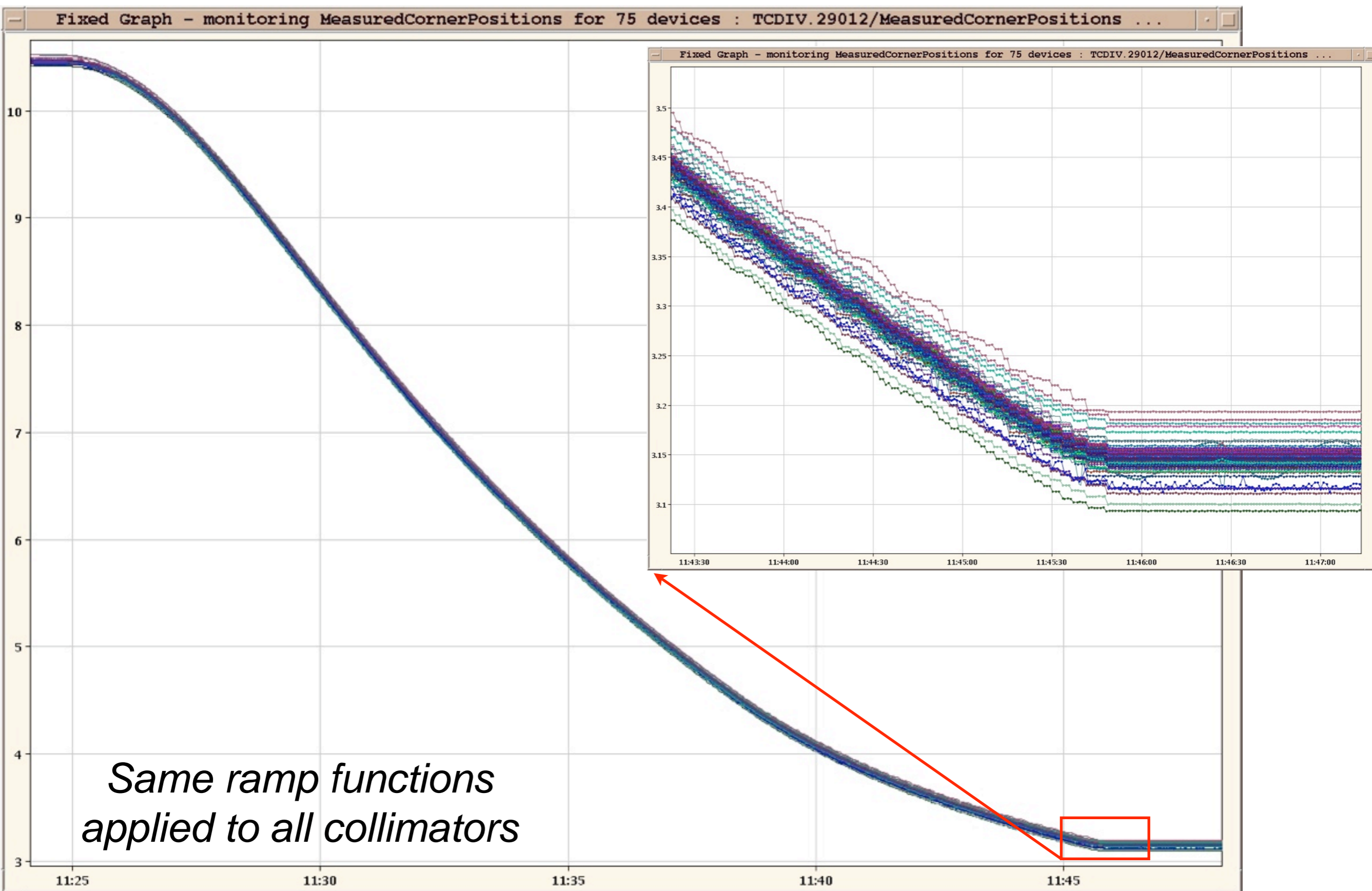


- Results of synchronized ramp tests**
- Results of reproducibility tests in IR7**
- Issues from beam operation**
- Outcome of machine protection checks**

Synchronized ramp tests (I)

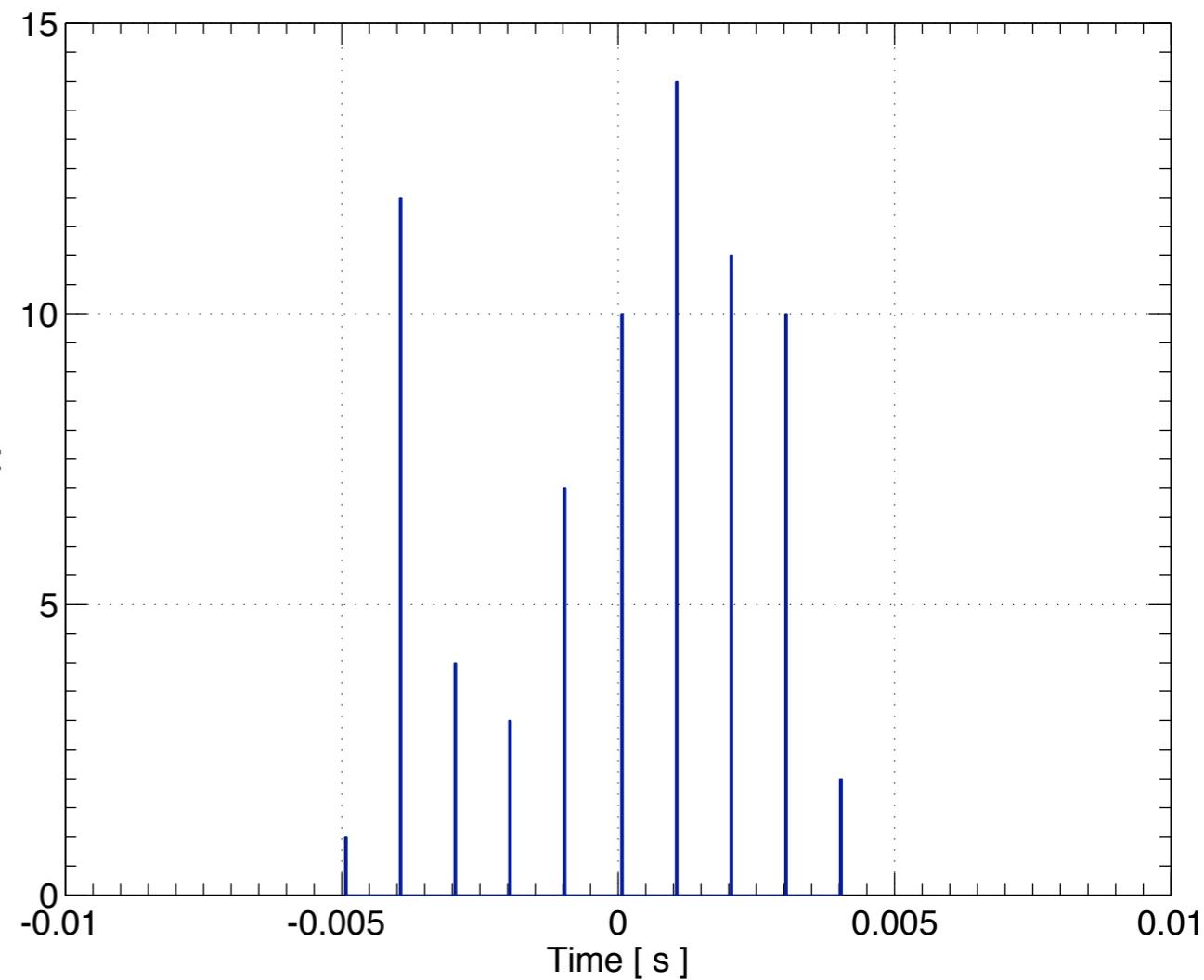
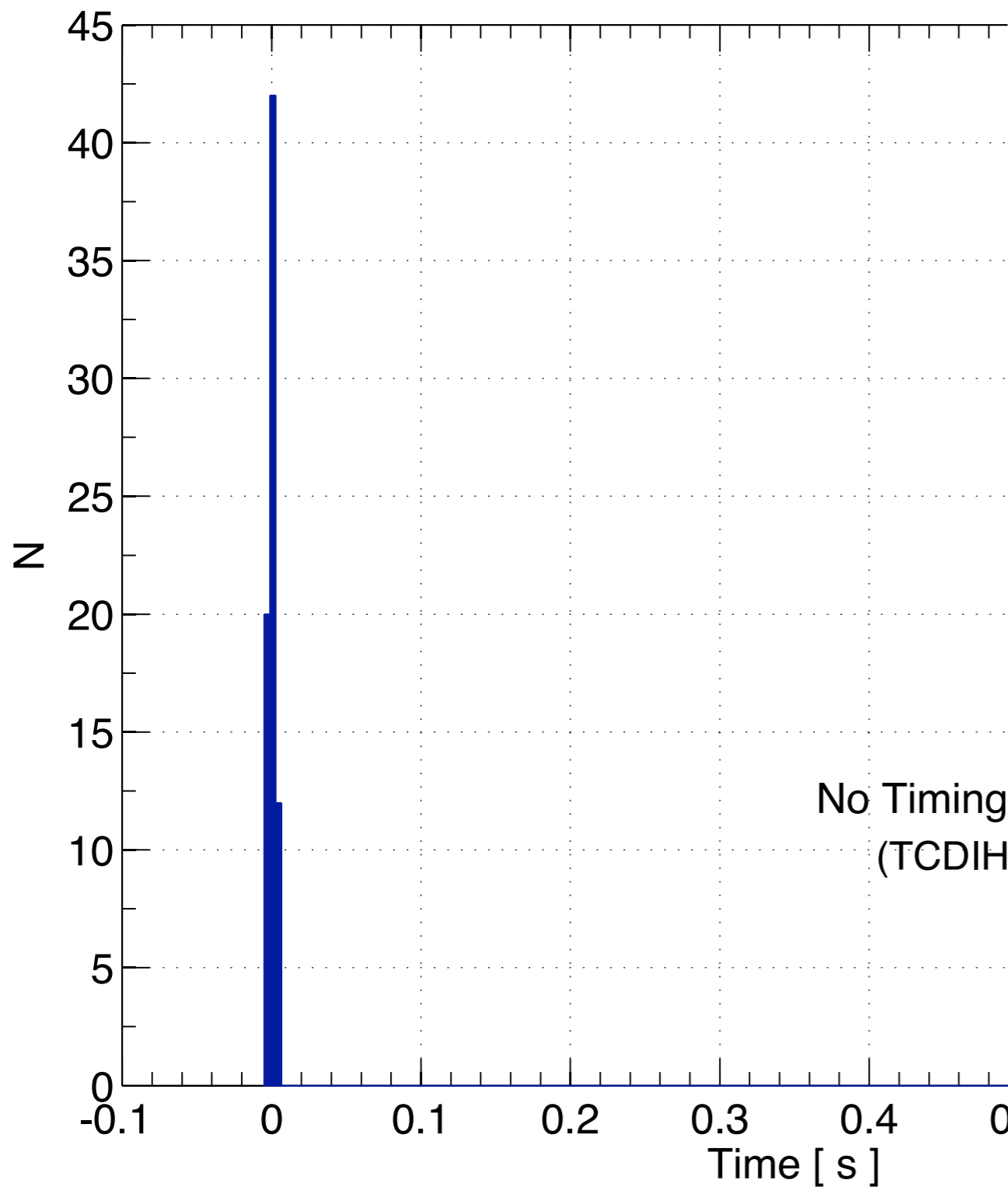
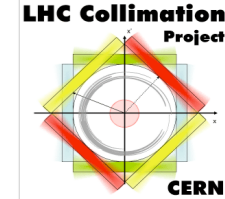


Synchronized ramp tests (II)

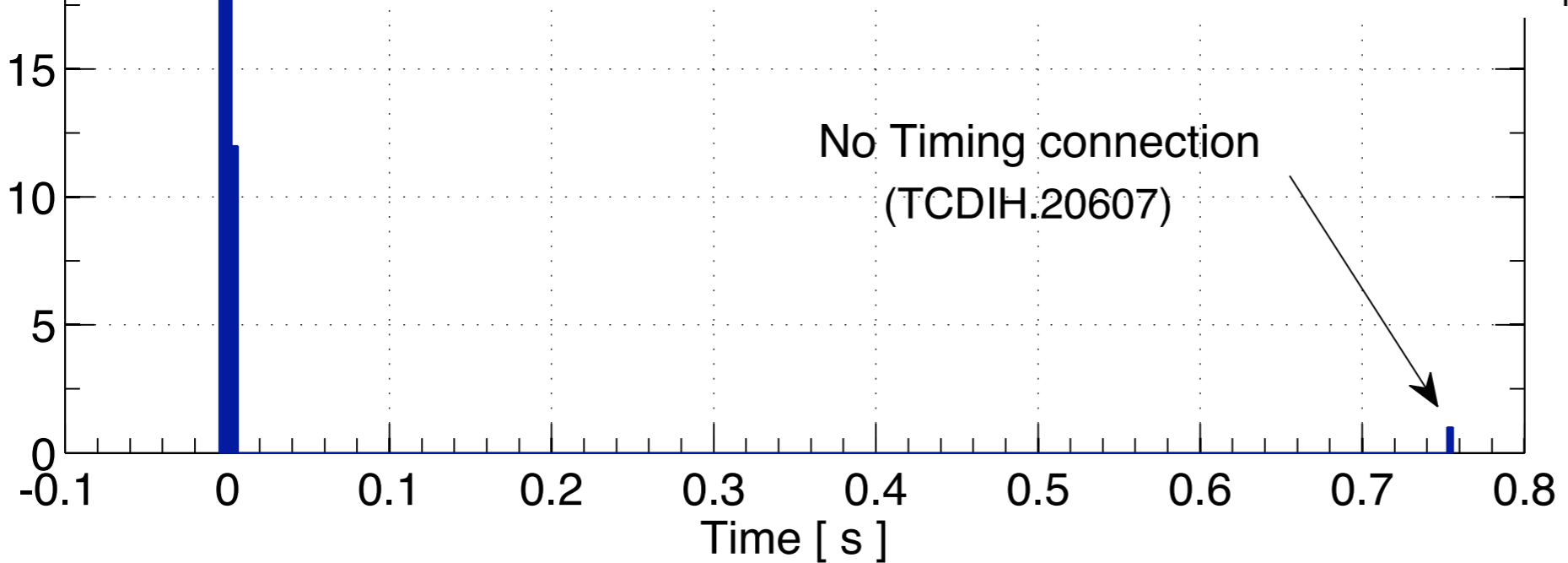
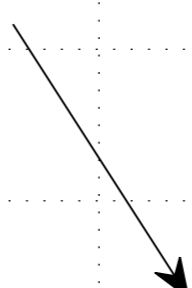




Synchronization performance

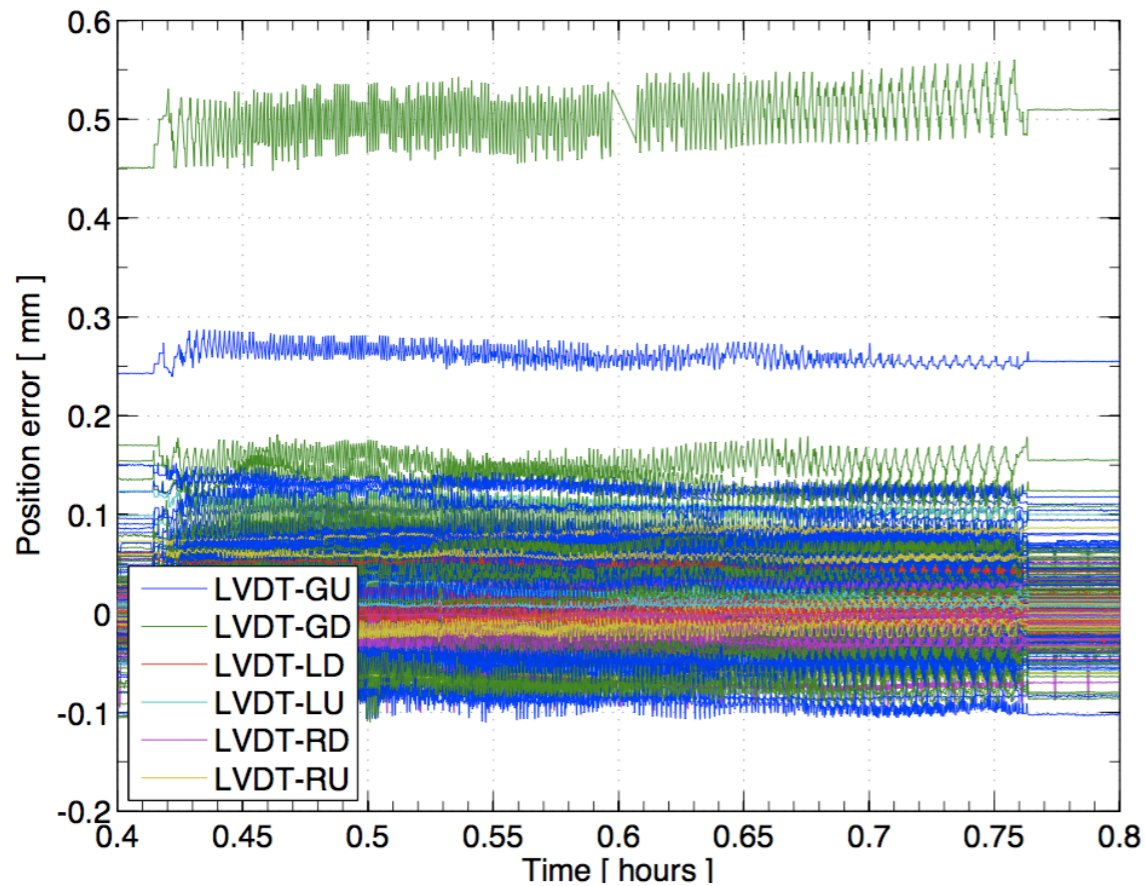


No Timing connection
(TCDIH.20607)

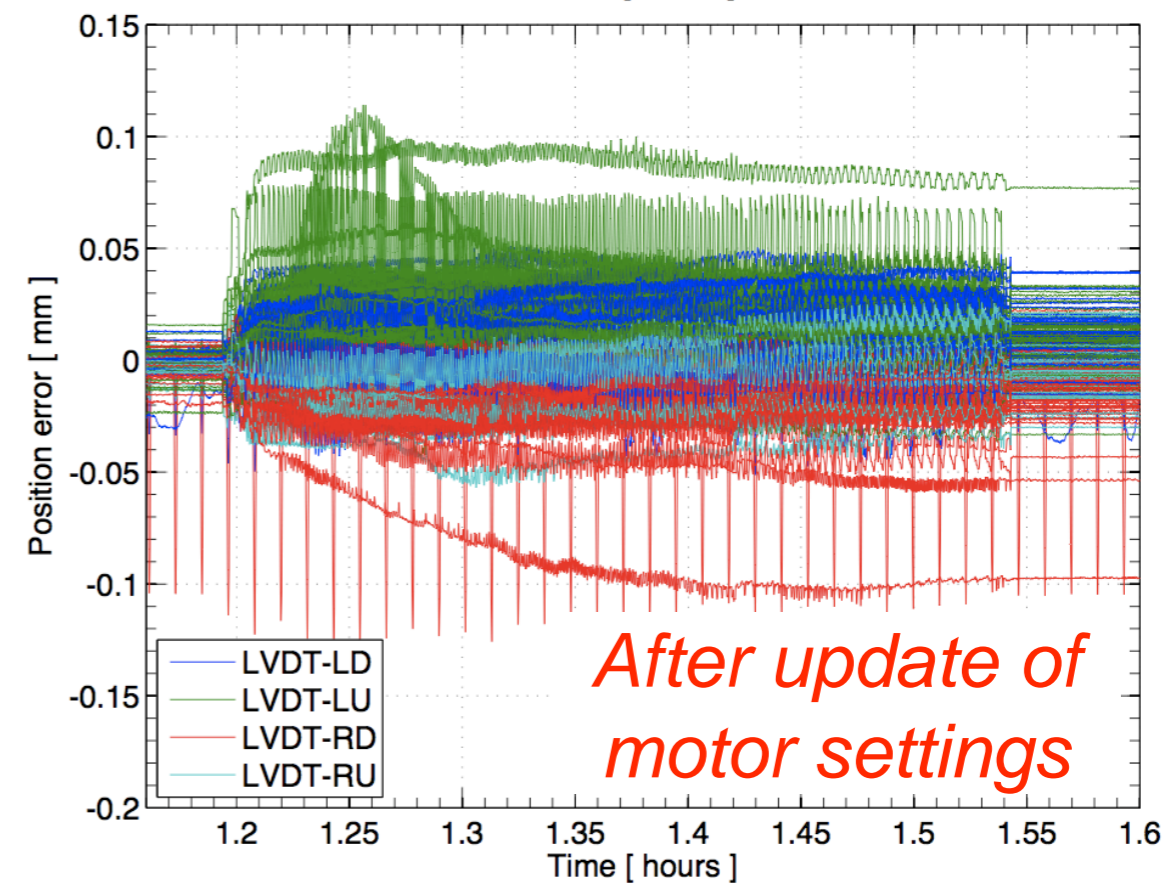
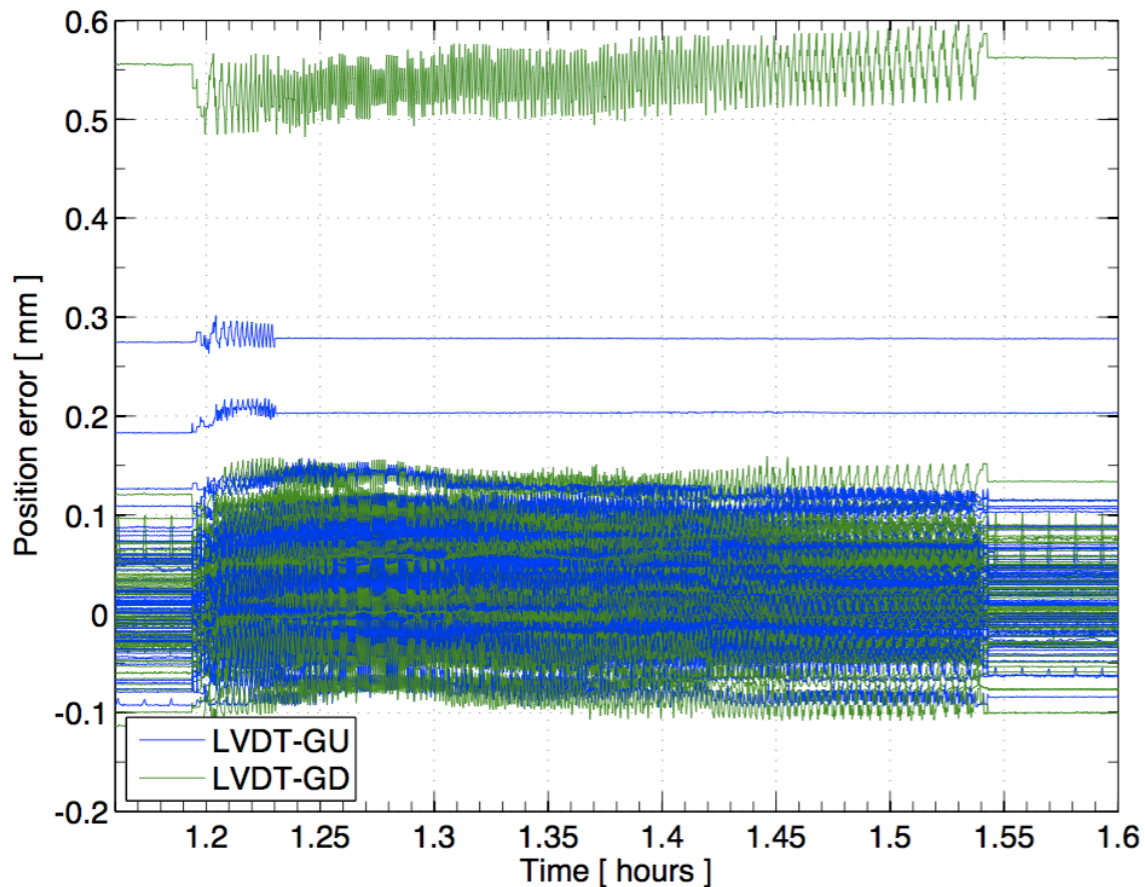
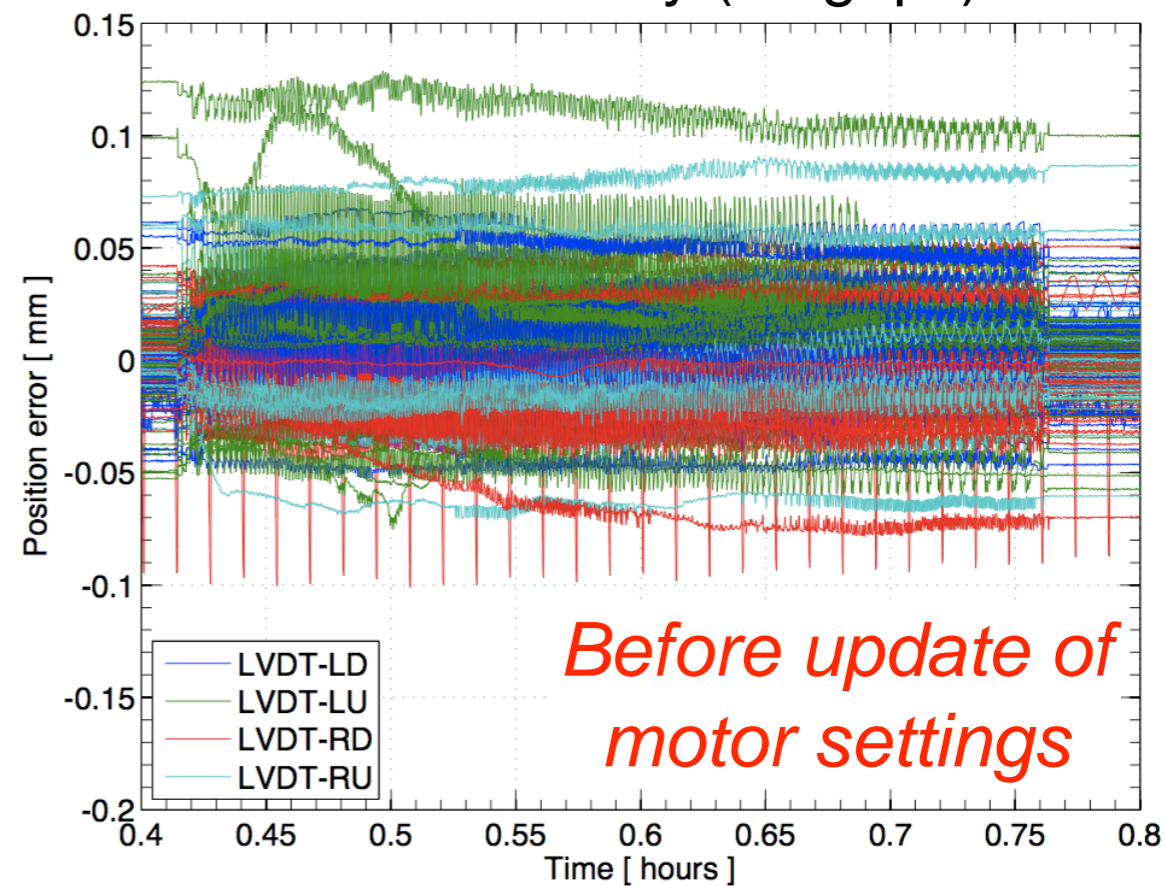


Distribution of setting / LVDT errors

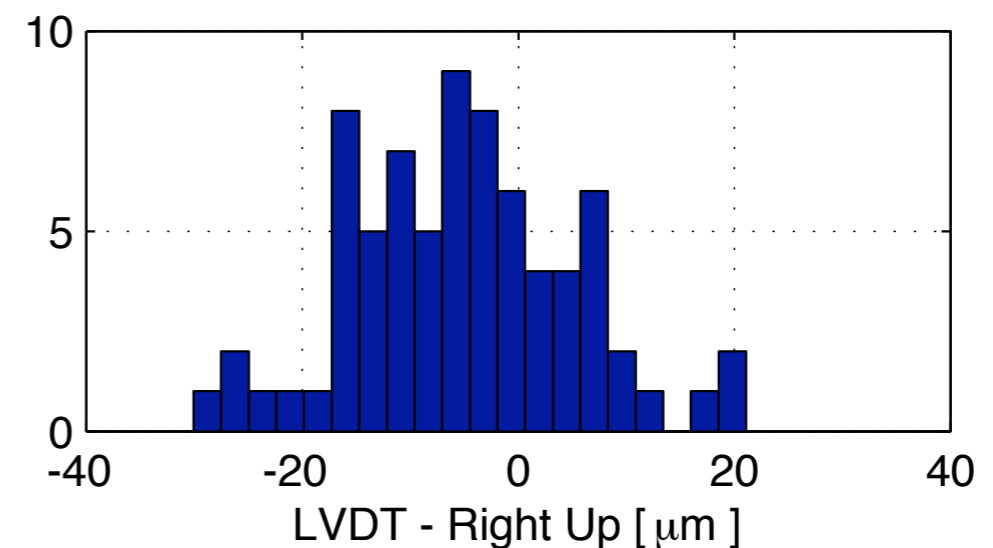
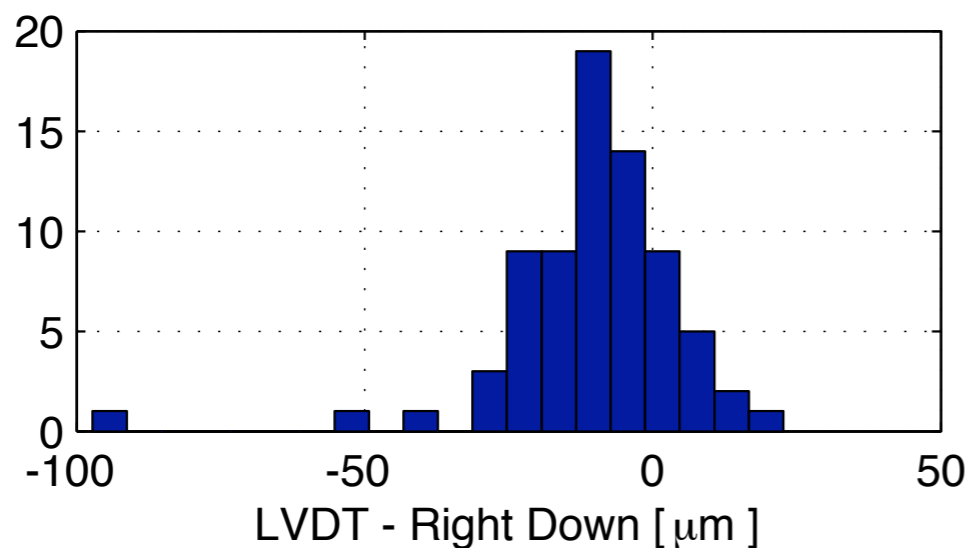
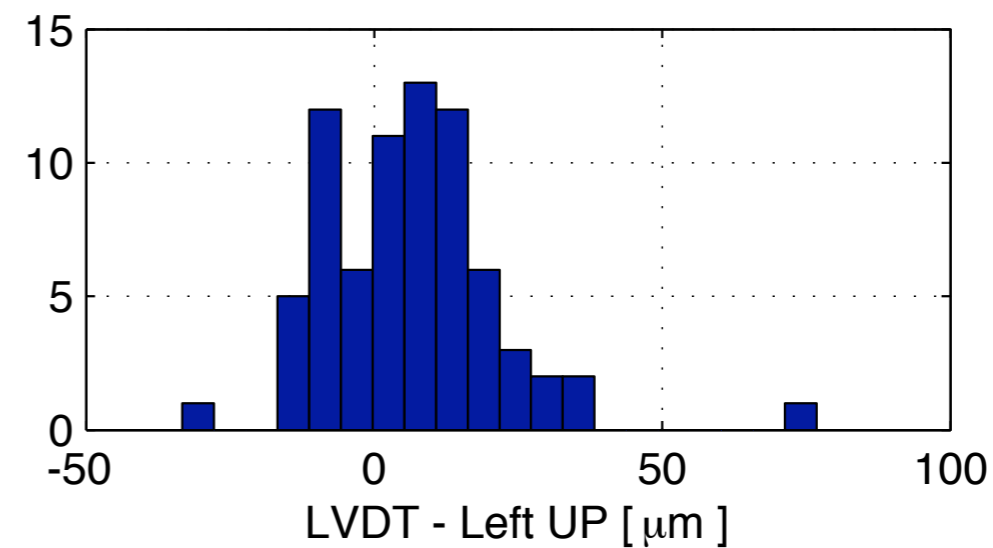
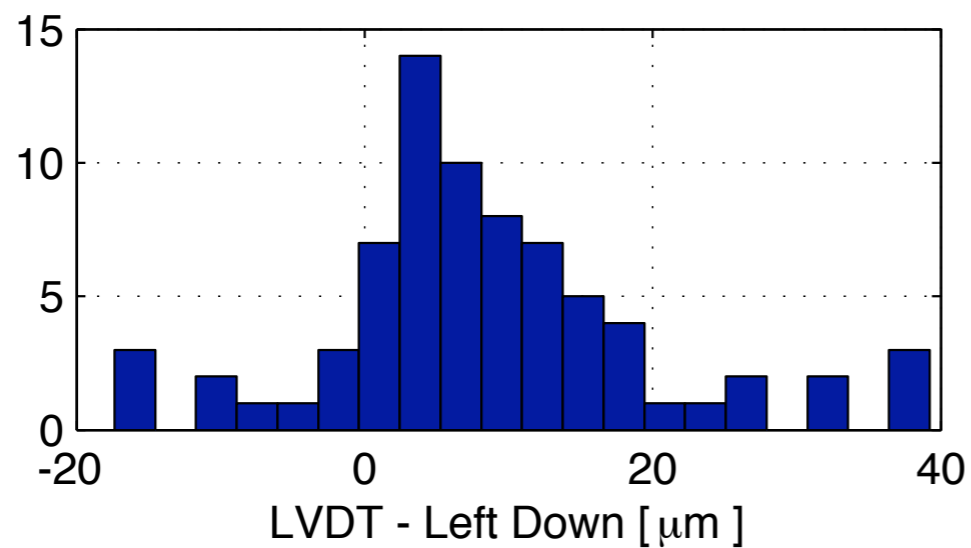
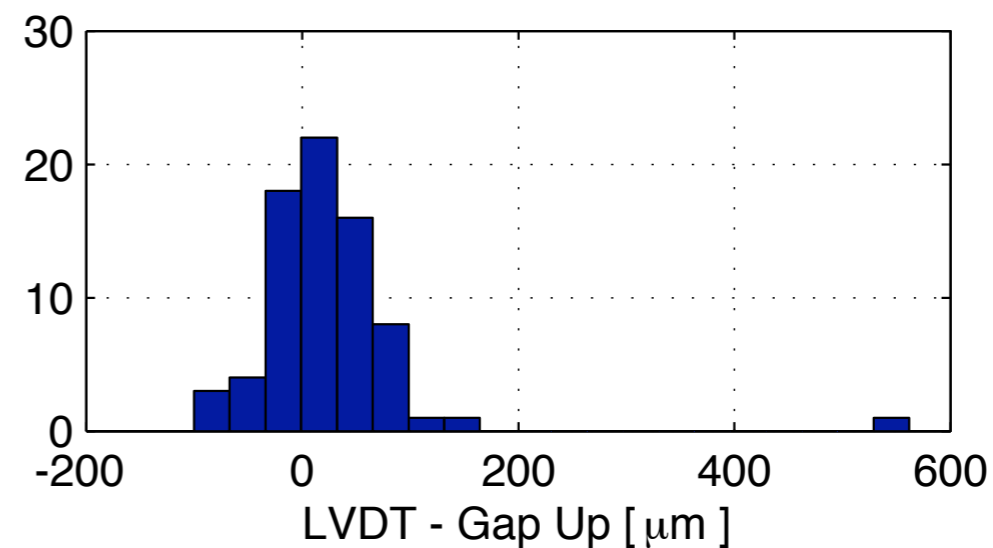
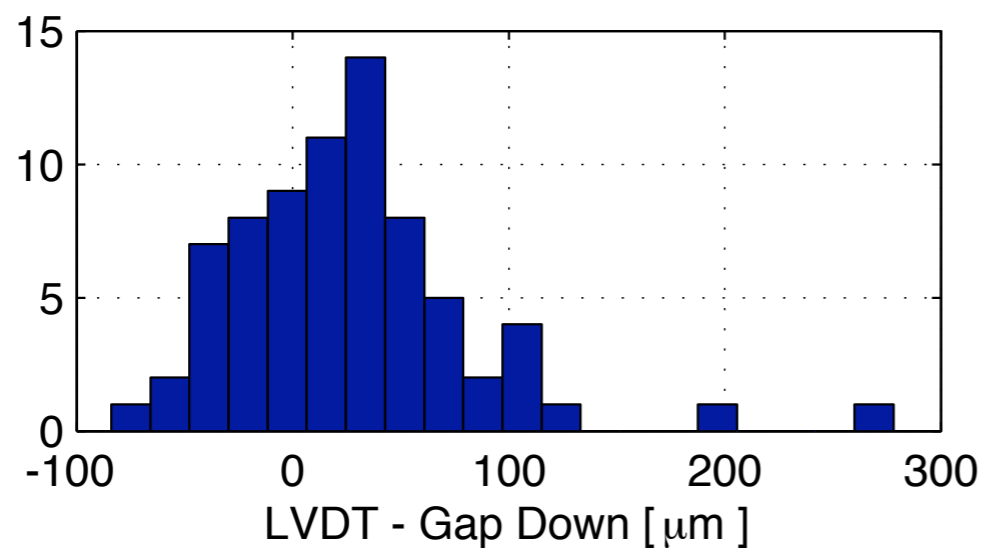
All sensors



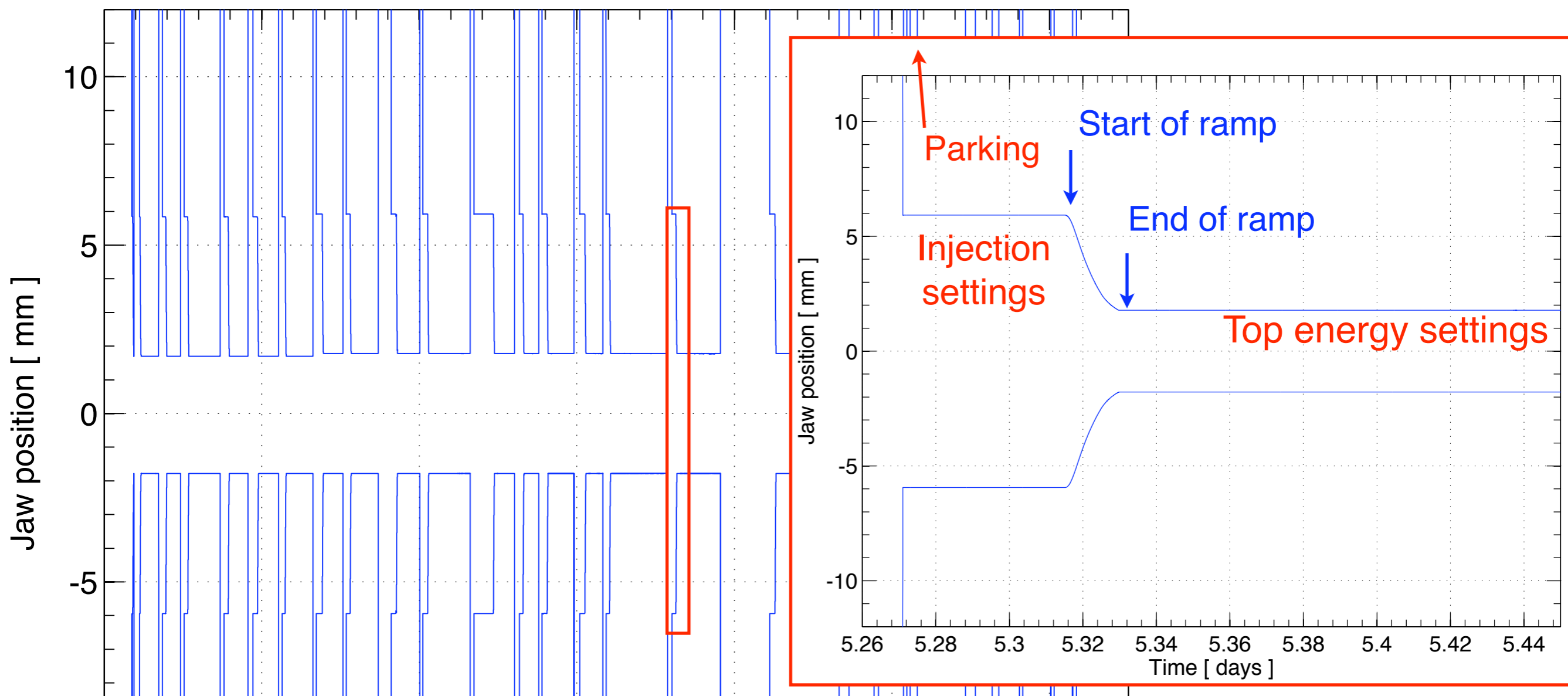
Corners only (no gaps)



Distribution of errors (end of ramp)

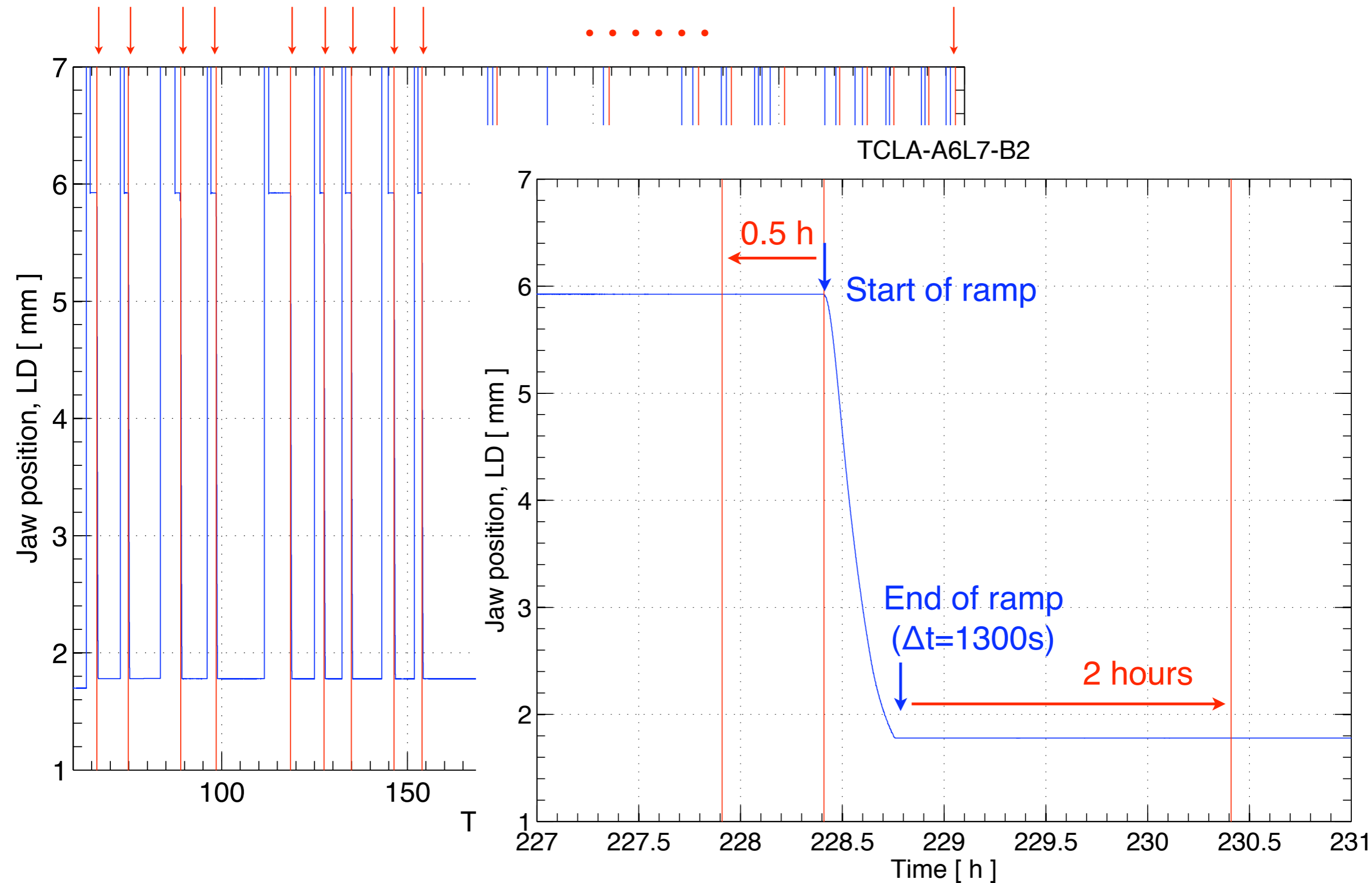


TCLA-A6L7-B2



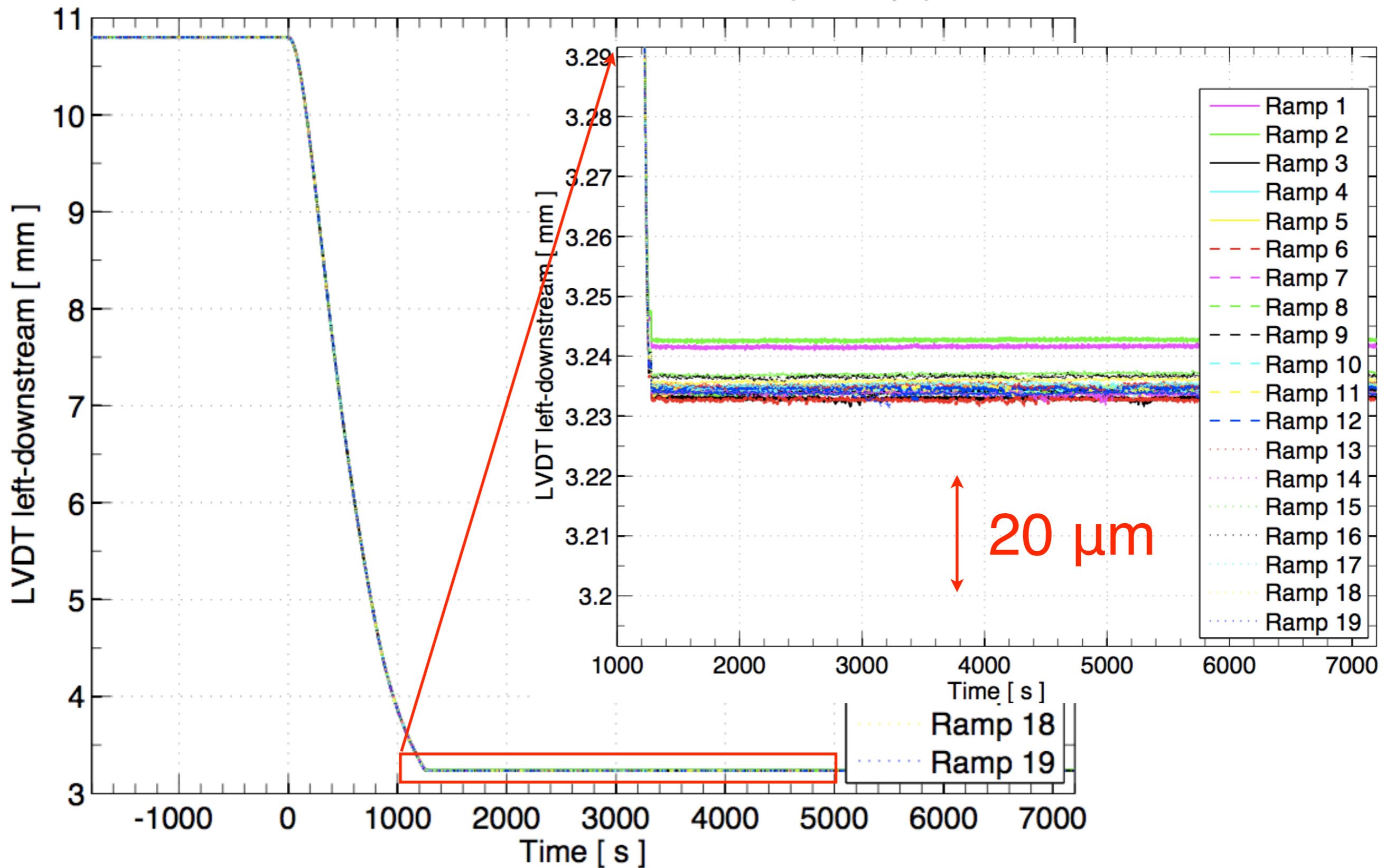
- Reproducibility tests on all 28 collimators in IP7
- 27 ramps over 12 days, 5.5 GB of data (positions only!)
- Real ramp functions to 5 TeV used (different for each collimator)
- “Handed over” to operation to perform tests continuously. Thanks to OP team!
- One “accident”: power lost -> unwanted autoretraction

Data analysis



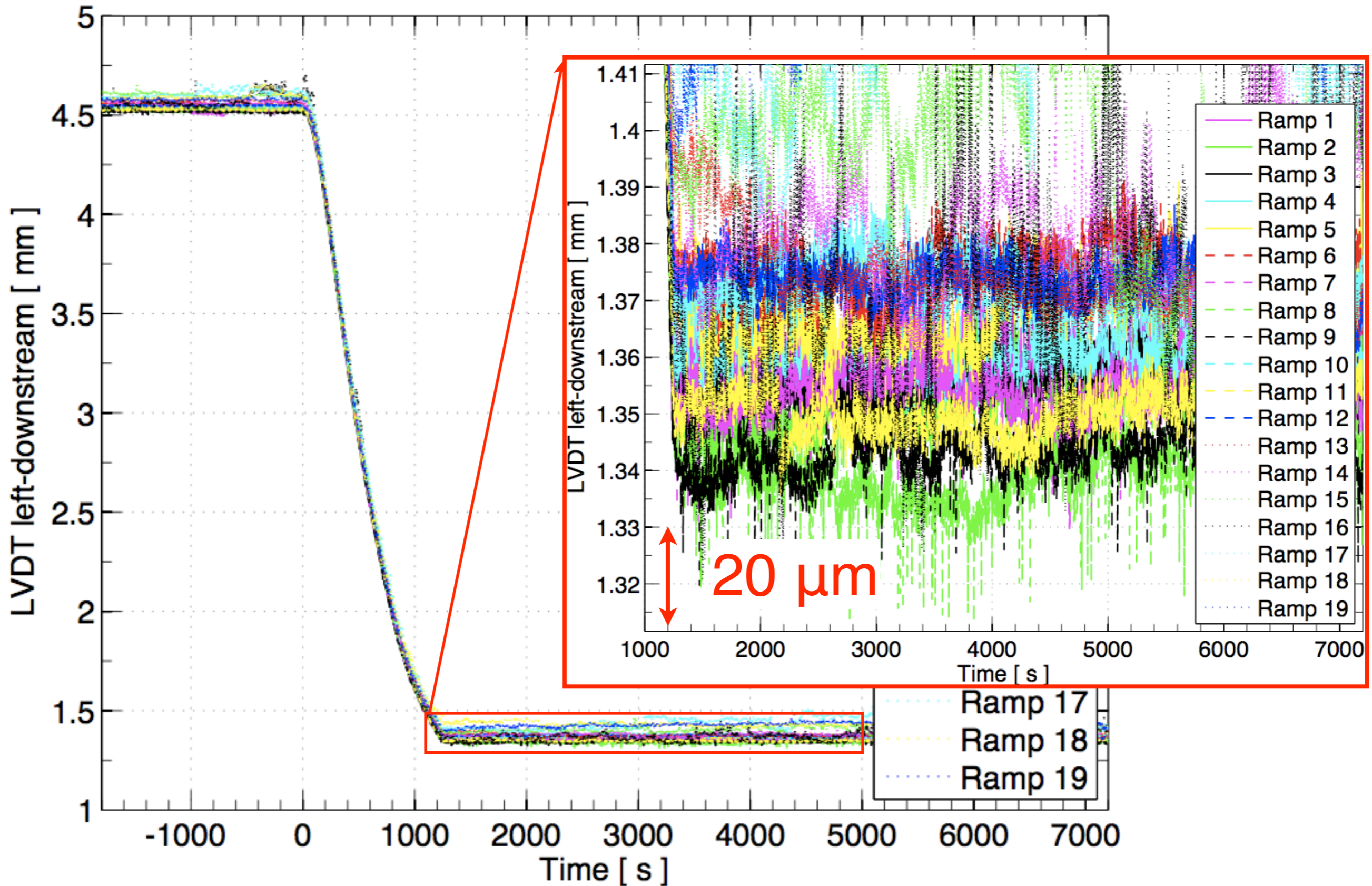
Typical example

TCLA-B6L7-B2 / LVDT left-downstream (19 ramps)



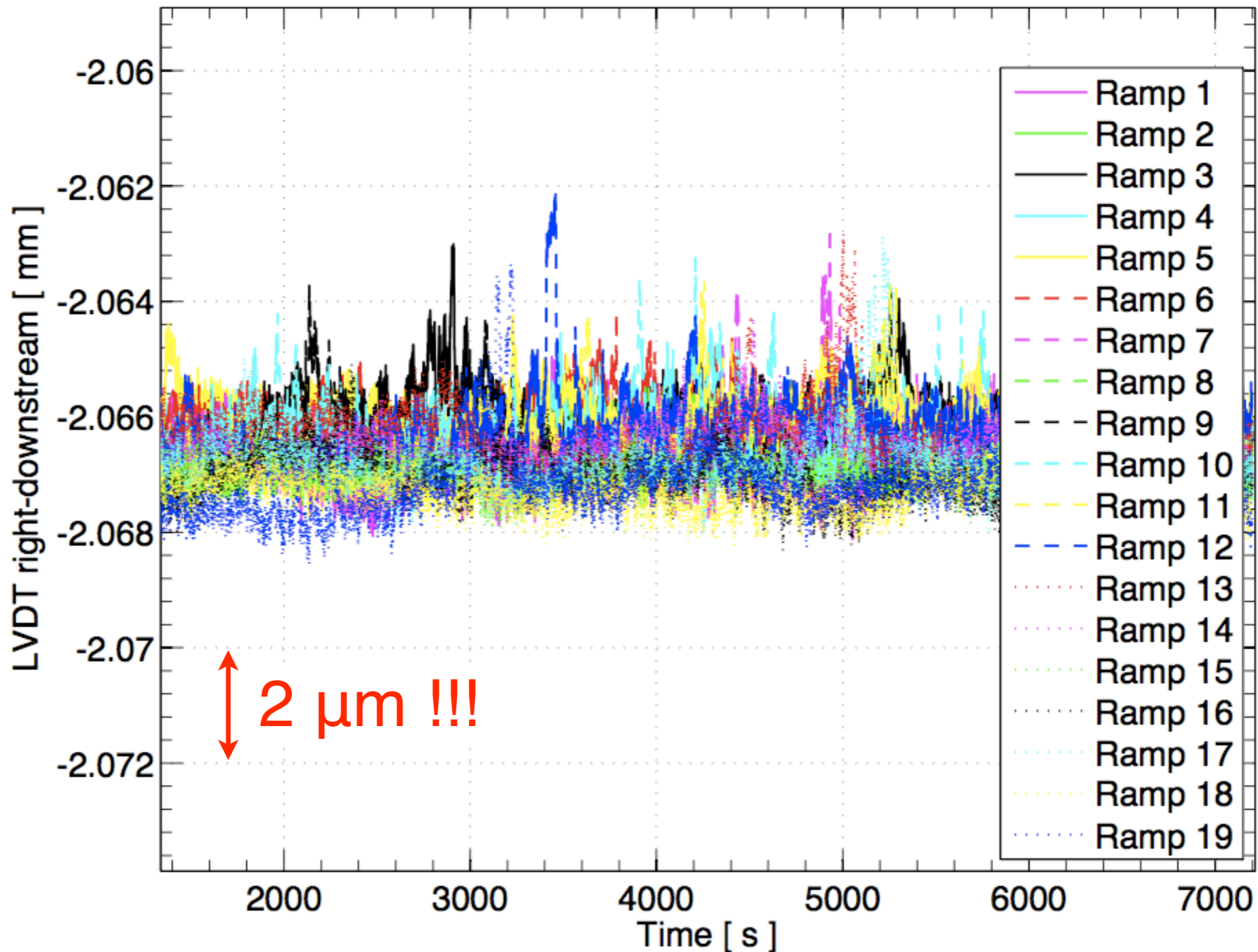
The worst case

TCP-D6L7-B1 / LVDT left-downstream (19 ramps)



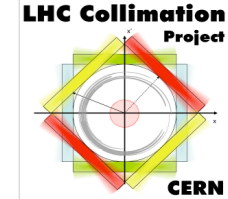
The best case

TCLA-D6R7-B1 / LVDT right-downstream (19 ramps)





Long term stability

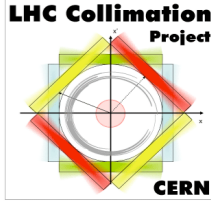


Problems during beam tests

- ☑ B1 into 2 → 3 (Aug. 8th-11th)
Loss steps on the TDI
 - ☑ B1 into 2 → 3 → 4 → 5,
B2 into 8 → 7 → 6 (Sep. 5th-8th)
Low-level memory leak
Faulty BIC configuration in
Noise on 1 resolver blocked the MDC
- All the above has been FIXED!*
- ☑ Trip of 23 collimators (Sep. 26th)
5 IP's + bld. 252 affected
“Unwanted” auto-retraction test
Not yet understood



Machine protection commissioning



☑ Temperature interlocks

Procedure: force temperature reading beyond threshold

Found 4 minor issues out of 400 sensors

Transmitted to E. Blanco for follow-up.

TDI temperature interlocking under resp. of ATB...

☑ Position interlocks

Procedure: automatic sequence for discrete + E-dep. limits

Overall: very satisfactory, no major issues

Discrete limits also tested for TCDQ

Missing: global, synchronized test.

TODO's:

TDI: wrong LVDT's connected to BIC

TCDIH.20607 not connected to BIC

Few energy limit checks missing in IP3

1 gap value in TI8 badly calibrated - could not run sequence

OP procedures for MP test documented on the OP checkout page:
<https://espace.cern.ch/LHCMachineCheckout/Machine%20Checkout%20Web%20Pages/GNRL%20ISSUES.aspx?PageView=Shared>