



# Results from TCP.D6L7 Test on 25-10-2010

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8<sup>th</sup> of November 2010

**TCP Test Procedure and overview of beam dump**

**BLM Losses vs Dcum (RS05) as example**

**Intensity and Jaw Position during test**

**BLM and vacuum losses versus time**

**BLM losses versus jaw position**

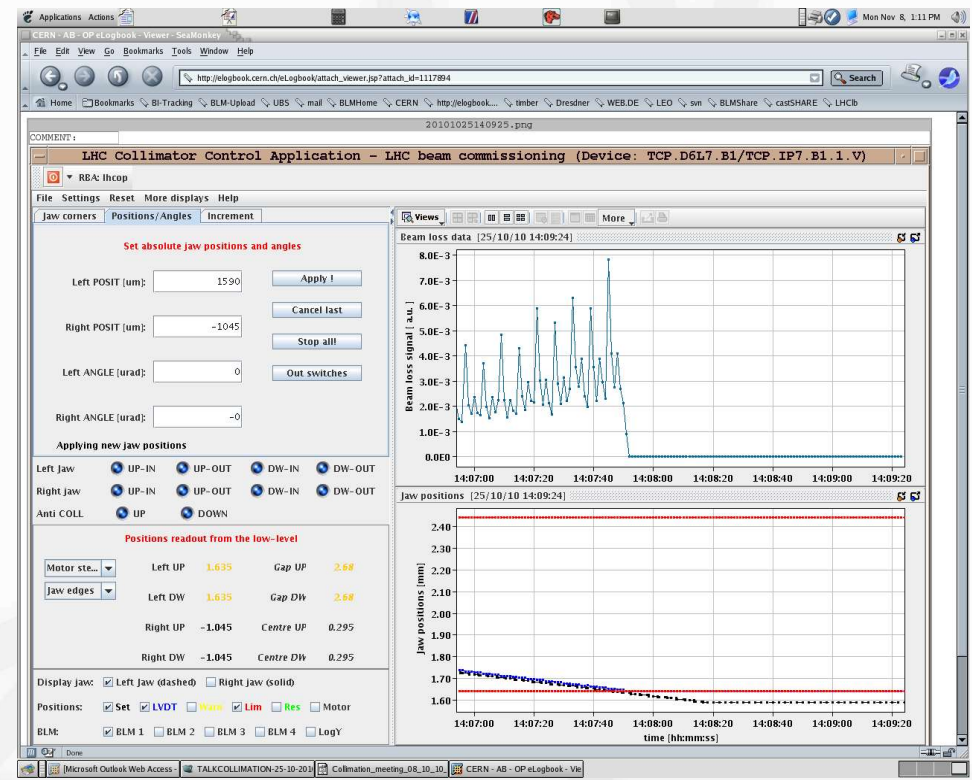
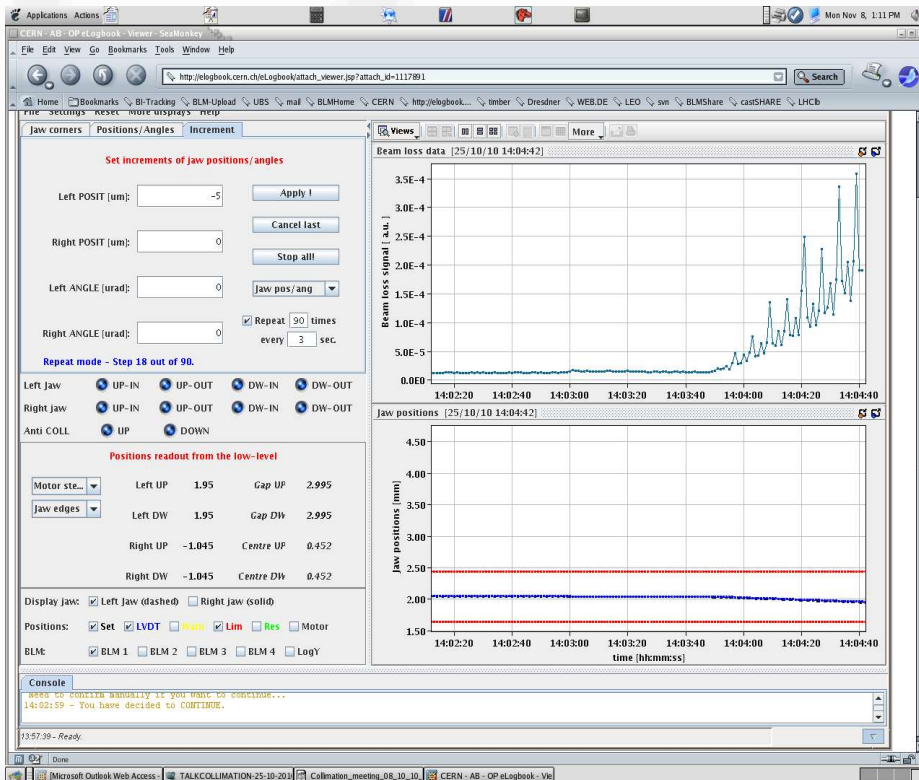
**Vacuum Losses versus jaw position**

**BLM and Vacuum Losses versus Jaw Position**

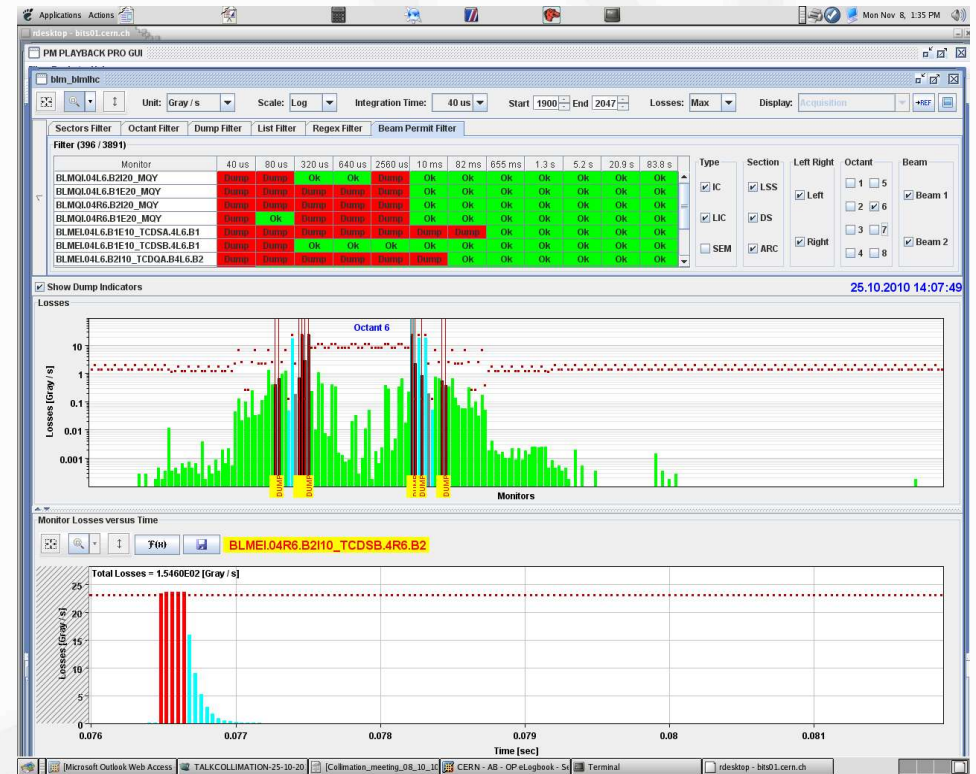
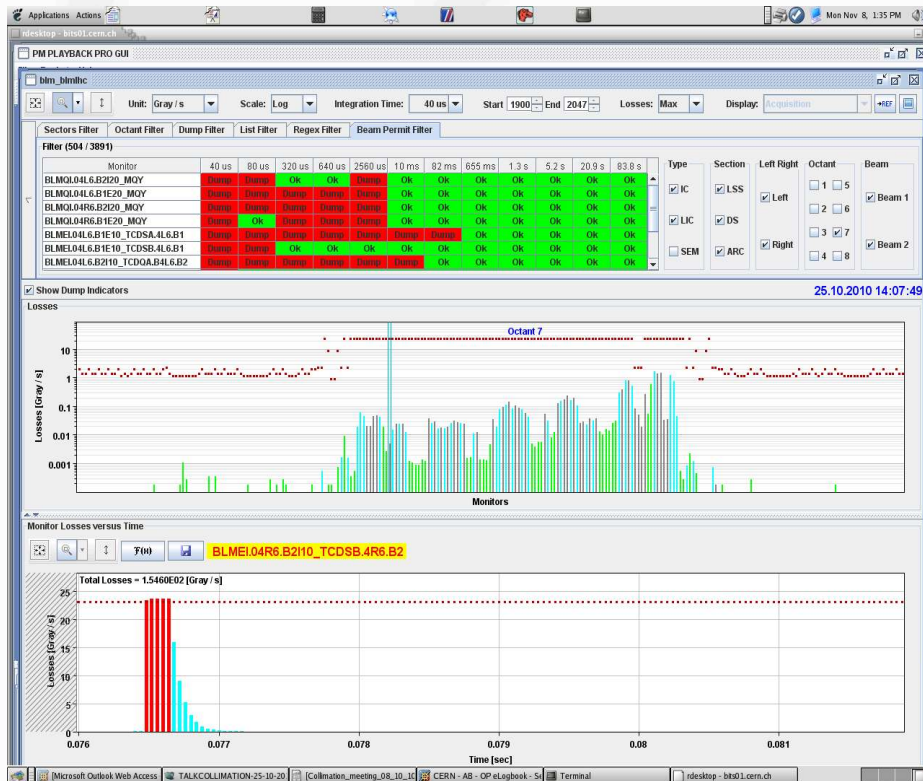
**TCP BLM Maximum Losses for all RS during test**

**BLM Post Mortem Expert Data for TCPs and TCSGs in IR7**

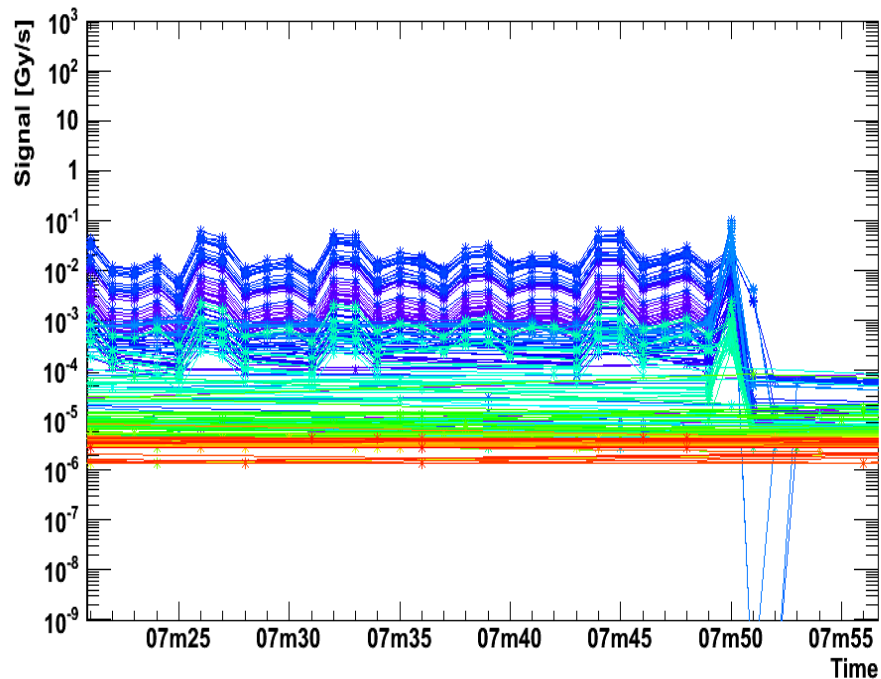
- Beams dumped at 14:07:49 (LT) when TCP B1 V (TCP.D6L7.B1) reached its position limit. Interlock worked as specified.
- Increment every 3sec jaw position by 5 $\mu$ m
- TCP position thresholds were not changed for maximum safety.
- Got tail data for beam1 vertical from 2.045mm to 1.642mm (explored 1 sigma of tail).



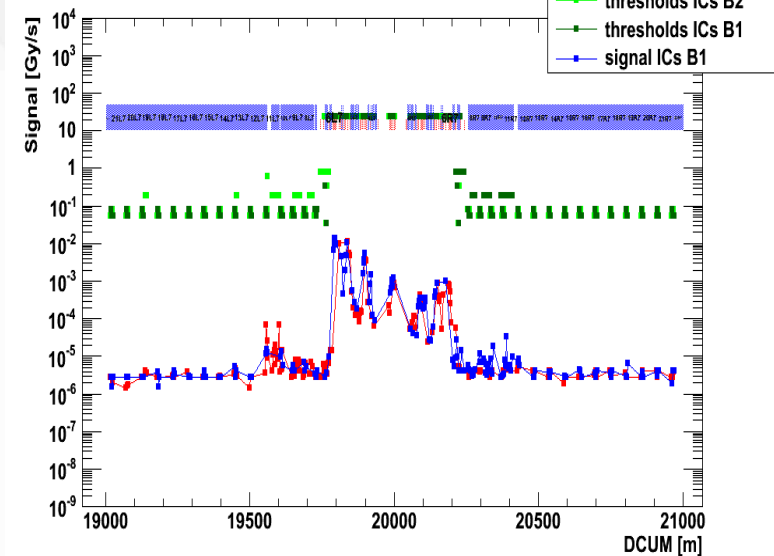
- Beam 1 intensity:  $42.62e12p$  , Beam 2 intensity:  $39.75e12p$ ,  $\beta^*=3.4m$
- Beams dumped at 14:07:49 (LT): 25-10-2010
- Beams dumped due to losses on 04L6 MQY (B2I20,B1E20) and 06R6 MQY (B2I20,B1E20) in RS01- RS05, not due to losses on TCP monitors



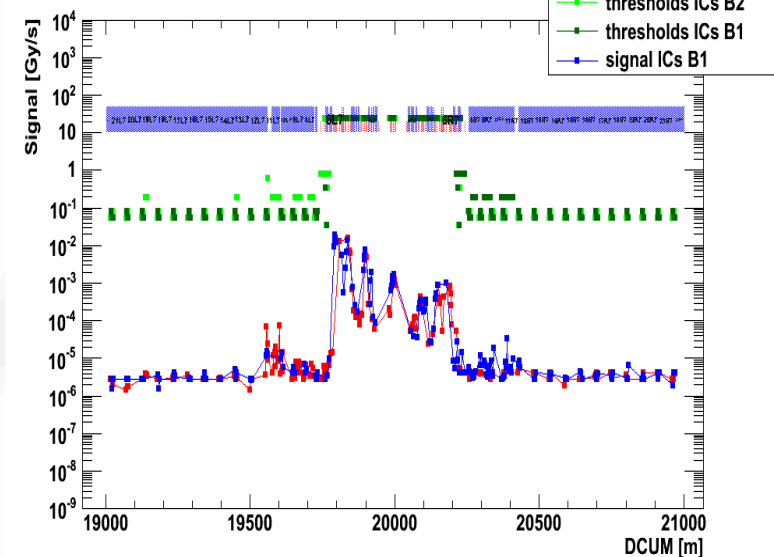
plot vs. time, RS05



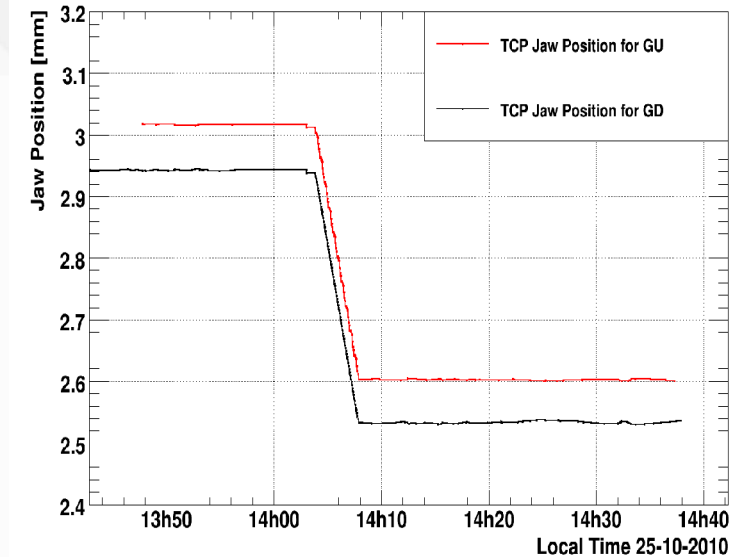
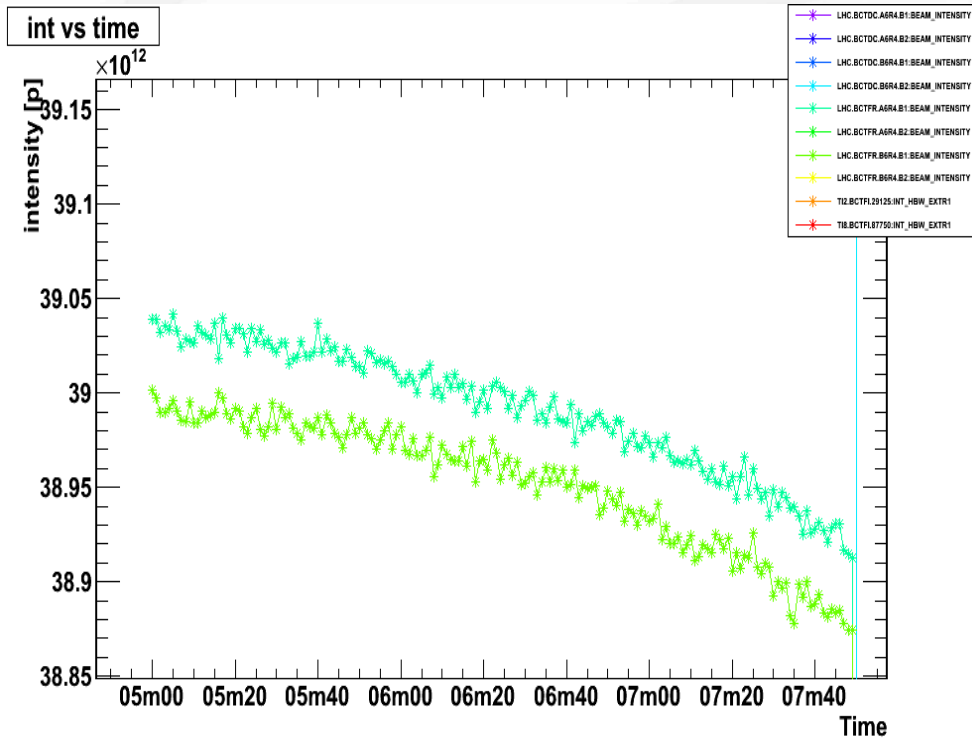
20101025-120740\_RS05



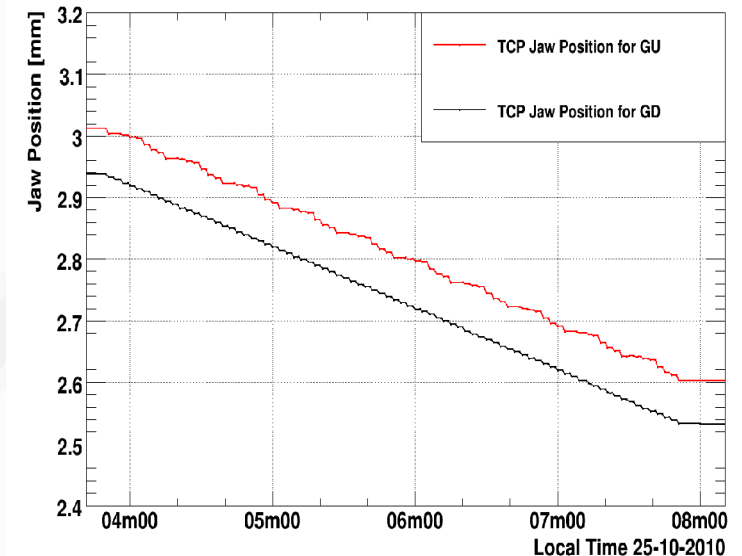
20101025-120741\_RS05

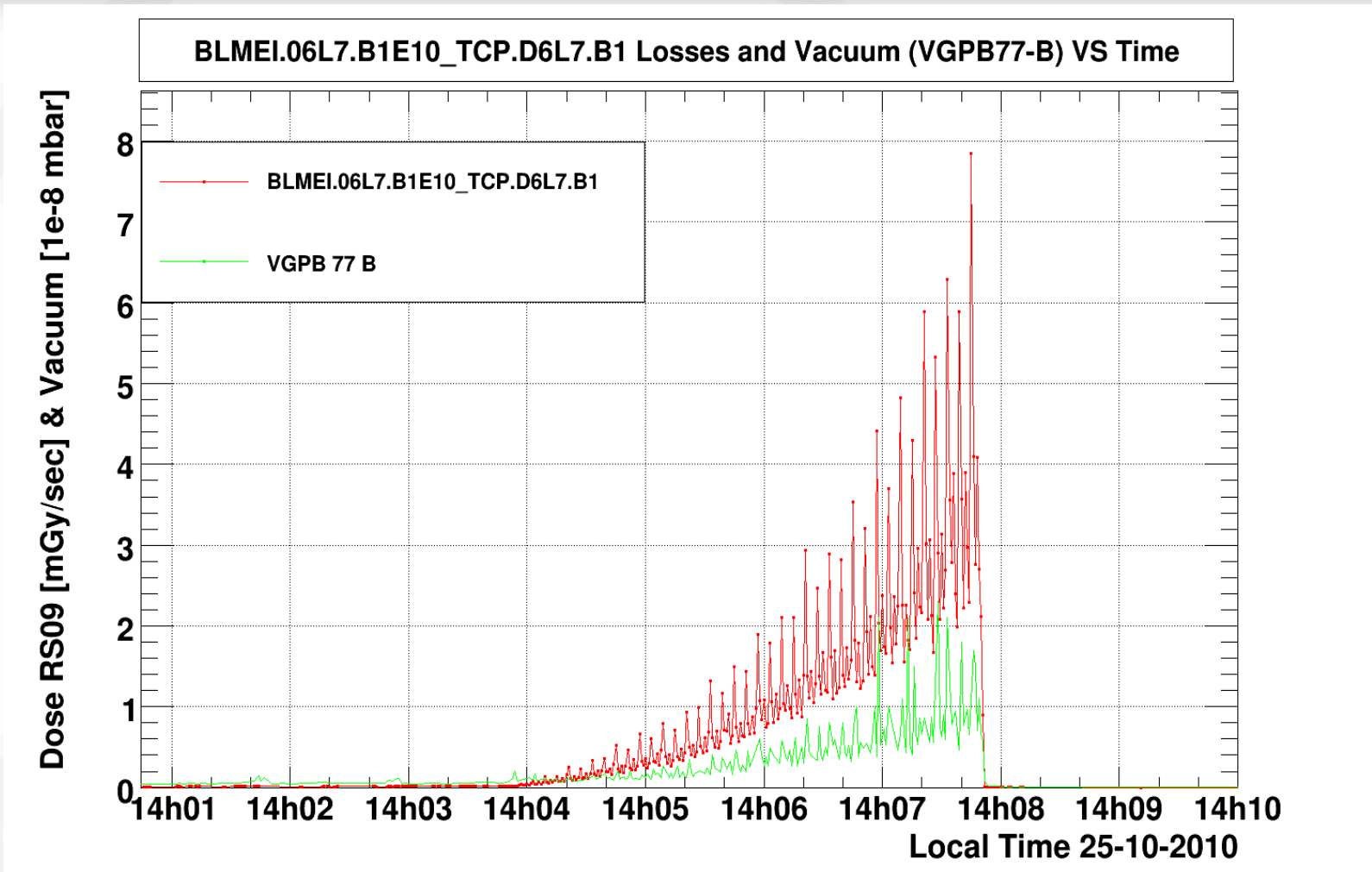


- Stepwise movement of collimator jaw during 4 minutes causes losses
- In many BLMs with a max. loss of 0.1 Gy/sec for RS05 (2.56ms)

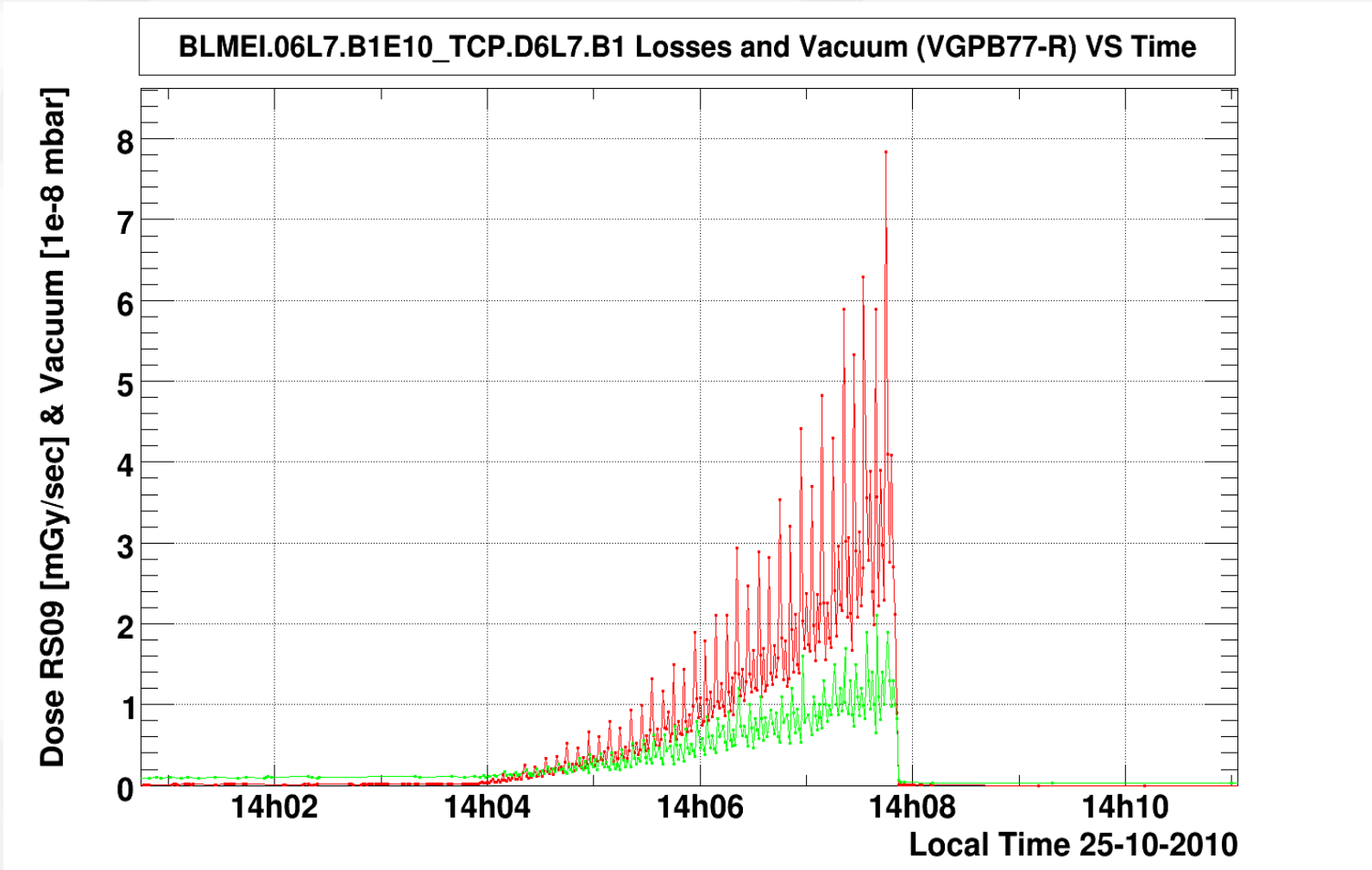


- Stepwise movement of collimator jaw (every 3 sec 5 $\mu$ m ) during ~ 4 minutes leads to decrease in beam intensity



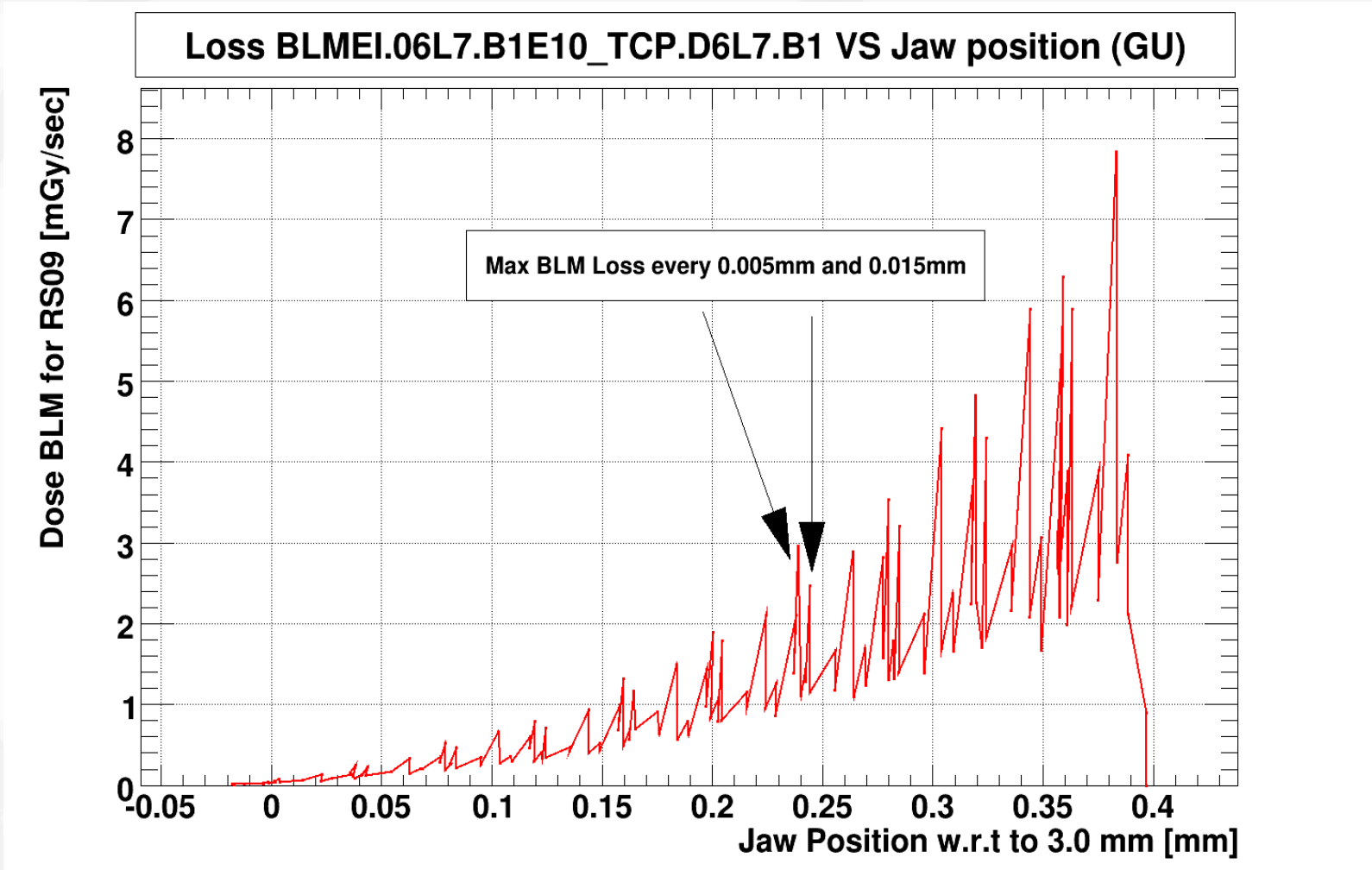


- BLMEI.07L7.B1E10\_TCP.D6L7.B1 located at 19790.184 m
- VGPB 77 6L7 located at 19841.942 m
- Distance monitor- pressure gauge is 51.758 m

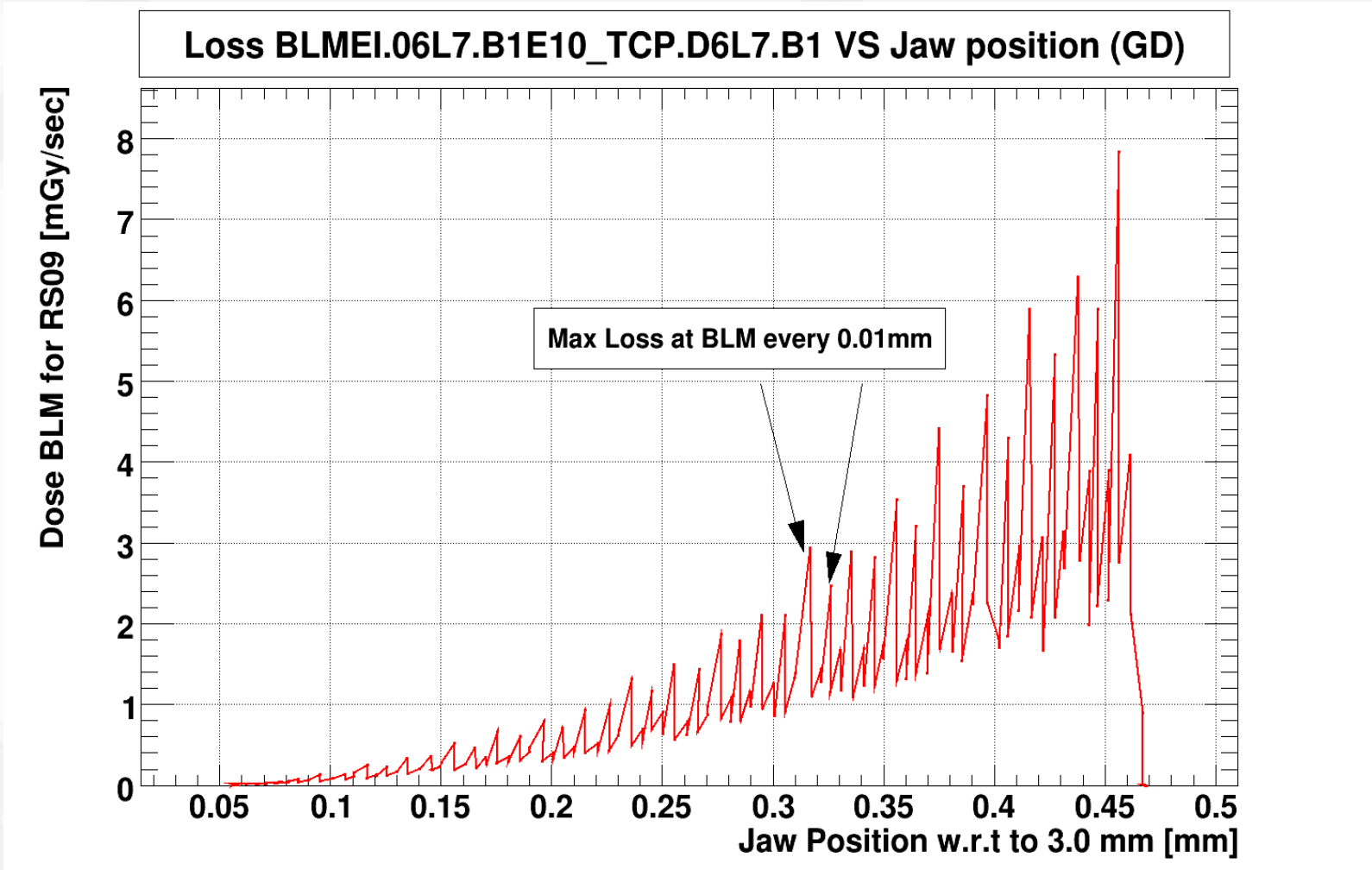


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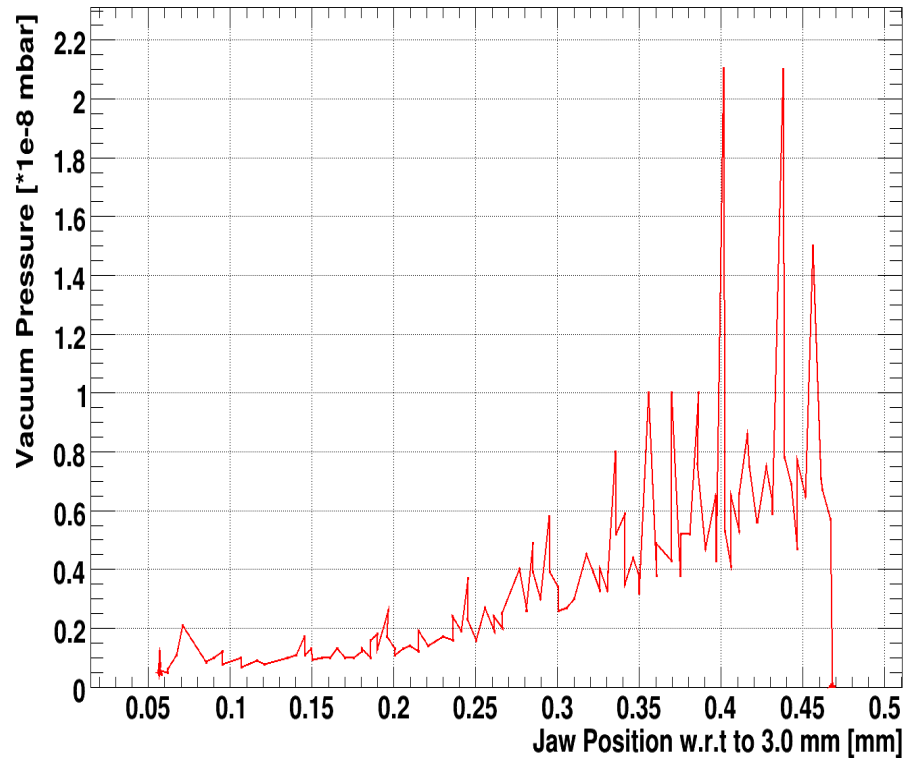


- BLM Losses on BLMEI.07L7.B1E10\_TCP.D6L7.B1 for RS09 vs jaw position show a maximum loss every 0.005 and 0.01 mm during stepwise movement of collimator jaw

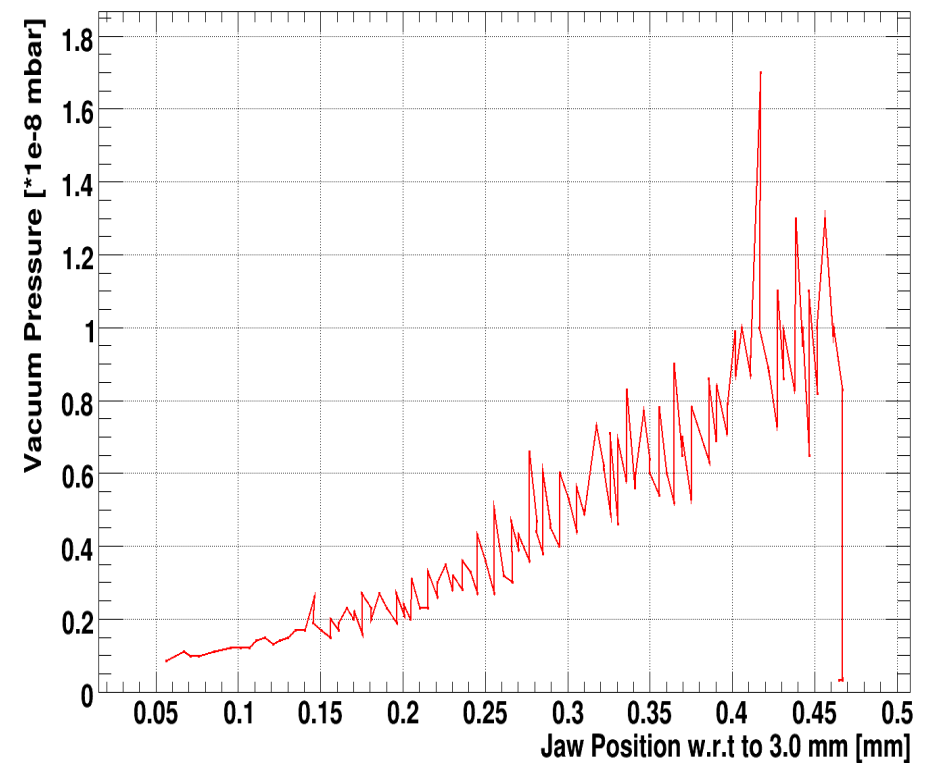


- BLM Losses on BLMEI.07L7.B1E10\_TCP.D6L7.B1 for RS09 vs jaw position show a maximum loss every 0.01 mm during stepwise Movement of collimator jaw

### Vacuum Loss (VGPB77-B) VS Jaw position (GD)

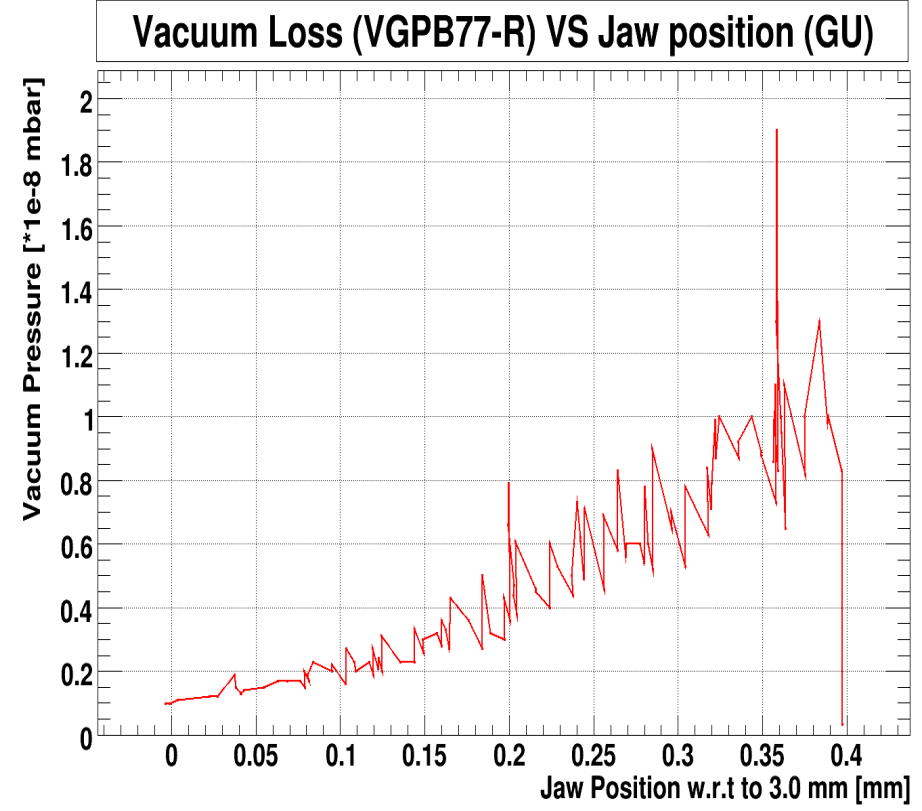
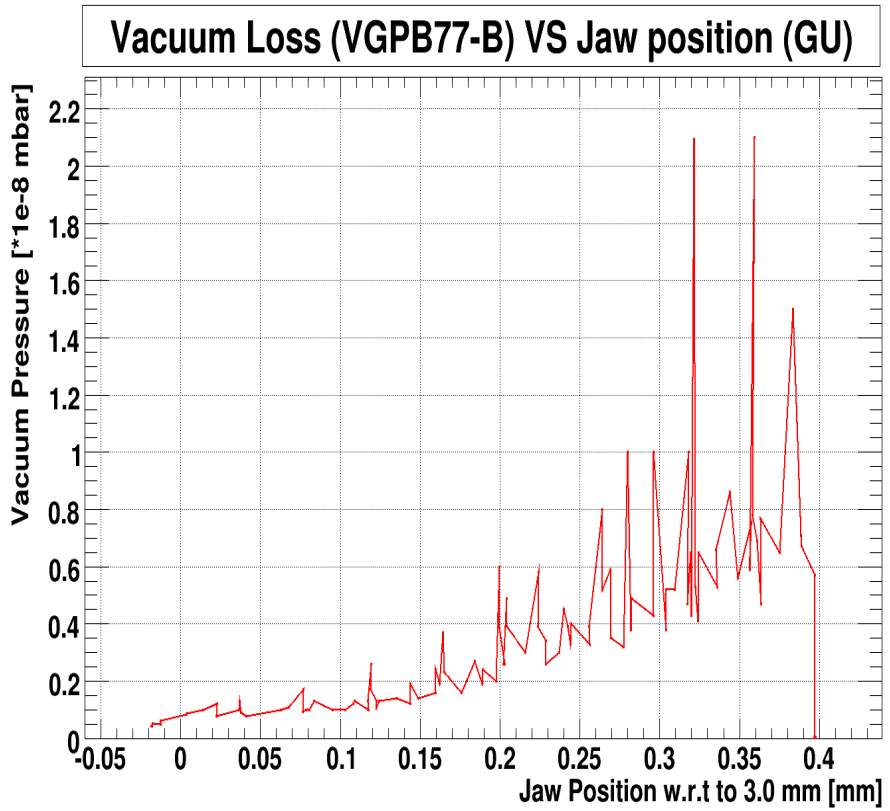


### Vacuum Loss (VGPB77-R) VS Jaw position (GD)

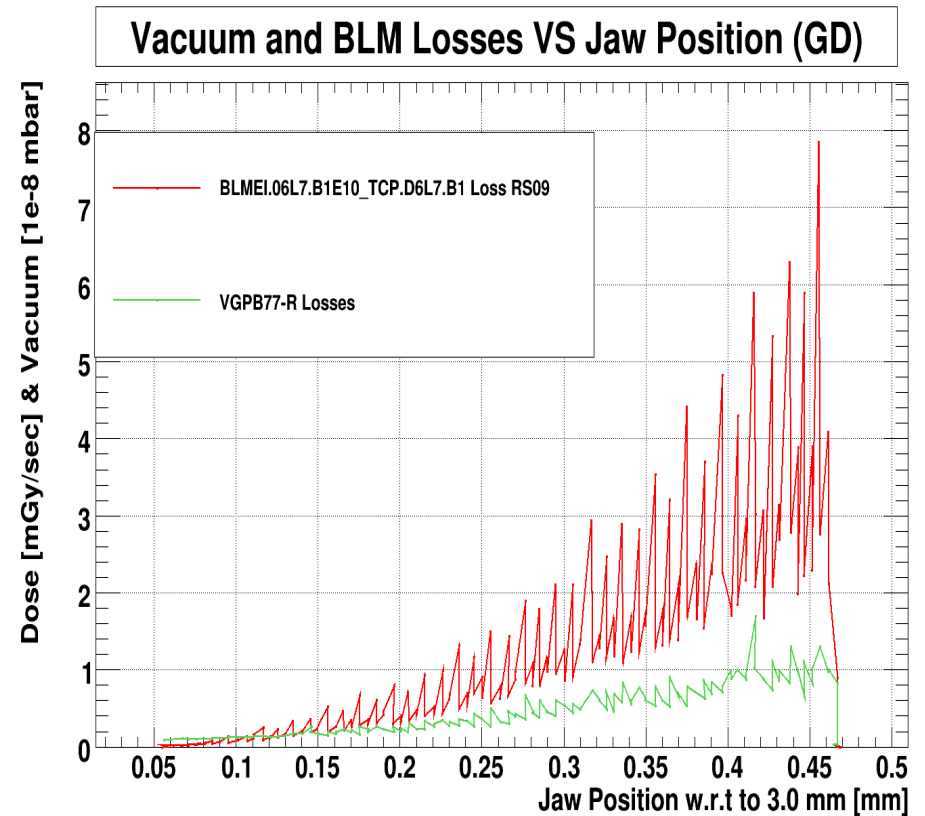
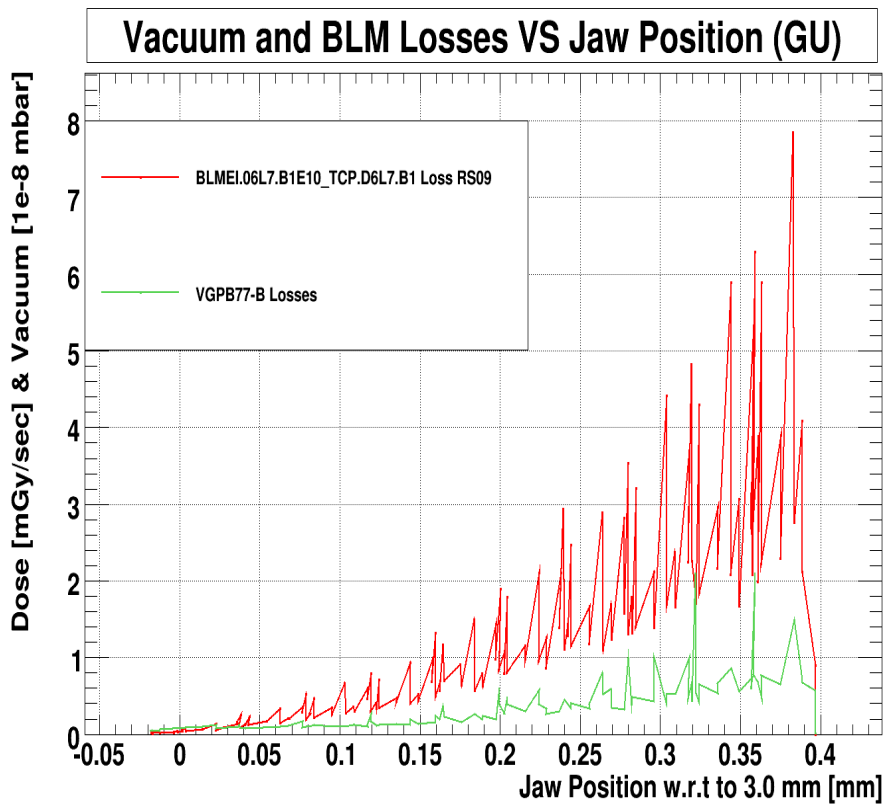


- Vacuum losses vs jaw position
- Max. increase in pressure from  $5e-10$  mbar up to  $2.1e-8$  mbar

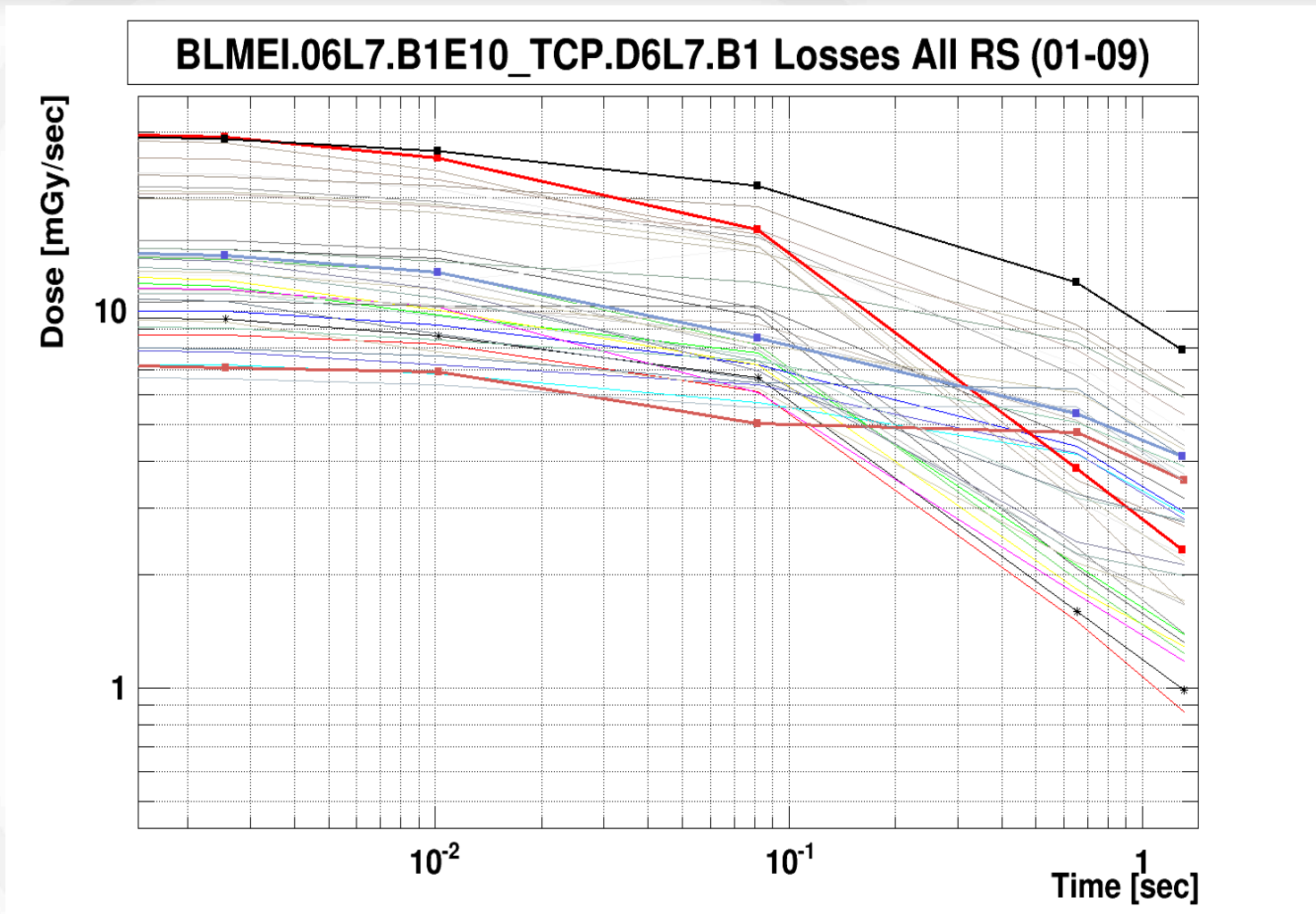
# Vacuum Losses versus Jaw Position (GU)



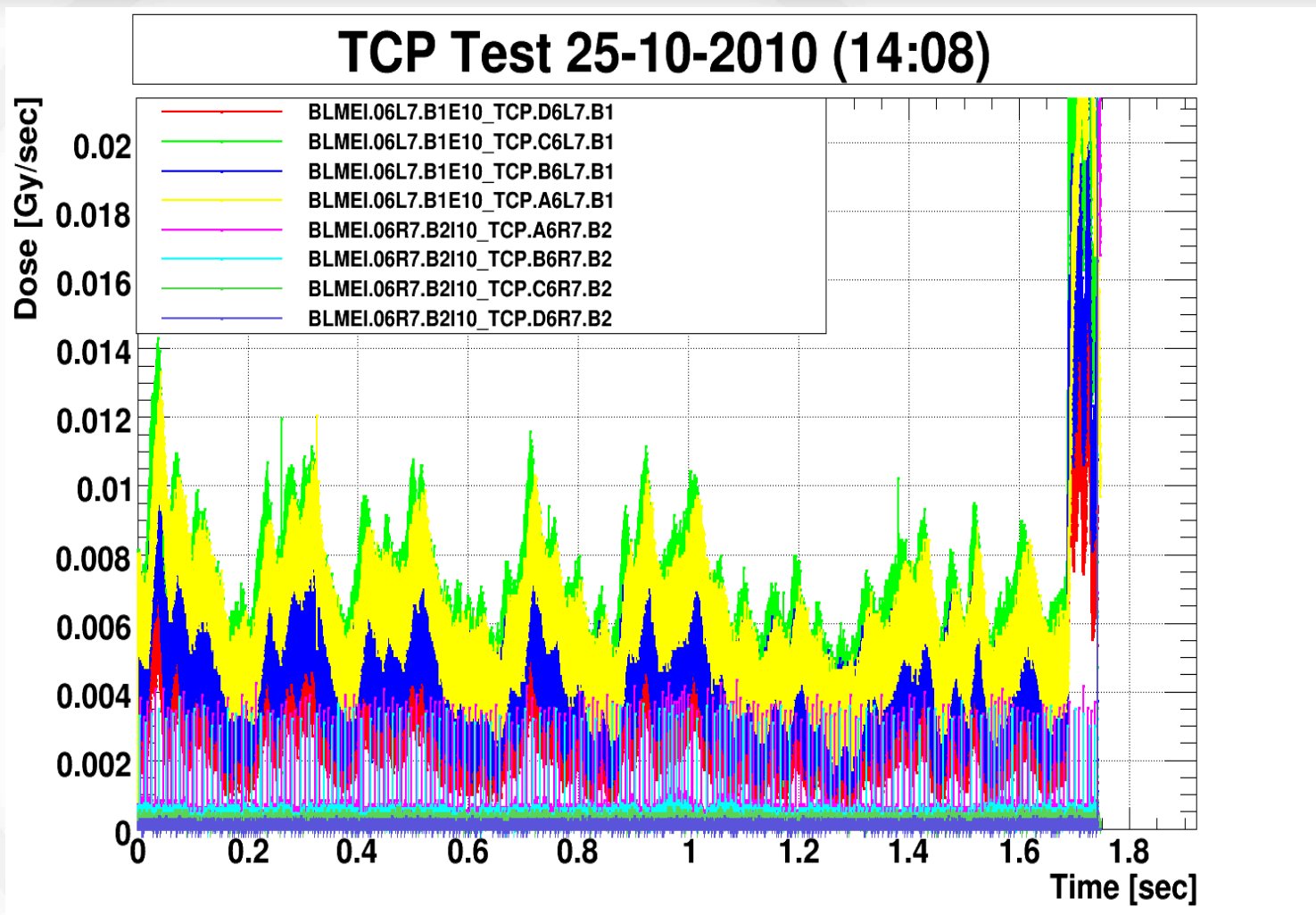
- Vacuum losses vs jaw position
- Max. increase in pressure from  $5e-10$  mbar up to  $2.1e-8$  mbar



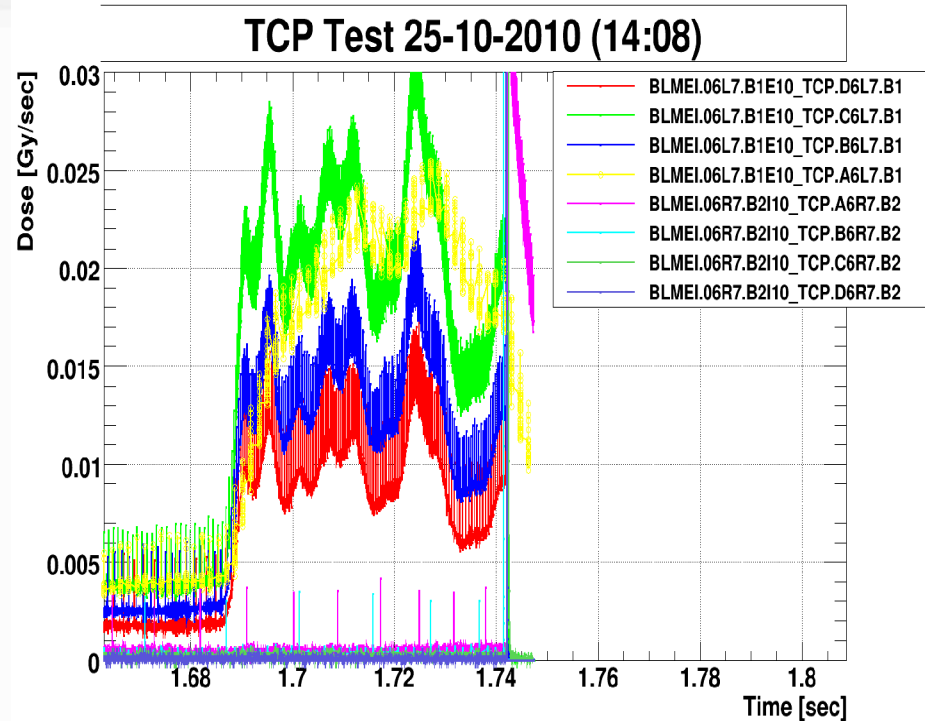
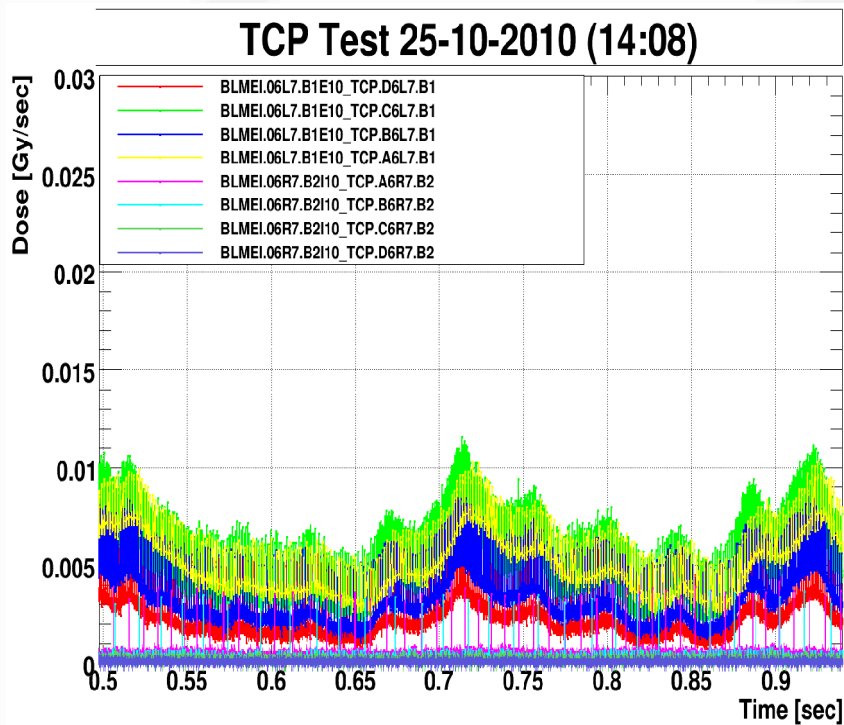
- BLM Losses on BLMEI.07L7.B1E10\_TCP.D6L7.B1 for RS09 and vacuum losses vs jaw position in mm during stepwise movement of collimator jaw



- BLM Losses on BLMEI.07L7.B1E10\_TCP.D6L7.B1 for RS01-RS09 vs time
- Each curve represents loss pattern over time for a max loss during TCP jaw movement (RS01-RS05) constant, then decrease until RS09

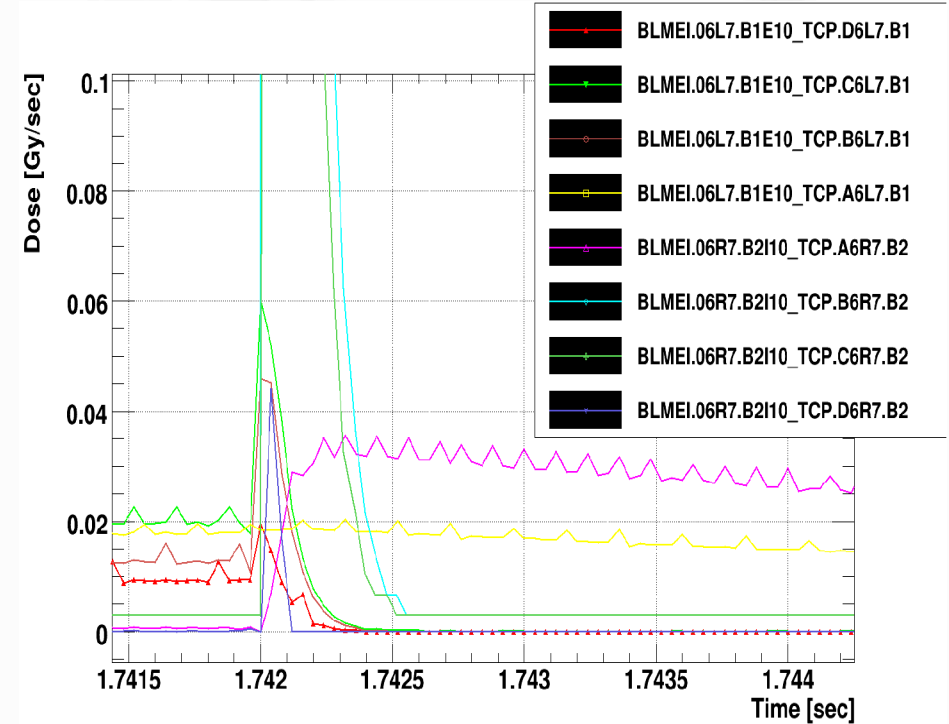
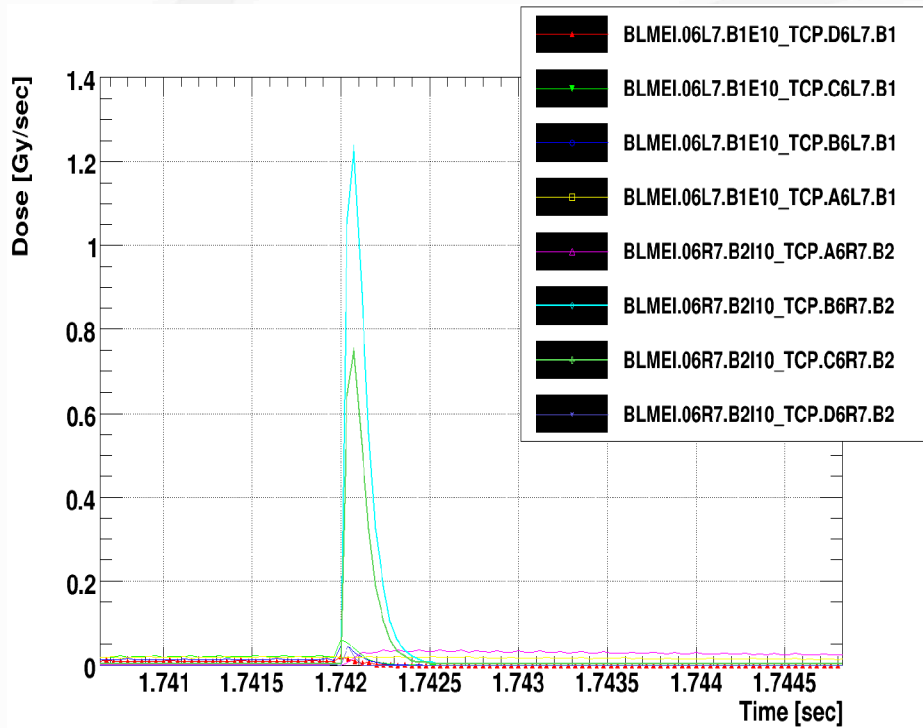


- Losses from long PM buffer on TCPs in L7 and R7 for RS01 vs time
- Losses appear with a frequency of  $\sim 0.2$ sec during the 1.7sec before dump

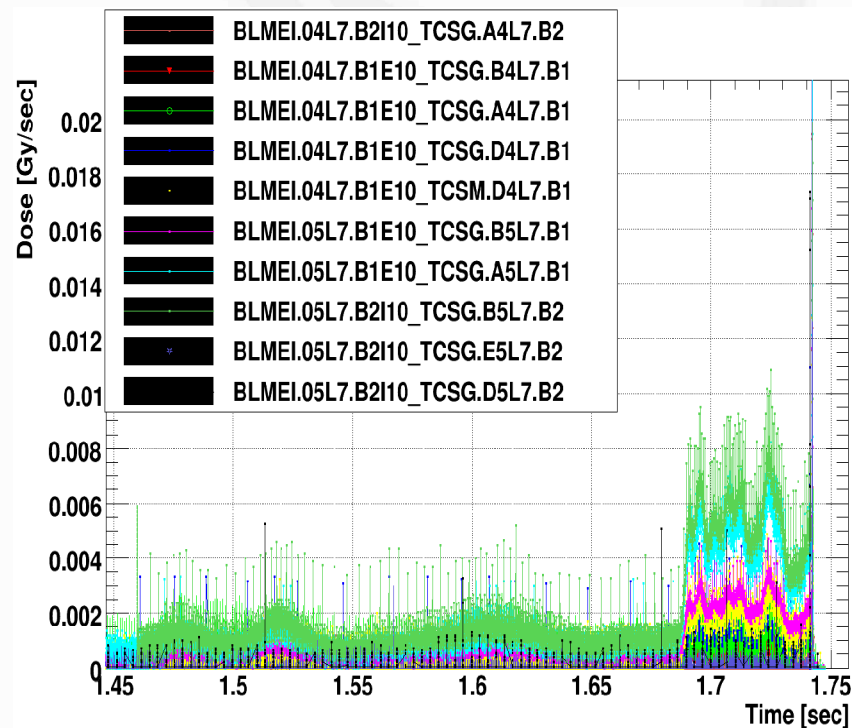
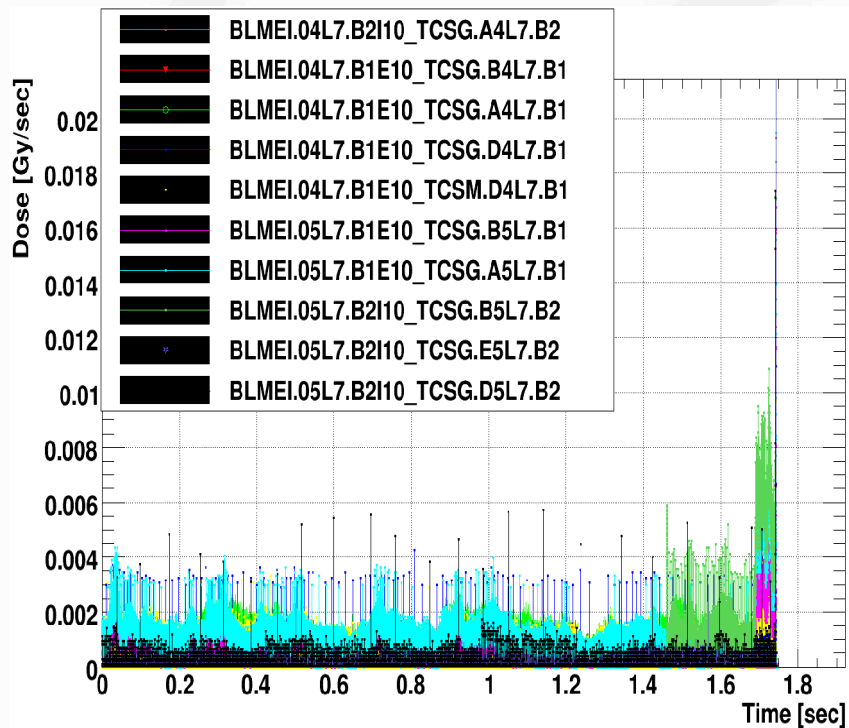


- Losses from long PM buffer on TCPs in L7 and R7 for RS01 vs time
- Zoom into losses before and during beam dump
- TCP A6L7 B1 does follow the 'oscillations' before the dump but NOT 0.04sec before dump

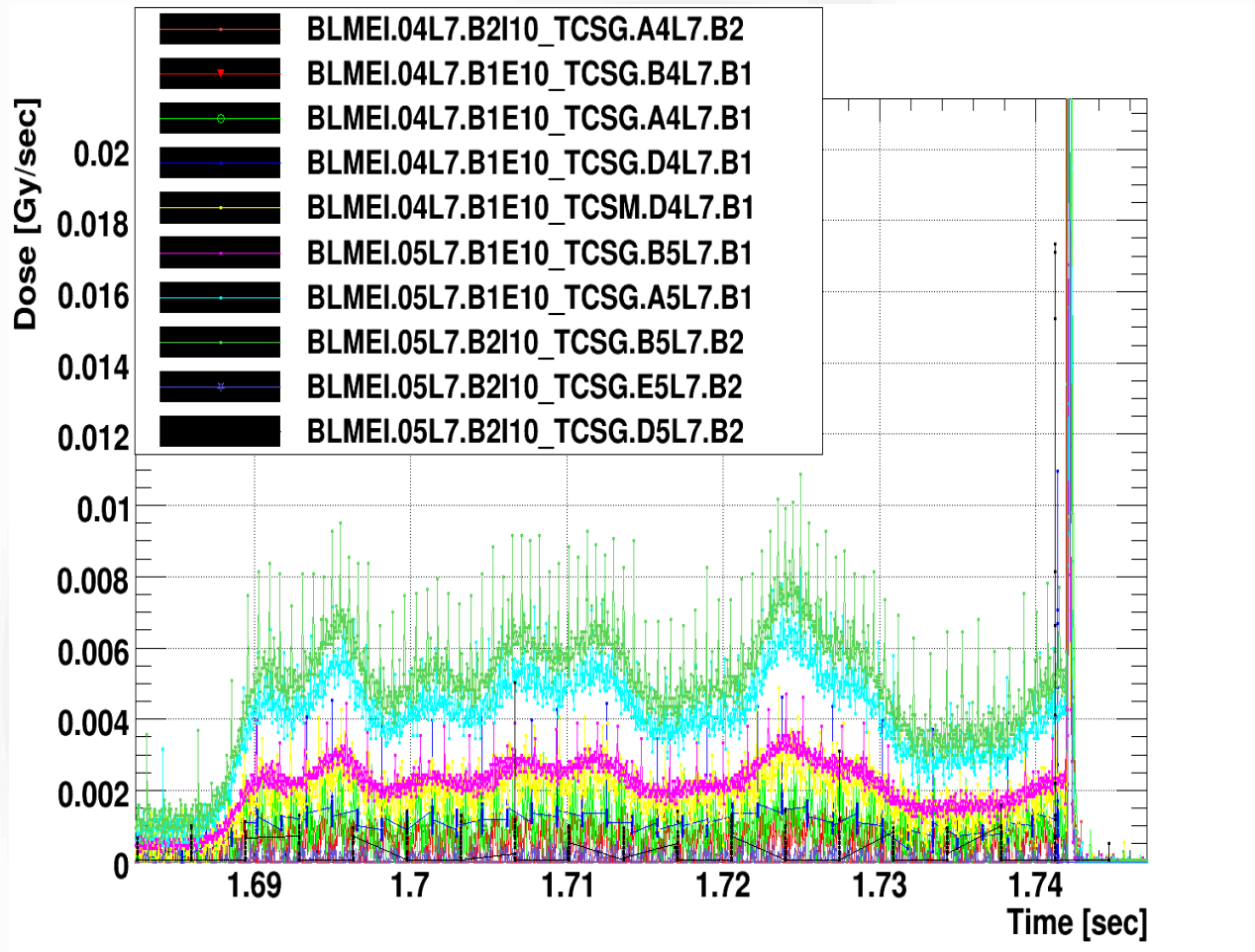




- Losses from long PM buffer on TCPs in L7 and R7 for RS01 vs time
- Zoom into losses during beam dump
- Highest losses during dump at TCPs in R7 (1.2Gy/sec)



- BLM Long PM buffer data for losses on TCSGs in L7



- BLM Losses on TCSGs in L7 shortly before dump occurred

- BLM and vacuum losses around collimators in IR7 have been investigated
- During the TCP jaw movement, the vacuum losses increase from  $5e-10$  to  $2e-8$  mbar (maximum)
- BLM losses and vacuum losses correlate with jaw position