

- Initial plan for the Friday:
 - Morning: Collimator setup at 3.5 TeV.
 - Afternoon: controlled longitudinal emittance blow-up.
 - Night: Transverse feedback system commissioning.
- 09:00 : Cold compressor failure in Pt2 → 7 hours lost
- 16:00: Access needed in UX45 for a problem on the BQM crates power supply. → 2.5 hours lost
- 18:30: Cryo problems in sectors 78 and 81 (turbine in Pt8)
 - both sectors need to be switched off
 - Cryo back by 3am → 8.5 hours lost
- 05:45 : Ready for injection:
 - 06:00: Problem with power converter in TI 8 (RBIH.80407). The DCCT returns zero, even though it is on and the correct function is loaded.

T18 Transfer Line Fault



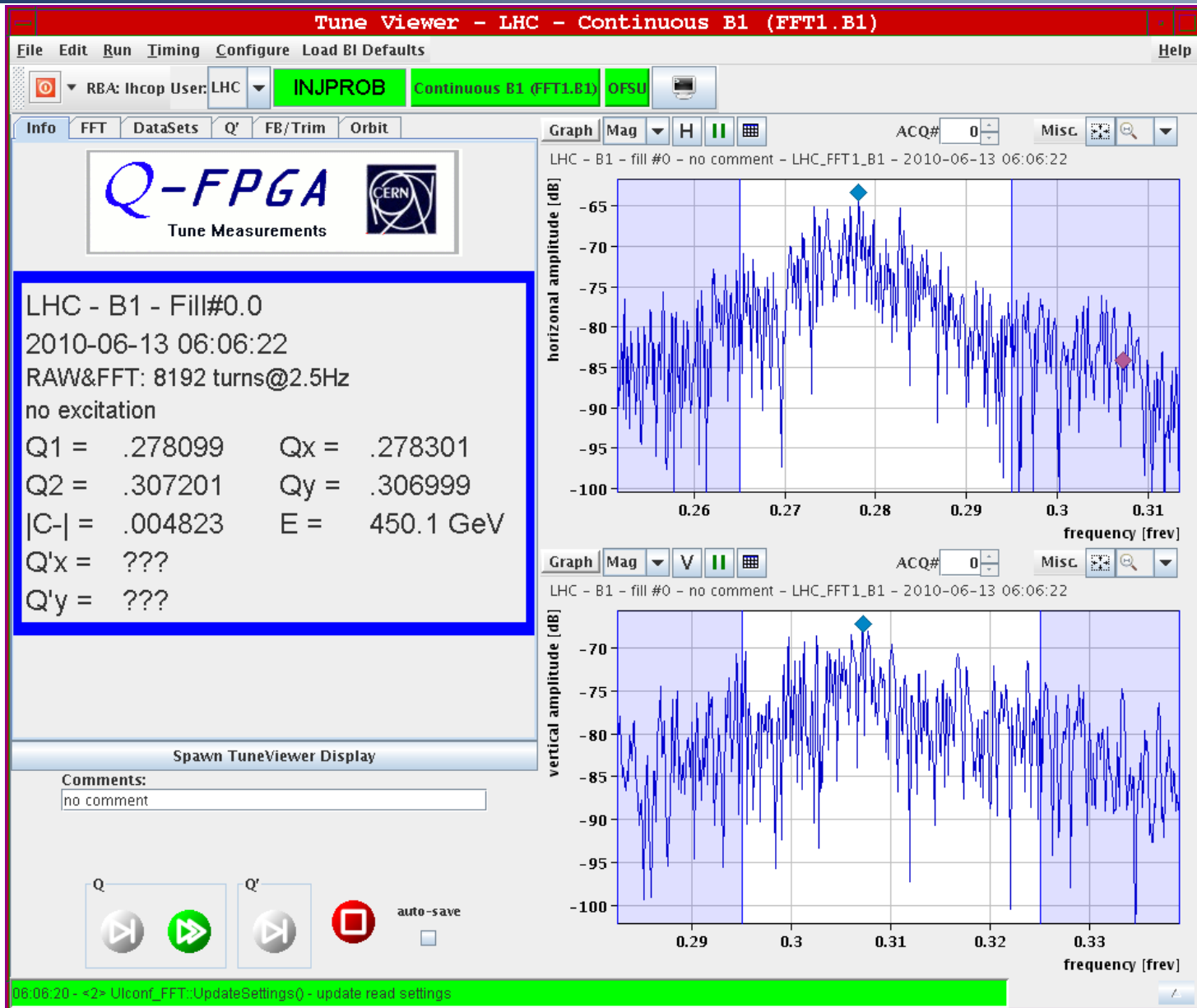
- Initial plan for the Saturday :
 - Morning: Collimator setup at 3.5 TeV.
 - Evening: Transverse feedback system commissioning.
 - Night (if time permits): Squeeze setup with separated beams.
- 11:45: Start collimation setup (after almost 30 hours lost due to technical problems):
 - 13:15: Beams dumped due to losses while aligning the TCTH.4R2.B1. Step of 20 microns!
 - Completed 4 collimators per beam → ca. 15 min per collimator.

- 14:30: Circuit RQ5.L8 tripped:
 - Water problem on the water-cooled cable of B2. Requires access.
- 18:15: Pre-Cycle finished:
 - 18:40: Beam 2 not extracted because of BIC crates down in SPS.
 - 19:15: Beam2 is back.
- 20:30: Starting damper studies at 450 GeV:
 - Both beams with 1 bunches a $2e10$.
 - Emittances: B2H $2.4 \mu\text{m}$; B2V $3.1 \mu\text{m}$.
 - All coarse delays adjusted for all dampers.
 - All phase shifters adjusted, for damping in all planes.
 - Two pick-up mode with vector sum: coarse settings for H.B1, V.B1 and H.B2 done;
For V.B2: something has changed with respect to pervious setting-up sessions; Optimum phase setting using Q9 only has changed from 100 degrees to 70 degrees; not understood even after dedicated phase measurements.

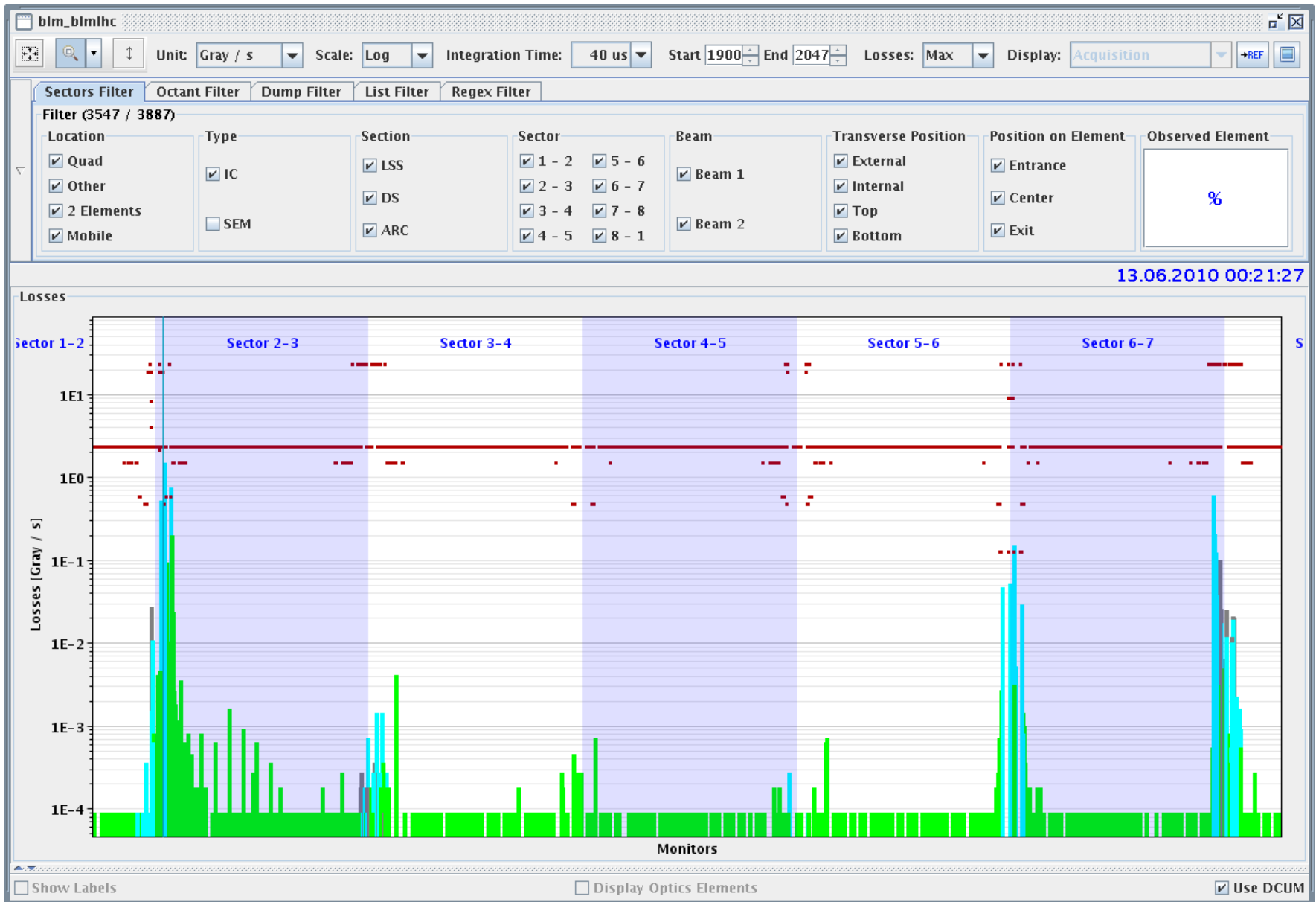
- **Damper Studies Summary continued:**
 - Damper caused 80 % of beam lost during Beam 1 injection. It was traced back to a wrong setting for high intensity.
 - Ramping with all damper modules on and tune feedback is not obvious. During the ramp preparation the damper experts were reducing the damper gain as much as possible and still the tune signal is not very good. The reduction of the gain then caused again some emittance growth, otherwise the emittances stayed small. The tune feedback trims are very jittery.
 - Observed case were the damper could create losses in IR2 (missing the collimators in IR3 and IR7) → to be understood; wrong hierarchy might be related to TDI settings (as discussed 2 days ago: TDI position dependence on primary position).
- **06:30: End Damper studies and preparing fill for Collimator setup:**
 - High intensity fill with $9 \cdot 10^{10}$ single bunch per beam.



Tune Spectrum with Damper ON



Beam Losses with Damper ON



- Initial plan for the Sunday:
 - Morning: Collimator setup at 3.5 TeV.
 - Evening: Transverse feedback system commissioning.
 - Night (if time permits): Squeeze setup with separated beams.
- 08:40: Start Collimator setup
 - Hump affects measurements of collimator positioning.
 - 12:30: Beam dump due 0.02 mm step in TCLA collimator position in IR7. Both beams dumped:
 - ➔ Completed 26 collimators, 13 per beam.
 - Preparation of next fill delayed by earth problem on a quad in TI8.
 - ➔ no beam collimation studies until 19:30.

LHC Collimator Control Application - LHC beam commissioning (Device: TCP.C6R7.B2/TCP.IP7.B2.2.H)

RBA: lhcop

File Settings Reset More displays Help

Jaw corners Positions/Angles Increment

Set absolute jaw positions and angles

Left POSIT [um]:

Right POSIT [um]:

Left ANGLE [urad]:

Right ANGLE [urad]:

Initialization...

Left jaw UP-IN UP-OUT DW-IN DW-OUT

Right jaw UP-IN UP-OUT DW-IN DW-OUT

Anti COLL UP DOWN

Positions readout from the low-level

LVDT's	Left UP	1.142	Gap UP	3.023
Jaw edges	Left DW	1.136	Gap DW	3.045
	Right UP	-2.02	Centre UP	-0.439
	Right DW	-2.008	Centre DW	-0.436

Display jaw: Left jaw (dashed) Right jaw (solid)

Positions: Set LVDT Warn Lim Res Motor

BLM: BLM 1 BLM 2 BLM 3 BLM 4 LogY

Views

Beam loss data [13/06/10 09:38:58]

Beam loss signal [a.u.]

Jaw positions [13/06/10 09:38:58]

Jaw positions [mm]

time (hh:mm:ss)

Console

```
--> BLMEI.6R7.B2I1_TCP.B6R7.B2
--> BLMES.6R7.B2I1_TCP.B6R7.B2
```

08:30:39 - Ready.

LHC Collimator Control Application - LHC beam commissioning (Device: TCSG.B5R3.B1/TCSG.IP3.B1.4.H)

RBA: lhcop

File Settings Reset More displays Help

Jaw corners Positions/Angles Increment

Set increments of jaw positions/angles

Left POSIT [um]:

Right POSIT [um]:

Left ANGLE [urad]:

Right ANGLE [urad]: ▾

Repeat times every sec.

Applying new jaw positions

Left Jaw UP-IN UP-OUT DW-IN DW-OUT

Right jaw UP-IN UP-OUT DW-IN DW-OUT

Anti COLL UP DOWN

Positions readout from the low-level

LVDT's ▾ Left UP 1.368 Gap UP 2.544

Jaw edges ▾ Left DW 1.371 Gap DW 2.614

Right UP -1.296 Centre UP 0.036

Right DW -1.288 Centre DW 0.041

Display jaw: Left jaw (dashed) Right jaw (solid)

Positions: Set LVDT Warn Lim Res Motor

BLM: BLM 1 BLM 2 BLM 3 BLM 4 LogY

Views

Beam loss data [13/06/10 10:00:53]

Jaw positions [13/06/10 10:00:54]

Console

```
--> BLME1.05R3.B1I10_TCSM.B5R3.B1
--> BLME5.05R3.B1I10_TCSM.B5R3.B1
```

09:47:04 - Ready.



Cross-talk from beam 2 sets beam 1 BLM to zero:

LHC Collimator Control Application - LHC beam commissioning (Device: TCSG.A5R3.B1/TCSG.IP3.B1.3.H)

RBA: lhcop

File Settings Reset More displays Help

Jaw corners Positions/Angles Increment

Set increments of jaw positions/angles

Left POSIT [um]:
Right POSIT [um]:
Left ANGLE [urad]:
Right ANGLE [urad]: times every sec.

Inputs okay - ready to move!

Left Jaw UP-IN UP-OUT DW-IN DW-OUT
Right jaw UP-IN UP-OUT DW-IN DW-OUT
Anti COLL UP DOWN

Positions readout from the low-level

LVDTs 5.483 11.741
Jaw edges 5.484 11.567
 -6.33 -0.424
 -6.319 -0.417

Display jaw: Left jaw (dashed) Right jaw (solid)

Positions: Set LVDT Warn Lim Res Motor

BLM: BLM 1 BLM 2 BLM 3 BLM 4 LogY

Beam loss data [13/06/10 10:07:26]

Jaw positions [13/06/10 10:07:26]

Console

```
--> BLMEI.05R3.B1I10_TCSM.A5R3.B1  
--> BLMES.05R3.B1I10_TCSM.A5R3.B1
```

10:06:05 - Ready.

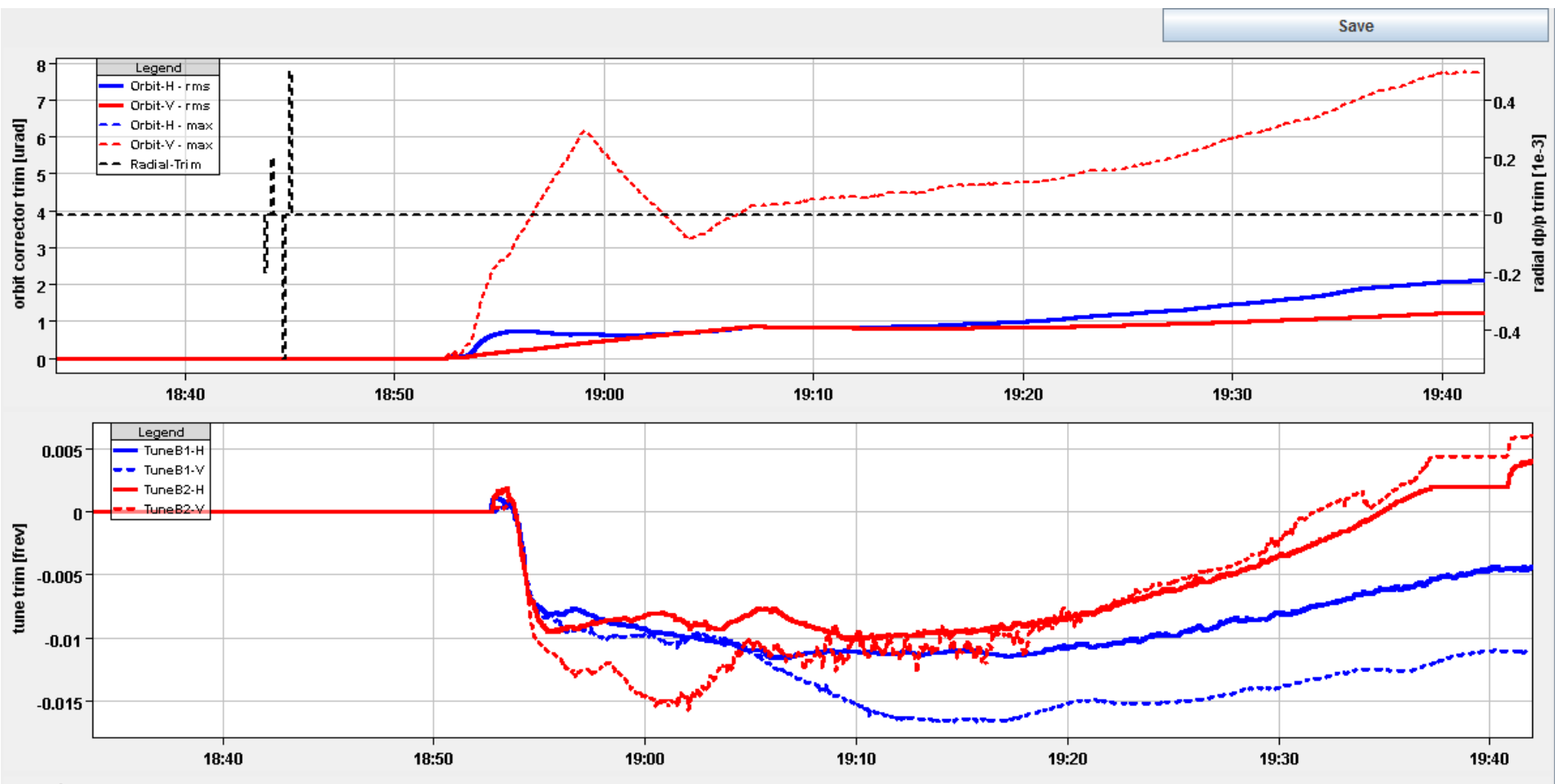
- 19:40: Beams back at 3.5 TeV for Collimation studies:

- Beam conditions were not ideal because the vertical emittances were very large: $B1 = 8\mu\text{m}$ and $B2 = 18\mu\text{m}$. As consequence, the beam halo basically filled already all the available vertical aperture defined by the end-of-ramp settings of the vertical TCPs. The BLM signals were particularly high and noisy.

In about 1h of net beam time at 3.5 TeV, 8 vertical collimators, 4 per beam (all vertical TCLAs) could be adjusted.

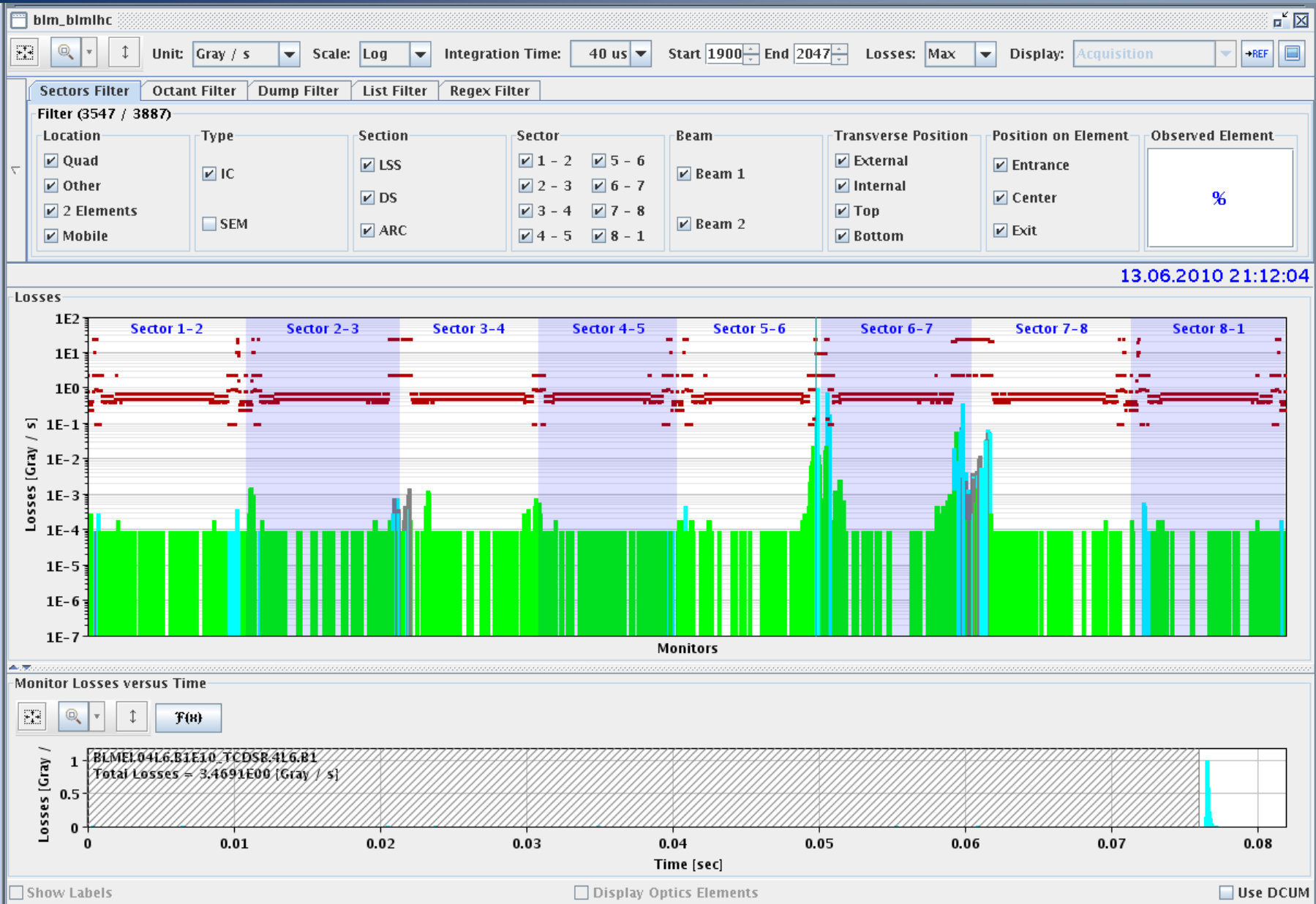
- 21:15: The beams were then lost due to BLMs in the Q4 of IP6 (2.56 ms) while aligning one of the last TCLAs in IP7. With a step of 20 microns.
 - ➔ in total now ca. half of the collimators adjusted at 3.5 TeV
- Emittance blow up even more after octupoles set to $K=-6$, up to 18 units in VB2

Tunes during Sunday afternoon ramp:





Beam loss Sunday afternoon @ end of Coll.:

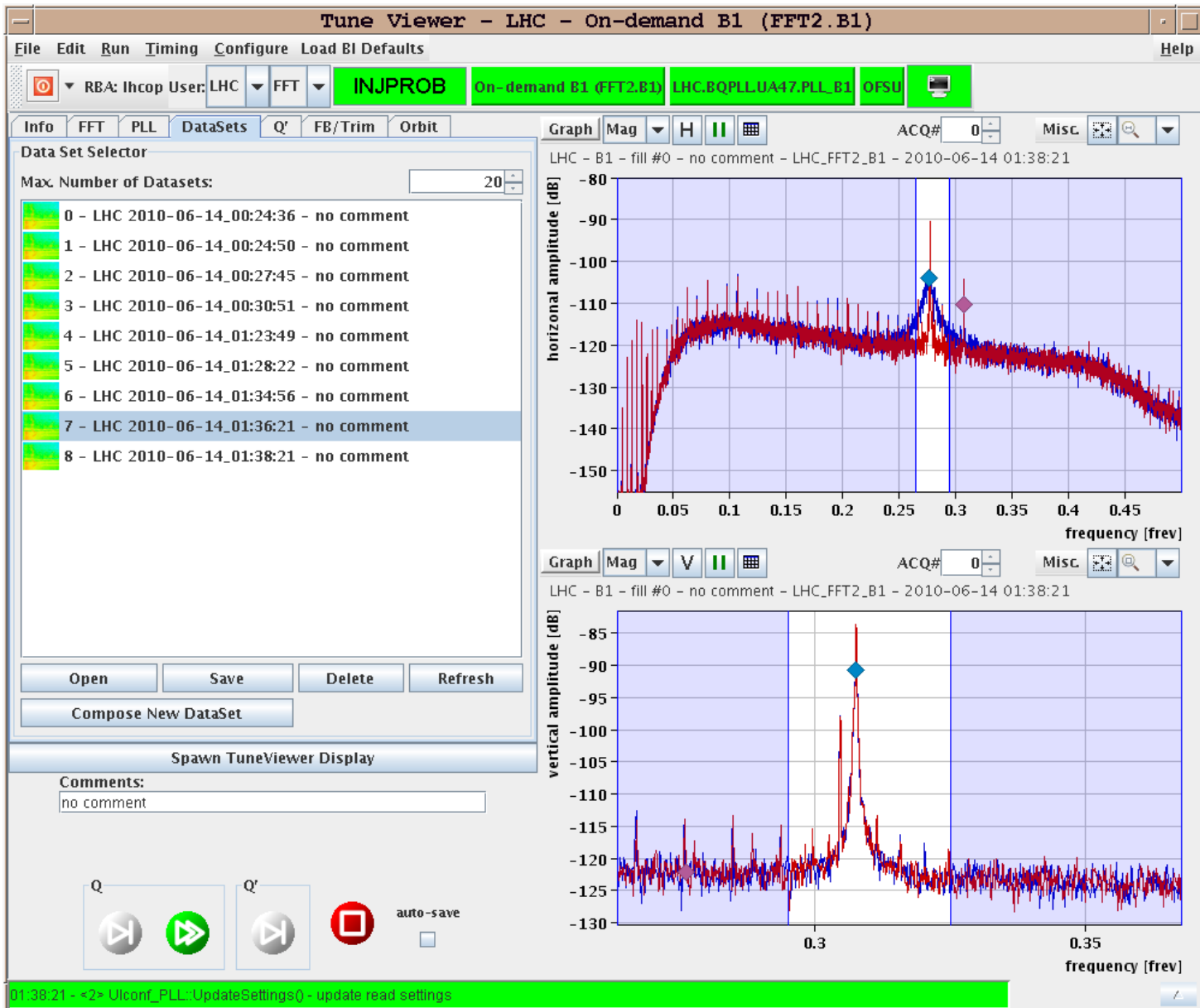


- **23:00: Beams back at 450 GeV for damper studies:**
 - Beams injected for damper studies at 00:13.
 - Adjusted phase shifters for the horizontal damper for Beam 1 by looking at tune shifts with the BBQ system.
 - Vector sum operation is difficult to commission and still needs to be continued.
 - Prepared gain function for feedback operation during ramp.

- **02:40: Lost Cryo in S67:**
 - The removal of the cryo maintain was caused by the temperature readings on RQTL7.L7 going into error.
 - First suspicion is a fuse on an electronics card.
 - 04:00: Access in Pt6 with special procedure due to broken lift.



Tune spectrum with damper on:



- Initial plan for the Monday:
 - Morning: Collimator setup at 3.5 TeV.
 - Evening: Transverse feedback system commissioning.
 - Night (if time permits): Squeeze setup with separated beams.

- Open Issues:
 - RCS.A45B1 QPS not OK; working on board B now.
 - RCBXV2.L1 tripped twice within one hour.



Program for the next 2 weeks

	Day	Start	Time (h)	Activity
9	Wed	A	8	Ramp optimisation, 2e10 (tune, chrom, OFB on...)
9	Wed	N	8	Ramp optimisation, 7e10, 1e11 (tune, chrom...)
10	Thur	M	8	Controlled longitudinal emittance blow up in ramp- 1e11
10	Thur	A	8	Transverse feedback system commissioning
10	Thur	N	8	Squeeze commissioning, 1e10
11	Fri	M	8	Collimator setting up at 3.5 TeV, with separation on, 1e11/beam
11	Fri	A	8	Controlled longitudinal emittance- on ramp - 1e11
11	Fri	N	8	Transverse feedback system commissioning
12	Sat	M	8	Collimator setting up at 3.5 TeV, with separation on, 1e11/beam
12	Sat	A	8	Squeeze commissioning, with separated beams, 1e10
12	Sat	N	8	Transverse feedback system commissioning
13	Sun	M	8	Collimator setting up at 3.5 TeV, with separation on, 1e11/beam
13	Sun	A	8	Squeeze commissioning, with separated beams, 1e10
13	Sun	N	8	Collimator qualification at 3.5 TeV, with separation on, 1e11/beam
14	Mon	M	8	Injection system qualification
14	Mon	A	8	Collimator setting up at 3.5 TeV, squeezed, with separation off, 1e11/beam
14	Mon	N	8	Collimator qualification at 3.5 TeV, squeezed, with separation off, 1e11/beam
15	Tues	M	8	Transverse feedback system commissioning
15	Tues	A	8	Beam dumping system qualification
15	Tues	N	8	Collimator qualification at 3.5 TeV, squeezed, with separation off, 1e11/beam
16	Wed	M	8	Transverse feedback system commissioning
16	Wed	A	8	Controlled longitudinal emittance blow up in ramp- 1e11
16	Wed	N	8	Collimator qualification at 3.5 TeV, squeezed, with separation off, 1e11/beam
17	Thur	M	8	Transverse feedback system commissioning
17	Thur	A	8	Beam dumping system qualification
17	Thur	N	8	Ramp-squeeze operational qualification
18	Fri	M	8	Transverse feedback system commissioning
18	Fri	A	8	Test run for high intensity fills with collisions- NO STABLE BEAMS
18	Fri	N	8	Test run for high intensity fills with collisions- NO STABLE BEAMS
19	Sat	M	8	Test run for high intensity fills with collisions- NO STABLE BEAMS
19	Sat	A	8	Test run for high intensity fills with collisions- NO STABLE BEAMS
19	Sat	N	8	Test run for high intensity fills with collisions- NO STABLE BEAMS
20	Sun	M	8	Test run for high intensity fills with collisions- NO STABLE BEAMS
20	Sun	A	8	Test run for high intensity fills with collisions- NO STABLE BEAMS
20	Sun	N	8	Test run for high intensity fills with collisions- NO STABLE BEAMS