

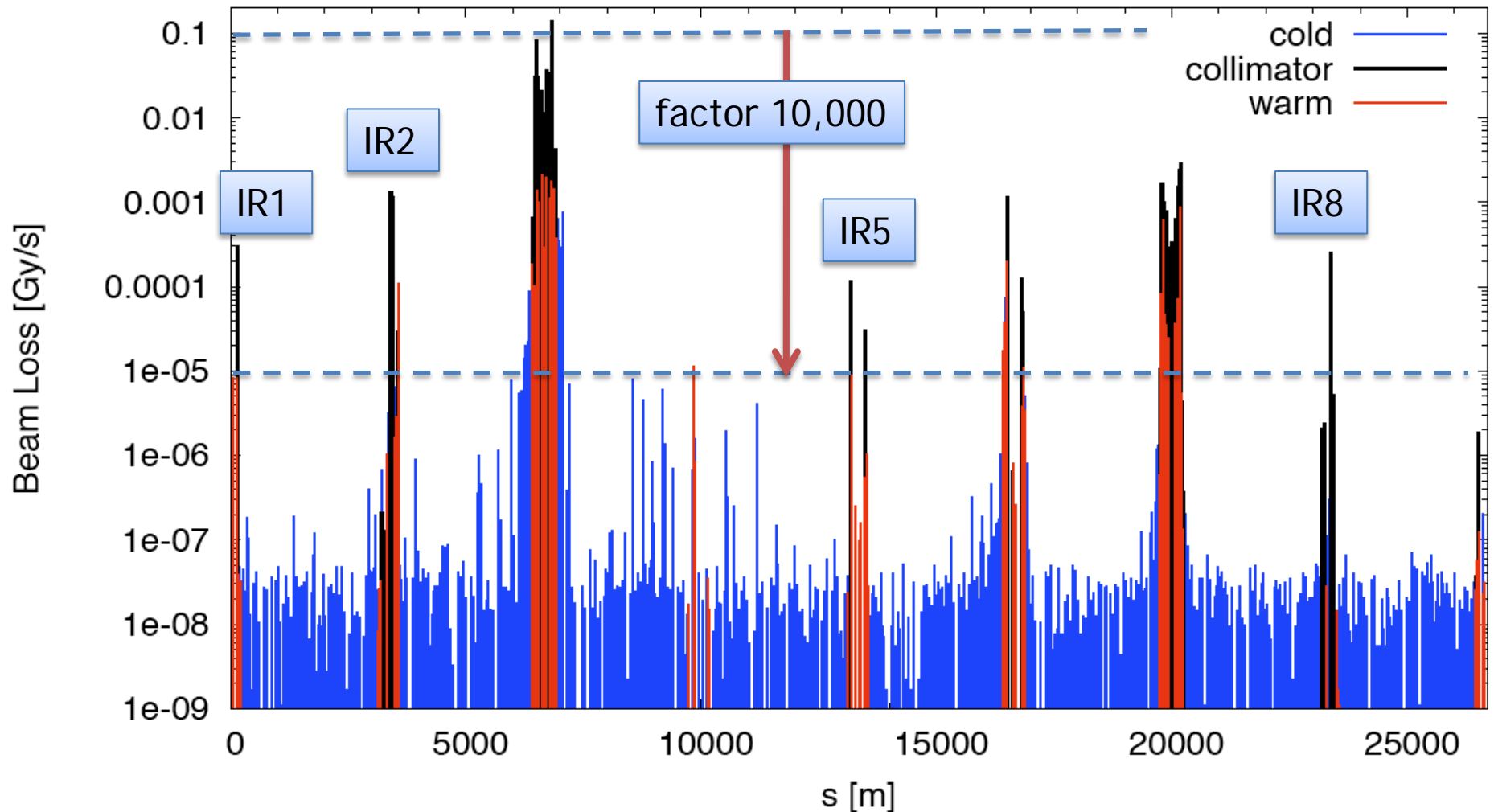
Friday 23/4/2010

Morning

- Ramping - squeezing all IPs to 2 m : excellent - done in 6 steps only
 - Last protection qualification test, at 3.5 TeV, squeezed optics: change RF frequency by +1 kHz and performed off momentum dump test and check losses around the machine: losses as expected
 - This completes the qualification of the protection systems for 3.5 TeV operation, squeezed optics, 3.5×10^{10} /beam
-

Qualification: Off-momentum collimation

Loss map for off-momentum error. All OK. See expected low leakage to experimental IR's. **OK for stable beams from coll.**





Friday 23/4/2010

Afternoon

Access in the LHC for UPS intervention (RE78, UPS EBS21 for PIC system, electronics card to be changed) and for QPS (quench heater of RB.67) - Access complete at 17:00.

Tripped S 81: RQD/RQF tripped first B22.L1 bus-bar detector crossed the threshold - Noisy card - is planned in next TS work programme



Friday 23/4/2010

Afternoon

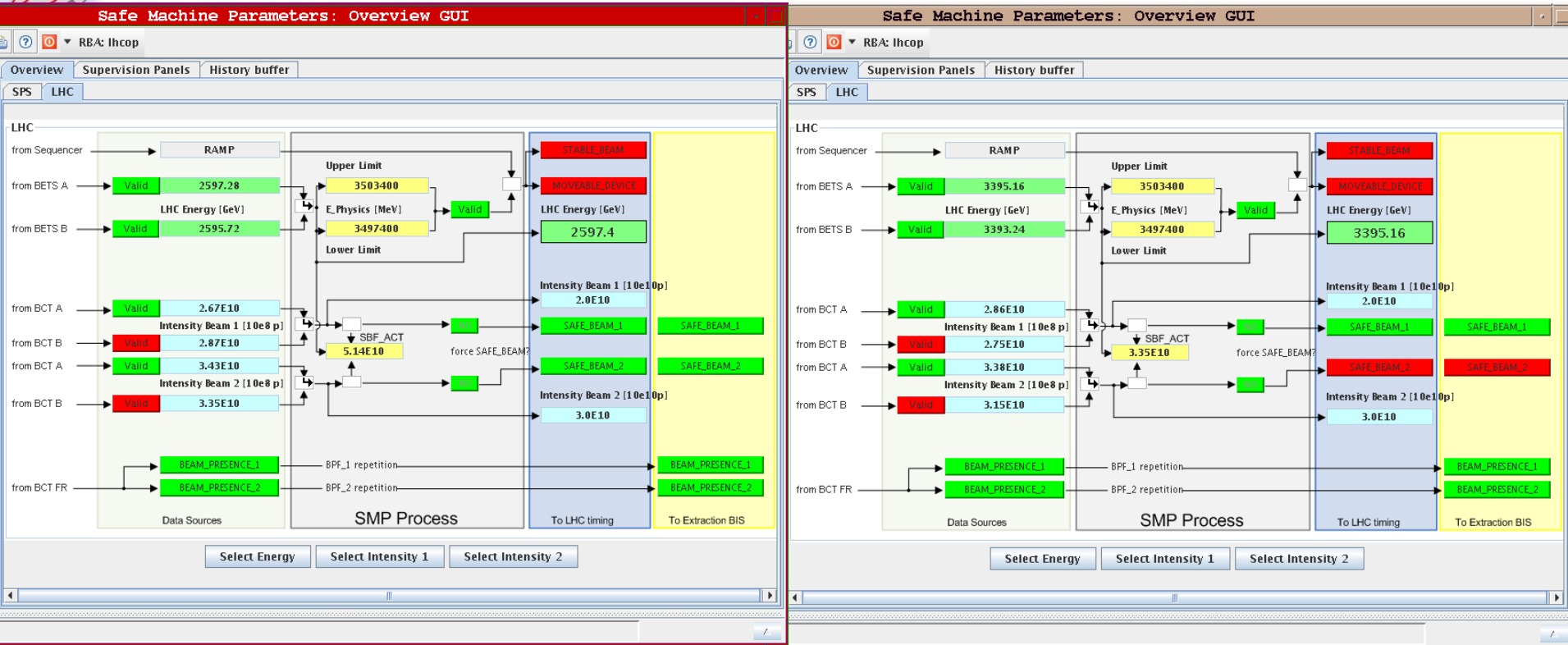
- Access in the LHC for UPS intervention (RE78, UPS EBS21 for PIC system, electronics card to be changed) and for QPS (quench heater of RB.67) - Completed at 17:00.
 - 17:10 - Pre-cycling started.
 - 17:45: Sector S81 tripped: RQD/RQF tripped first - B22L1 bus-bar detector crossed the threshold- noisy board - Intervention was already part of the w18 TS
 - 19:40 : Machine ready for injection - Problem in the SPS, beam is not doing more than one turn. Investigation performed, many equipment checked... Finally traced back to MKD, due to signal noise on a cable from the MKP, which was inhibited MKD. Temporary fixed by an attenuator on a noise, while waiting for w18 TS
-



Saturday 24/4/2010

- 00:00 : Injecting again in the LHC, checking beam parameters on pilot b1 and b2. orbit, tune, chrom. corrected
 - 00:30 : starting injection of the 3b x 3b
 - 00:56 : Start ramping - B1 = $2.8e10$ - B2 = $3.3e10$
B1 : H= 0.933 - V= 0.916 - B2 : H= 1.403 - V= 1.877
 - Setup beam flag false → all HW interlocks unmasked. No problem. Flag then flickering ON/OFF afterwards: too close to limit.
 - 01:45 : End Ramp - correcting orbits, chromaticities, coupling, collapsed separation bumps, re-correct orbits, collimation
-

Saturday 24/4/2010



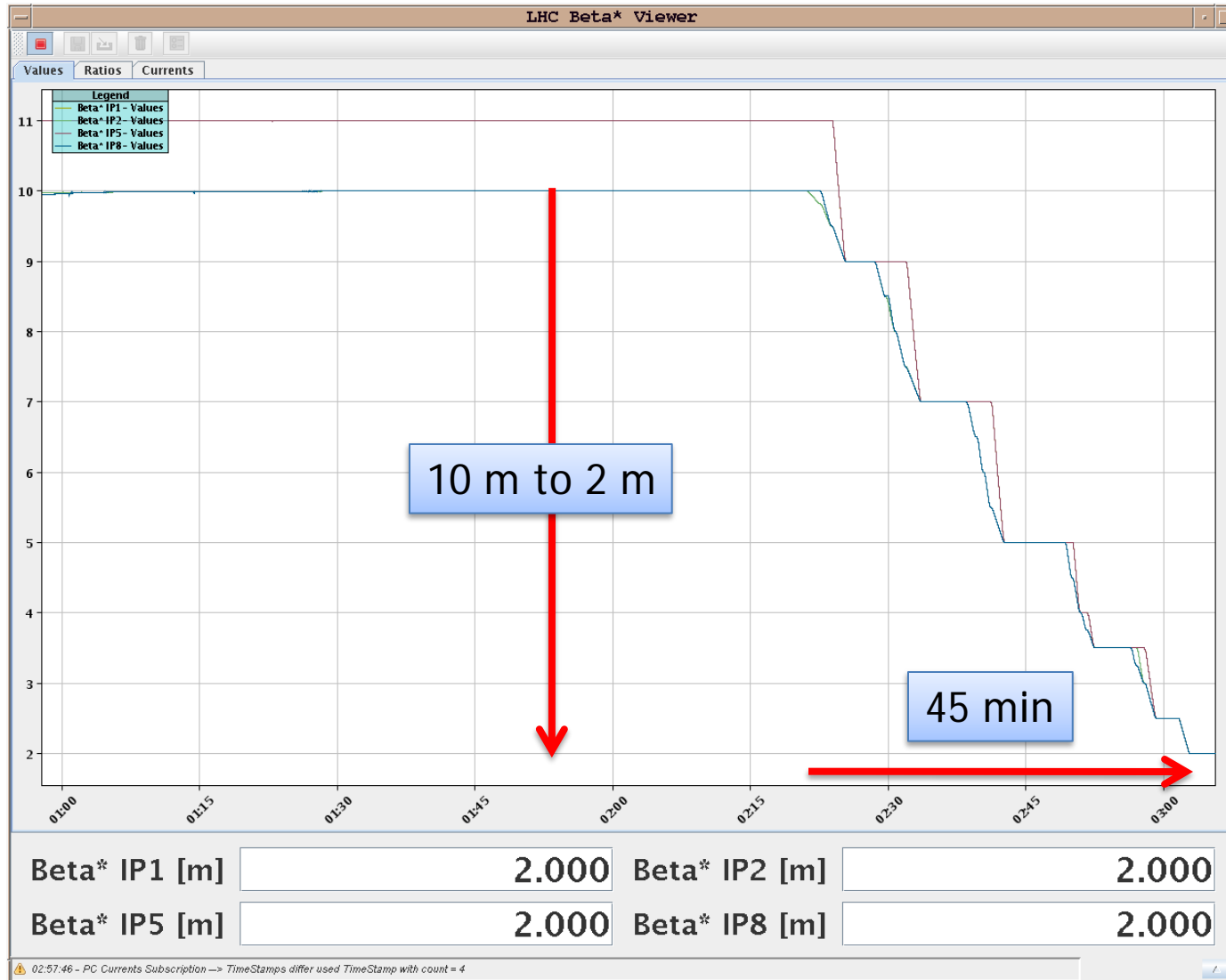
Setup Beam Flag : UNSAFE beam for the 1st time



Saturday 24/4/2010

- 02:00 : Start squeezing
 - 02:45 : at 5 m - Introducing the collimators for squeezed physics - Good. All collimator thresholds are activated.
 - 02:48 : Continuing the squeeze to 2m
 - 03:00 : All IPs to 2 m - Introducing Lumi scan values - correcting orbit back to reference orbit
 - 03:10 : Stable beams declared. $B1 = 2.8 \text{ e}10$ - $B2 = 3.3\text{e}10$
 - 03:15 : Luminosity scans starting
 - 05:30 : Optimization completed!
-

Squeeze to 2 m: Fast and Smooth



Saturday 24/4/2010

OP Vistars - Mozilla Firefox

File Edit View History Bookmarks Tools Help

http://op-webtools.web.cern.ch/op-webtools/vistar/vistars.php?usr=LHC1

Most Visited Scientific Linux CERN CERN IT Departme... CERN Home Page Linux distributions

LHC1 OP Vistars

LHC Page1 Fill: 1058 E: 3500 GeV 24-04-2010 03:14:09

PROTON PHYSICS: STABLE BEAMS

Energy: 3500 GeV I(B1): 2.75e+10 I(B2): 3.22e+10

FBCT Intensity Updated: 03:14:09

Comments 24-04-2010 03:04:01 :	BIS status and SMP flags	B1	B2
injection scheme 3x3 bunches:	Link Status of Beam Permits	true	true
B1 buckets: 1, 8941, 17851	Global Beam Permit	true	true
B2 buckets: 1, 8911, 17851	Setup Beam	true	false
All IPs to 2m!!! Preparing stable beams	Beam Presence	true	true
	Moveable Devices Allowed In	true	true
	Stable Beams	true	true

LHC Operation in CCC : 77600, 70480

PM Status B1 **ENABLED** PM Status B2 **ENABLED**

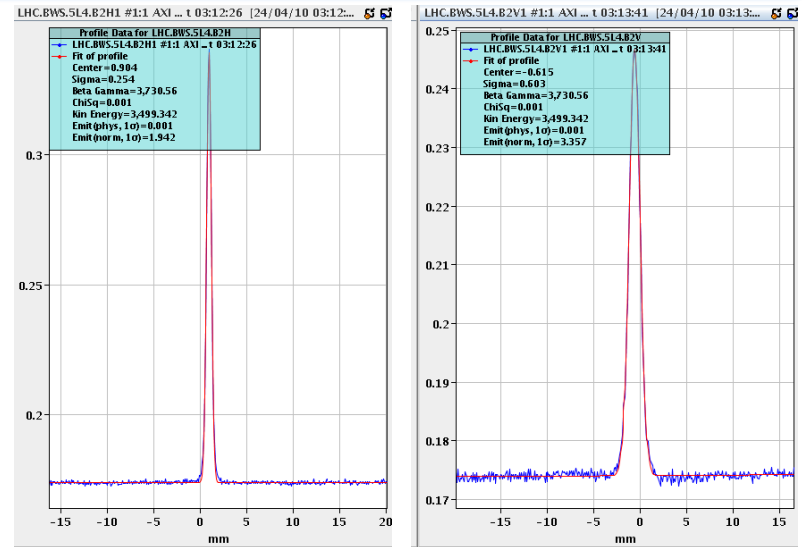
by E.Mati

Done

Stable beams

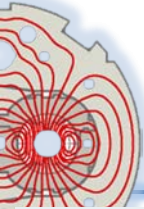
Emittances at Start of Stable Beams

- Normalized emittance beam 1:
 - $H = 1.69 \mu\text{m}$
 - $V = 1.74 \mu\text{m}$
- Normalized emittance beam 2:
 - $H = 1.94 \mu\text{m}$
 - $V = 3.31 \mu\text{m}$
- All below design emittance!
- Expected luminosity:
 - $L \approx 2 \times 10^{28} \text{ cm}^{-2} \text{ s}^{-1}$
- Quick estimate, need to calculate in more detail!



Measured beam 2 emittance

Luminosity after Optimization



24-Apr-2010 05:32:51 Fill #: 1058 Energy: 3500.3 GeV I(B1): 3.28e+10 I(B2): 3.25e+10

	ATLAS	ALICE	CMS	LHCb			
Experiment Status	PHYSICS	PHYSICS	PHYSICS	PHYSICS			
Instantaneous Luminosity	1.284e-02	1.147e-02	1.444e-02	1.497e-02			
BRAN Count Rate	1.966e+02	1.159e+02	3.518e+02	3.810e+02			
BKGD 1	0.048	0.014	0.040	0.141			
BKGD 2	5.000	24.770	5.608	2.321			
BKGD 3	0.000	0.005	0.003	0.045			
LHCf	PHYSICS	Count(Hz): 5.400	LHCb VELO Position	IN	Gap: 0.0 mm	TOTEM:	STANDBY

All experiments: $L > 1.1 \times 10^{28} \text{ cm}^{-2} \text{ s}^{-1}$

factor ~10 achieved, as predicted
(to be confirmed by experiments)

New golden orbit: "All IP to 2 m and optimized (stable beams)"

Lost 20-30% of luminosity after first 3 hours of physics (5h30 to 8h30)!

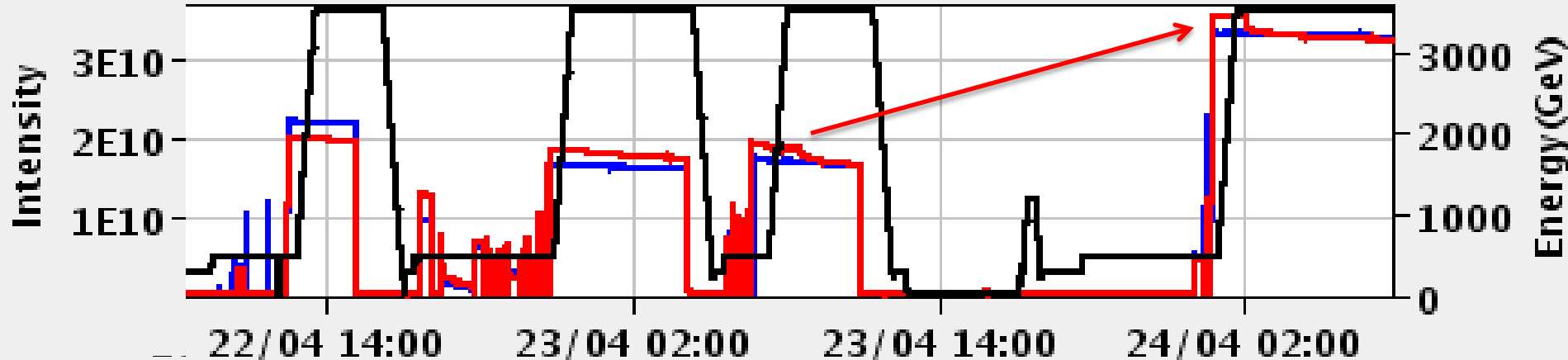
(seems consistent with measured emittance growth)

Ramp & Squeeze Start Working Smoothly

— I(B1) — I(B2) — Energy

LHC UPS repair
SPS problem

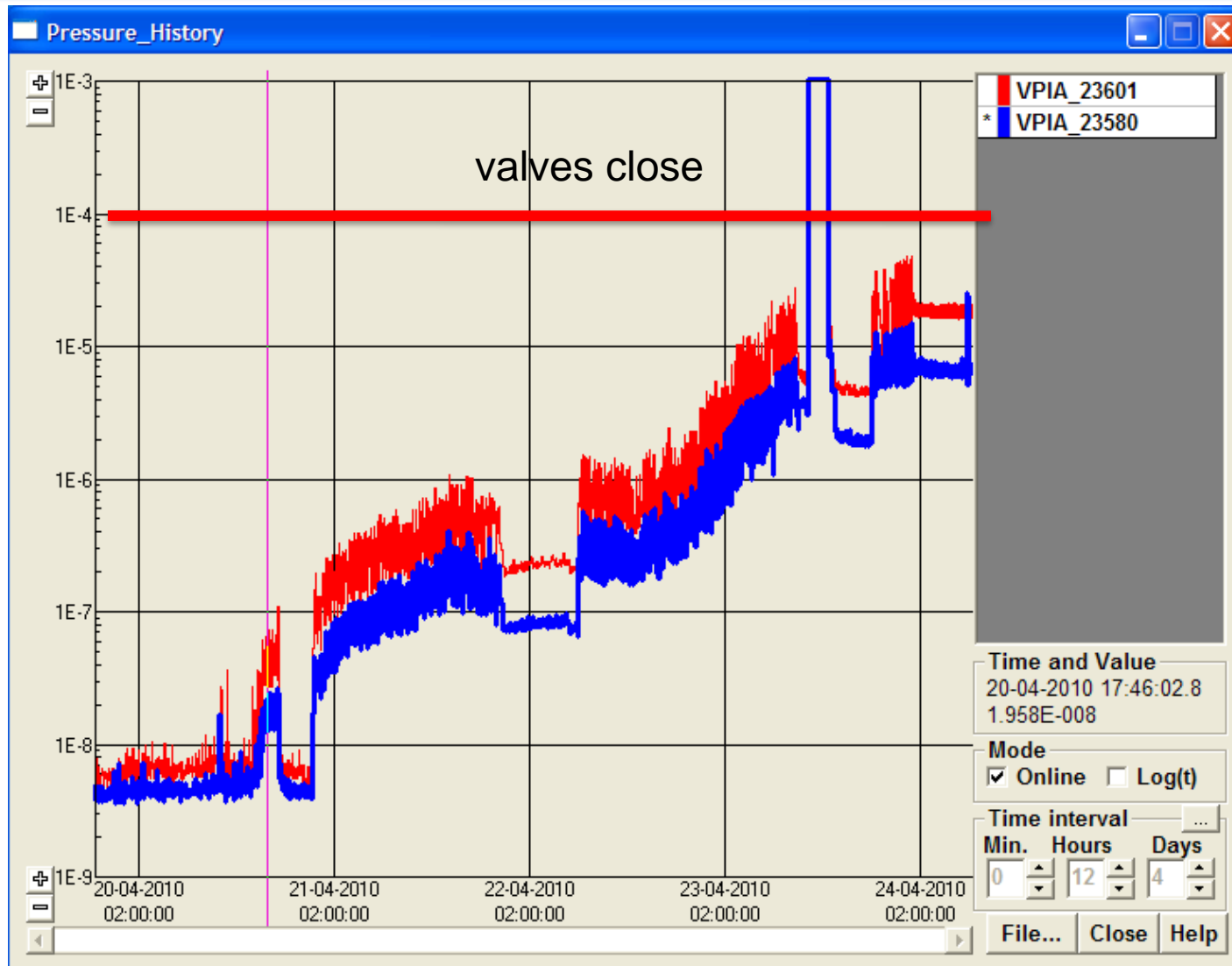
~ 48 hours



Ramp & squeeze @ 3.5 TeV qualification:
...last 2 fills w/o problem, lost on purpose...
Transverse damper commissioning @ 450 GeV

Ramp & squeeze for physics @ 3.5 TeV with
higher intensity

How to Proceed - SPS Vacuum Problem



Plan for the week end

If 2 fills can still be injected:

- 0) Keep present fill as long as possible
- 1) Put a fill for van der Meer scans
- 2) Put another fill with three bunches to repeat present fill.

23	FR	20:00	18	Setup beam Flag - Fill @ 3.5 TeV squeezed: Stable beams. 3.5e10/beam.
24	SA	A/N	8	Fill @ 3.5 TeV squeezed: Stable beams. 2e10/beam (2bx2b) VDM scans
25	SU	M	8	Fill @ 3.5 TeV squeezed optics: Stable beams - 3.5e10/beam (3bx3b) (consecutive, all week end long, pending SPS vacuum condition)
25	SU	A	8	
25	SU	N	8	