PM event 08/03/2010 21:56 – ATLAS BCM

- Beam 1 injection after a longer stop.
- ATLAS BCM dump.

Trying to put together facts….

BIC/EVENT_SEQ

BIC / EVENT_SEQ

HEADER

System	BIC
Class	EVENT_SEQ
Source	ISA
Event stamp	21:26:43.881 08/03/10
Version	0.3.21
Encoding	BIC/EVENT_SEQ
Qualifier	
Analysis flags	[NORMAL]

SUMMARY

pmAnalysisModuleVersion	0.3.21
Analysis result description	First input change detected: USER_PERMIT: Ch 6(ATLAS_Det): B T -> F on CIB.US15.R1.B2
Triggered BIC inputs	Ch 6(ATLAS_Det), Ch 3(LBDS-b2), Ch 3(LBDS-b1)
Beam 1 propagation delay to LBDS	107000 ns
Beam 2 propagation delay to LBDS	104000 ns
OVERALL	38 BICs triggered valid PM data

EVENT OVERVIEW

Index	Loc.Permit A/B	Time	Delta(uSec)	Description	BIC name
262		21:26:23+257601	-20623607	USER_PERMIT: Ch 12(FMCM_RBIH.29314): ...	CIB.SR2.INJ1.1
263		21:26:23+257601	-20623607	USER_PERMIT: Ch 12(FMCM_RBIH.29314): ...	CIB.SR2.INJ1.1
280		21:26:23+598901	-20282307	USER_PERMIT: Ch 12(FMCM_RBIH.87833): A...	CIB.SR8.INJ2.1
281		21:26:23+598903	-20282305	USER_PERMIT: Ch 12(FMCM_RBIH.87833): B...	CIB.SR8.INJ2.1
288		21:26:23+604091	-20277117	USER_PERMIT: Ch 12(FMCM_RBIH.29314): ...	CIB.SR2.INJ1.1
289		21:26:23+604093	-20277115	USER_PERMIT: Ch 12(FMCM_RBIH.29314): ...	CIB.SR2.INJ1.1
328		21:26:41+565643	-2315565	USER_PERMIT: Ch 12(FMCM_RBIH.29314): ...	CIB.SR2.INJ1.1
329		21:26:41+565643	-2315565	USER_PERMIT: Ch 12(FMCM_RBIH.29314): ...	CIB.SR2.INJ1.1
338		21:26:41+610511	-2270697	USER_PERMIT: Ch 12(FMCM_RBIH.29314): ...	CIB.SR2.INJ1.1
339		21:26:41+610513	-2270695	USER_PERMIT: Ch 12(FMCM_RBIH.29314): ...	CIB.SR2.INJ1.1
347		21:26:42+089643	-1791565	USER_PERMIT: Ch 12(FMCM_RBIH.29314): ...	CIB.SR2.INJ1.1
348		21:26:42+089643	-1791565	USER_PERMIT: Ch 12(FMCM_RBIH.29314): ...	CIB.SR2.INJ1.1
357		21:26:42+383470	-1497738	USER_PERMIT: Ch 12(FMCM_RBIH.29314): ...	CIB.SR2.INJ1.1
358		21:26:42+383471	-1497737	USER_PERMIT: Ch 12(FMCM_RBIH.29314): ...	CIB.SR2.INJ1.1
373		21:26:43+044645	-836563	USER_PERMIT: Ch 12(FMCM_RBIH.29314): ...	CIB.SR2.INJ1.1
374		21:26:43+044645	-836563	USER_PERMIT: Ch 12(FMCM_RBIH.29314): ...	CIB.SR2.INJ1.1
383		21:26:43+274067	-607141	USER_PERMIT: Ch 12(FMCM_RBIH.29314): ...	CIB.SR2.INJ1.1
384		21:26:43+274069	-607139	USER_PERMIT: Ch 12(FMCM_RBIH.29314): ...	CIB.SR2.INJ1.1
391		21:26:43+651290	-229918	USER_PERMIT: Ch 12(FMCM_RBIH.87833): A...	CIB.SR8.INJ2.1
392		21:26:43+651290	-229918	USER_PERMIT: Ch 12(FMCM_RBIH.87833): B...	CIB.SR8.INJ2.1
401		21:26:43+653647	-227561	USER_PERMIT: Ch 12(FMCM_RBIH.29314): ...	CIB.SR2.INJ1.1
402		21:26:43+653647	-227561	USER_PERMIT: Ch 12(FMCM_RBIH.29314): ...	CIB.SR2.INJ1.1
419		21:26:43+881208	0	USER_PERMIT: Ch 6(ATLAS_Det): B T -> F	CIB.US15.R1.B2
420		21:26:43+881208	0	USER_PERMIT: Ch 6(ATLAS_Det): B T -> F	CIB.US15.R1.B1
422		21:26:43+881210	2	USER_PERMIT: Ch 6(ATLAS_Det): A T -> F	CIB.US15.R1.B2
426		21:26:43+881210	2	USER_PERMIT: Ch 6(ATLAS_Det): A T -> F	CIB.US15.R1.B1
501		21:26:43+881290	82	USER_PERMIT: Ch 2(LHC Beam1-Permit): B ...	CIB.SR2.INJ1.1
516		21:26:43+881303	95	USER_PERMIT: Ch 1(ATLAS): B T -> F	CIB.SR8.INJ2.2
524		21:26:43+881305	97	USER_PERMIT: Ch 1(ATLAS): A T -> F	CIB.SR8.INJ2.2
525		21:26:43+881305	97	USER_PERMIT: Ch 1(INJ2-2): B T -> F	CIB.SR8.INJ2.1
538		21:26:43+881308	100	USER_PERMIT: Ch 1(INJ2-2): A T -> F	CIB.SR8.INJ2.1
544		21:26:43+881311	103	USER_PERMIT: Ch 1(ATLAS): B T -> F	CIB.SR2.INJ1.2
553		21:26:43+881313	105	USER_PERMIT: Ch 1(INJ1-2): B T -> F	CIB.SR2.INJ1.1
554		21:26:43+881314	106	USER_PERMIT: Ch 1(ATLAS): A T -> F	CIB.SR2.INJ1.2
556		21:26:43+881315	107	USER_PERMIT: Ch 1(INJ1-2): A T -> F	CIB.SR2.INJ1.1
619		21:26:43+881350	142	USER_PERMIT: Ch 2(LHC Beam2-Permit): A ...	CIB.SR8.INJ2.1
715		21:26:43+881432	224	USER_PERMIT: Ch 2(LHC Beam2-Permit): B ...	CIB.SR8.INJ2.1
729		21:26:43+881452	244	USER_PERMIT: Ch 6(LBDS-2): A T -> F	CIB.SR8.INJ2.2
732		21:26:43+881454	246	USER_PERMIT: Ch 6(LBDS-2): B T -> F	CIB.SR8.INJ2.2

SOURCE OVERVIEW

Index	Source Name	Data Valid
1	CIB.UA83.L8.B2	true
2	CIB.UJ56.R5.B1	true
3	CIB.UA83.L8.B1	true
4	CIB.UJ56.R5.B2	true
5	CIB.US15.L1.B1	true
6	CIB.US15.L1.B2	true
7	CIB.SR7.S7.B1	true
8	CIB.SR7.S7.B2	true
9	CIB.USC55.L5.B2	true
10	CIB.UA87.R8.B1	true
11	CIB.USC55.L5.B1	true
12	CIB.UA87.R8.B2	true
13	CIB.US15.R1.B1	true
14	CIB.US15.R1.B2	true
15	CIB.UJ33.U3.B2	true
16	CIB.UJ33.U3.B1	true
17	CIB.UA63.L6.B2	true
18	CIB.UA63.L6.B1	true
19	CIB.SR3.S3.B2	true
20	CIB.SR8.INJ2.1	true
21	CIB.SR3.S3.B1	true
22	CIB.SR2.INJ1.1	true
23	CIB.UA67.R6.B2	true
24	CIB.SR2.INJ1.2	true
25	CIB.UA67.R6.B1	true
26	CIB.UA47.R4.B1	true
27	CIB.CCR.LHC.B1	true
28	CIB.UA23.L2.B2	true
29	CIB.UA47.R4.B2	true
30	CIB.UA23.L2.B1	true
31	CIB.CCR.LHC.B2	true
32	CIB.UA43.L4.B2	true
33	CIB.UA43.L4.B1	true
34	CIB.TZ76.U7.B2	true
35	CIB.TZ76.U7.B1	true
36	CIB.SR8.INJ2.2	true
37	CIB.UA27.R2.B2	true
38	CIB.UA27.R2.B1	true

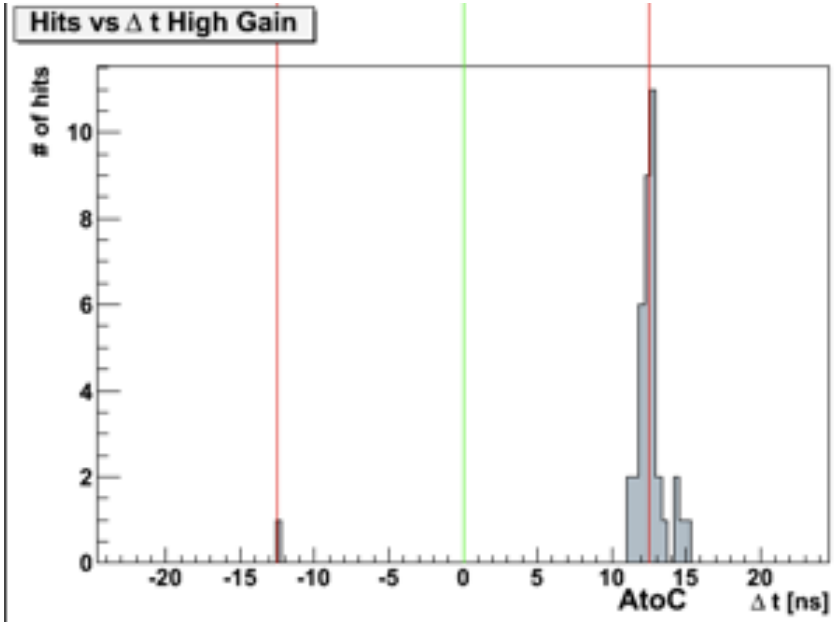
FILTER

☐ Beam_Permit_Loop ☐ Beam_Permit ☐ Local_Permit ☑ User_Permit ☐ User_Permit_Glitch ☑ Software ☐ Mask ☑ Masked_Permit

☐ Disabled_Permit ☐ Channel_Enable ☐ Test ☐ Power ☐ Self_Test ☐ Time ☐ Safe_Beam_Flag ☐ Marker ☑ Injection BICs

ATLAS BCM

- Trigger on beam 1: time difference plot clearly shows that the particles triggering the abort where traveling from ATLAS side A (Left) to side C (Right).

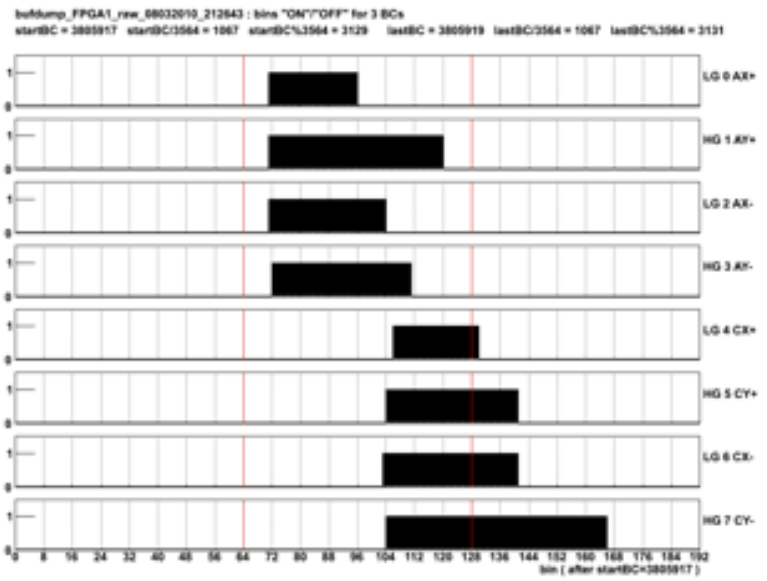


ATLAS BCM

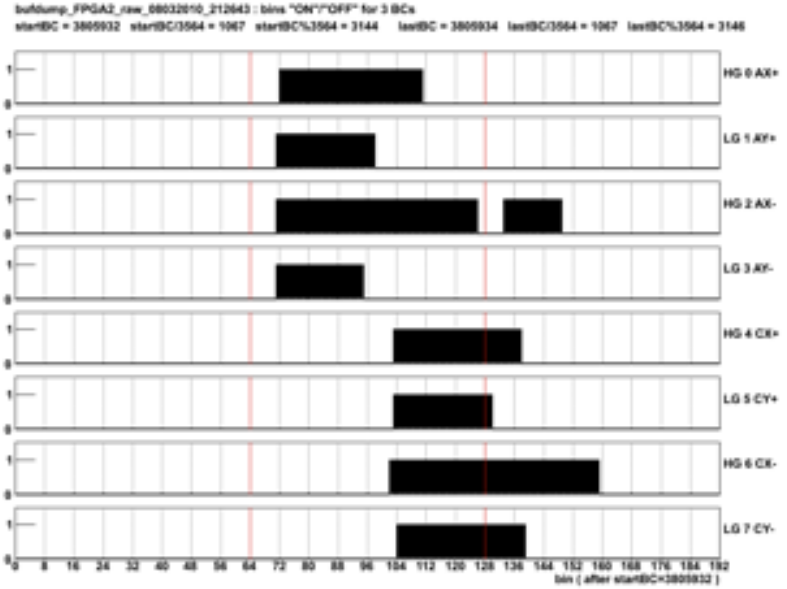
- All 8 detectors where above threshold for both high and low gain.
- The thresholds were set to around 300mV and HV was equal to 1000V.

- Dump condition: 3 low and 3 high gain above threshold

FPGA1



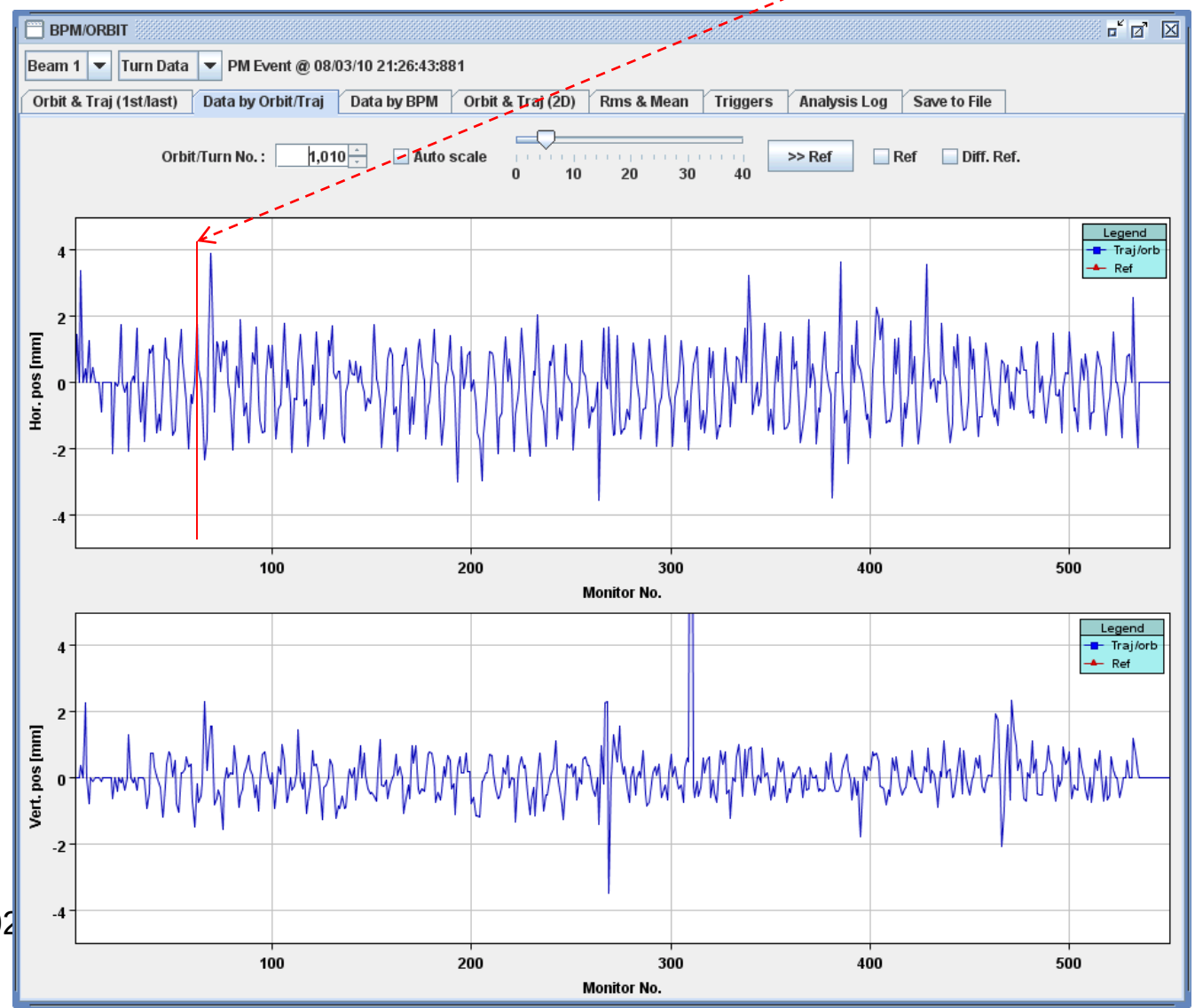
FPGA2



Time bin (1 bin = 390 ps)

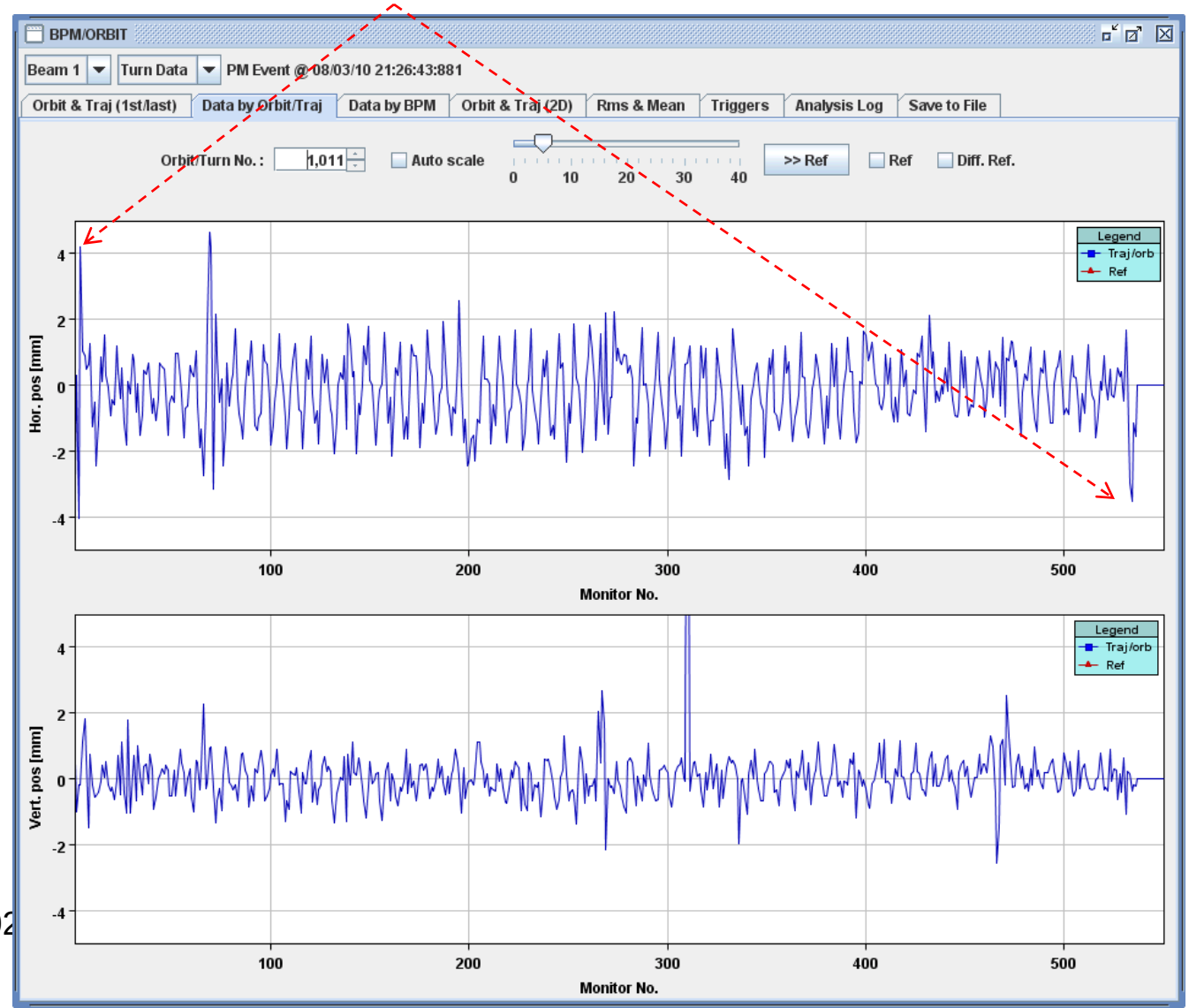
Beam position

- Turn no 1 – H oscillation starting right at the injection point



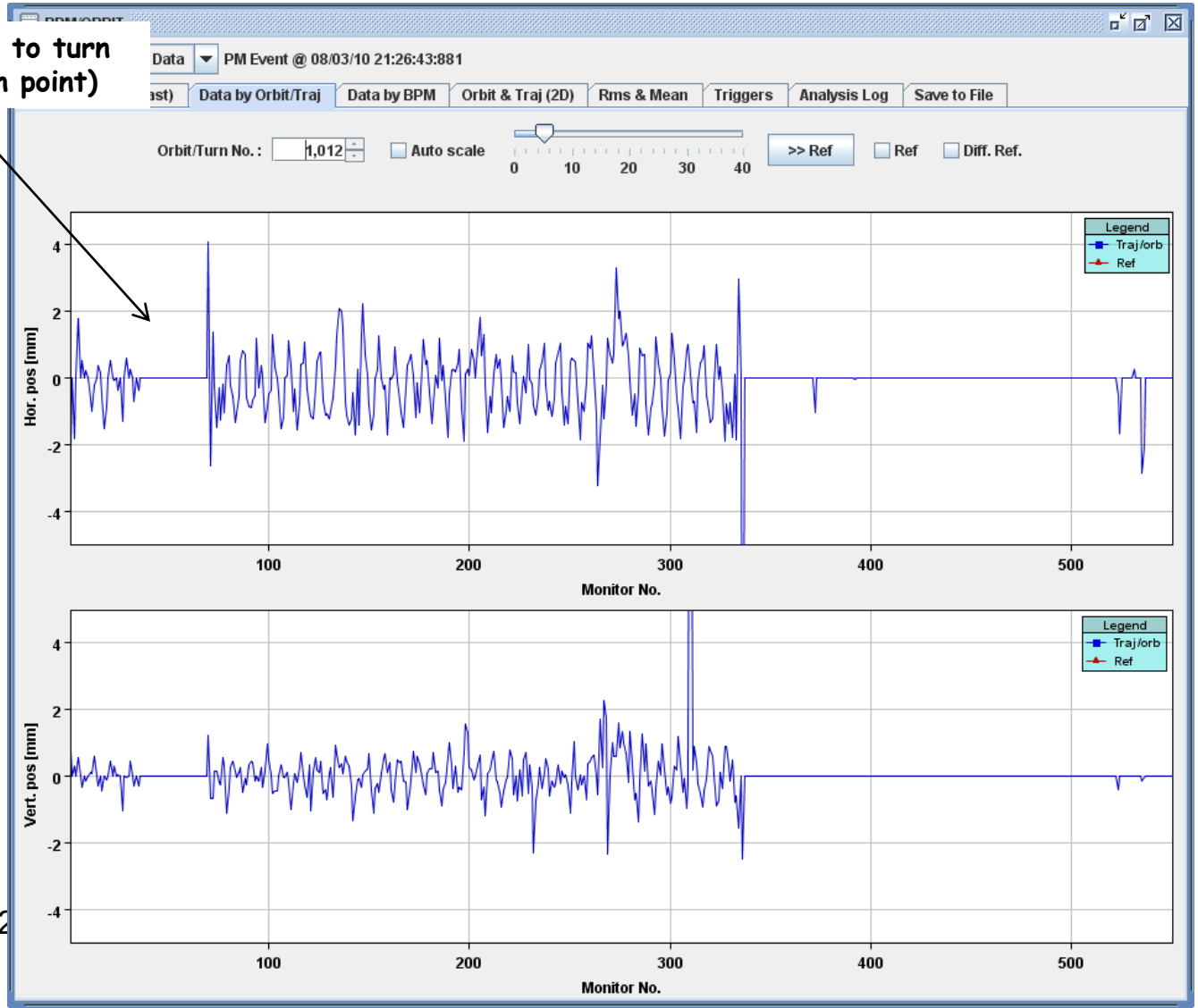
Beam position

- Turn no 2 – large excursions in ATLAS



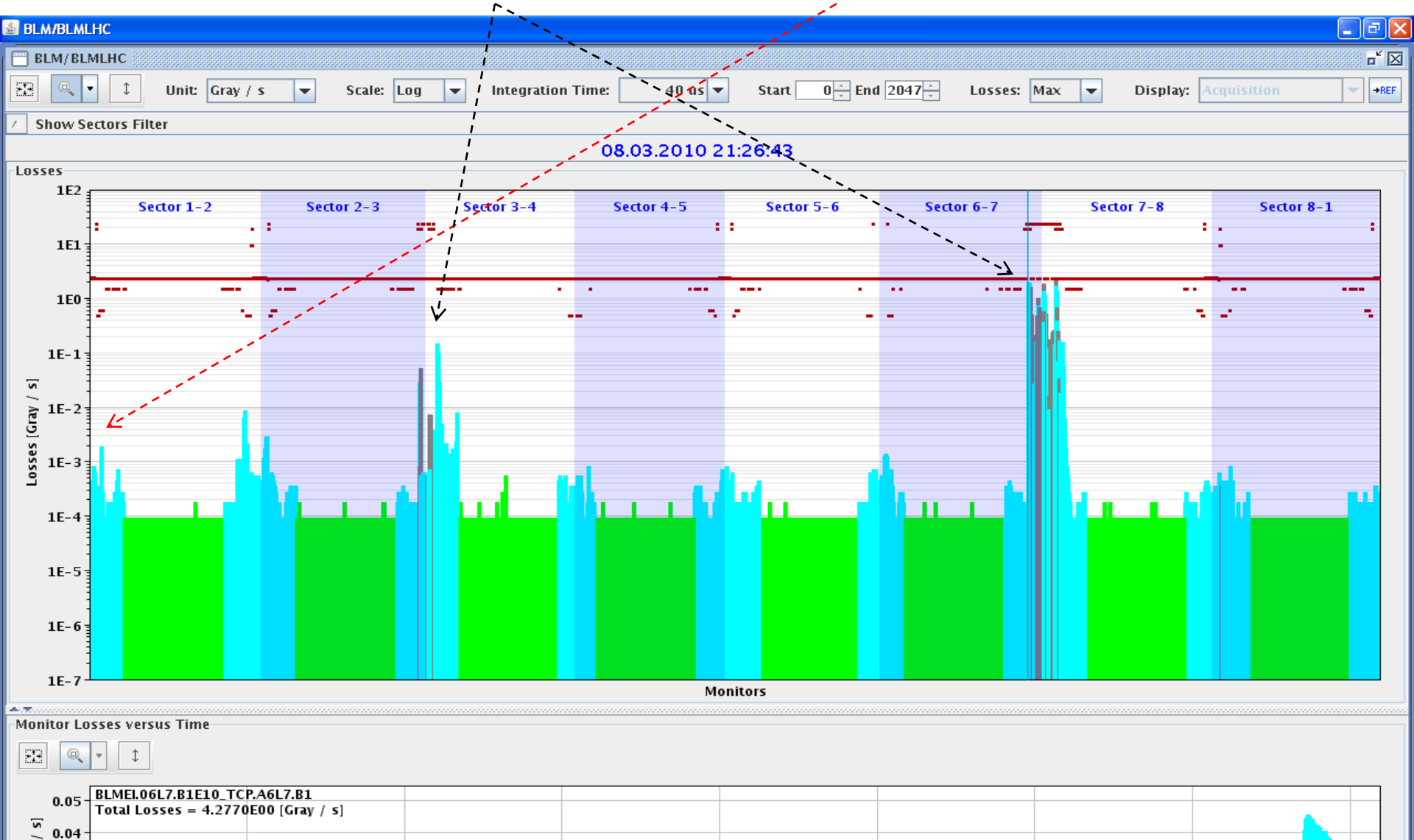
Beam position

- Turn no 3 → dump.



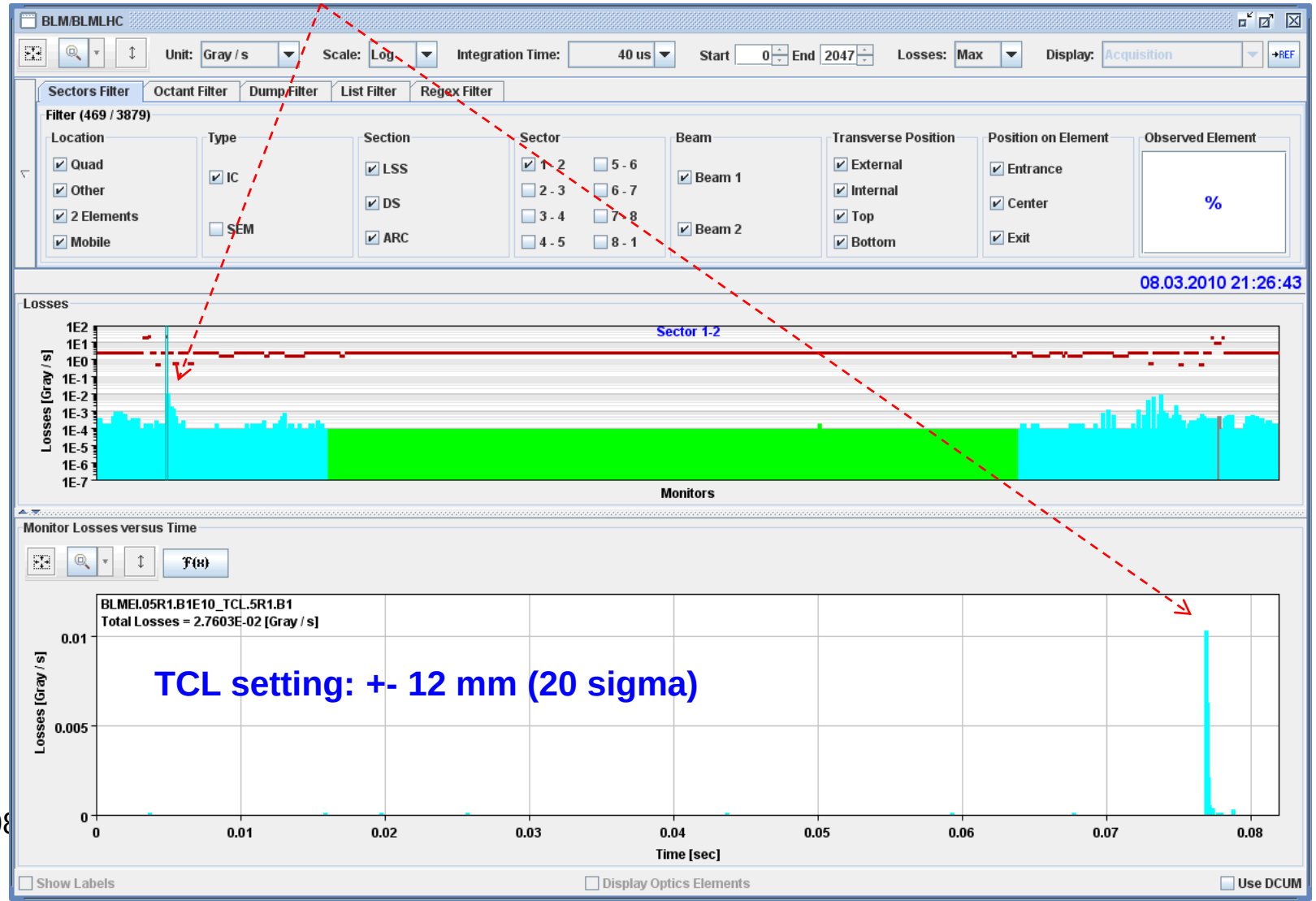
Machine BLMs

- Large losses @ collimators, very small loss near ATLAS on R-side



Machine BLMs

- Very small loss near ATLAS at TCL.5R1 clearly correlated with dump.
  - Factor ~ 100-1000 below BLM threshold - on the 'wrong side' (outgoing for B1).



Summary

- This was clearly a bad injection – mostly in H plane.
  - Starts already at injection point: >> source is in the TL or SPS – investigating…
  - First look at TIMBER does not indicate any issue in the line – tbc.
- There were significant losses in collimation regions (< BLM threshold), but only very small losses near ATLAS.
- Beam loss in ATLAS seems to have been just enough to trigger the BCMs with the presently set thresholds.
  - Seen from the machine they seem very low… At the moment ‘useful’ to detect poor injections…
  - But could become critical with more intensity!