Direct Dump BLMDD

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MPP

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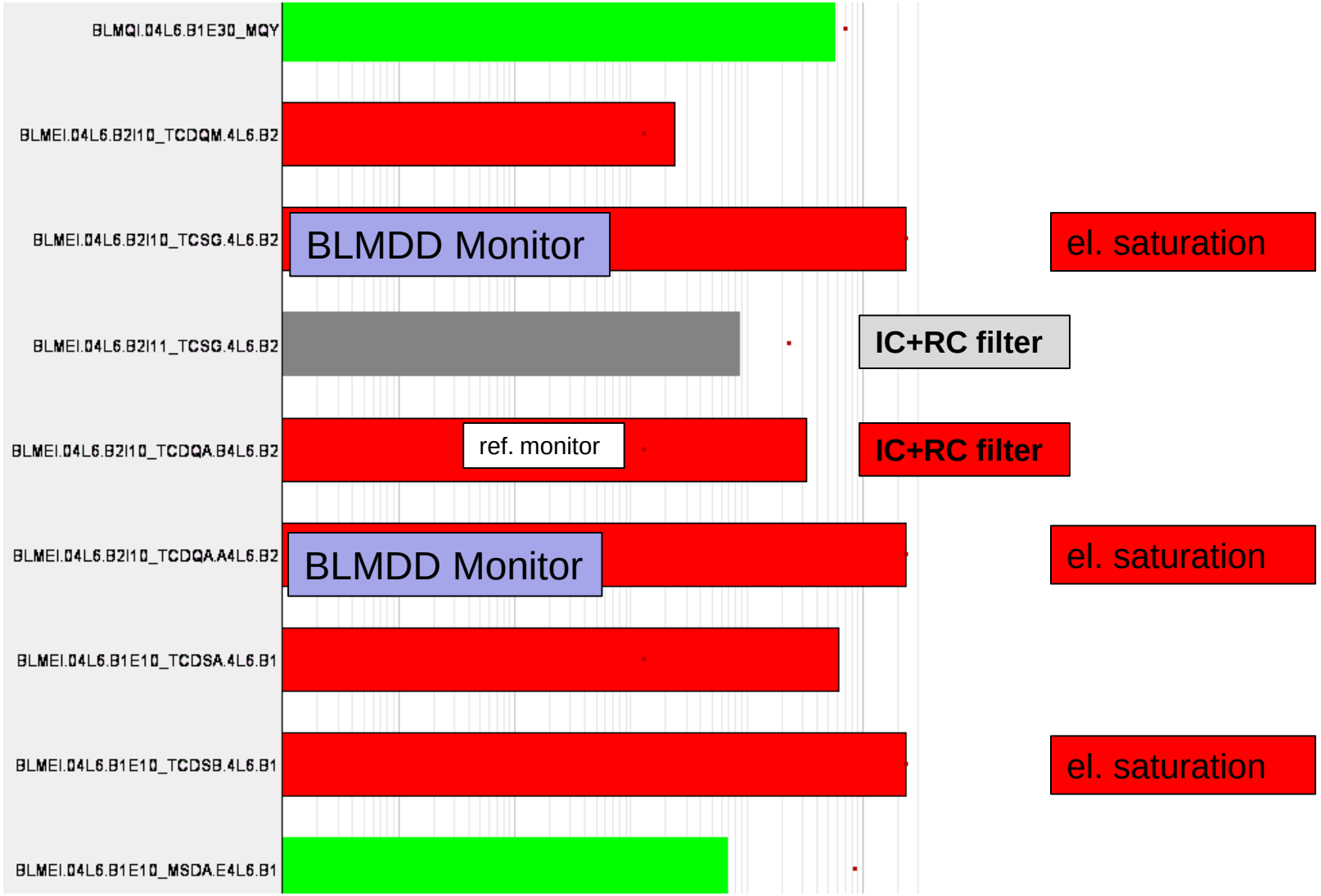
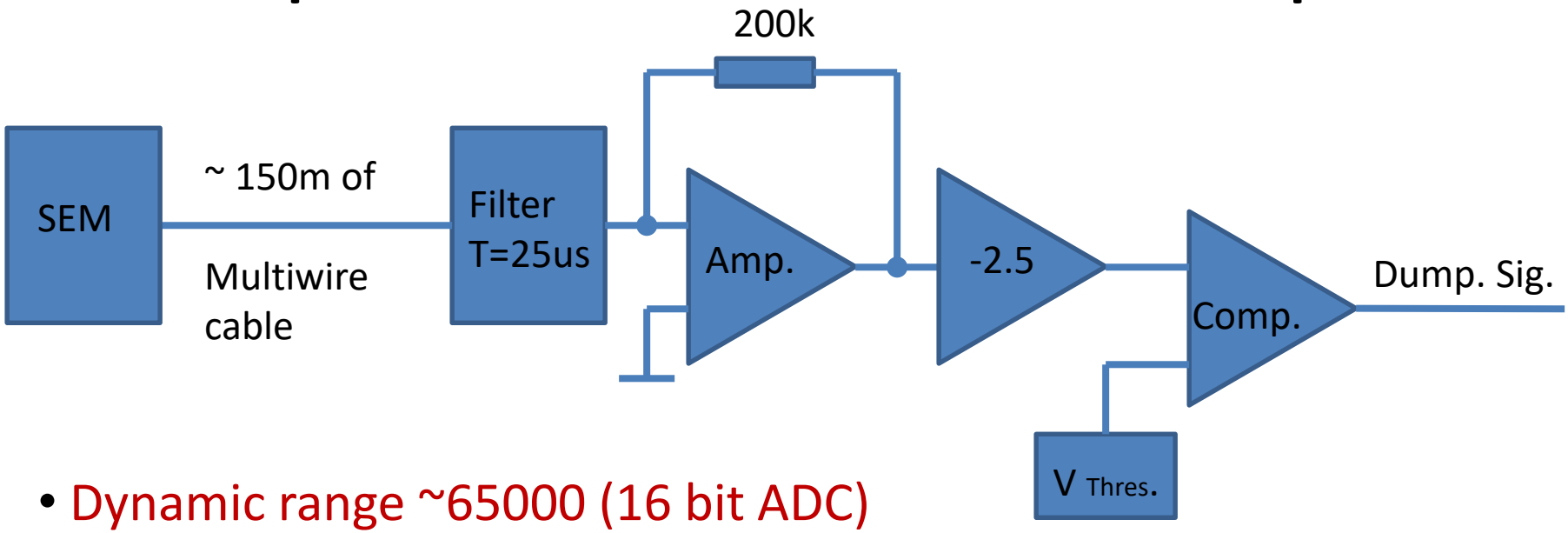
Outline

- Placement of Direct Dump (DD) Monitors
- Hardware, dynamic range, connection to the LBDS
- Change from SEM to IC
- Installation
- Tests

Placement of DD Monitors

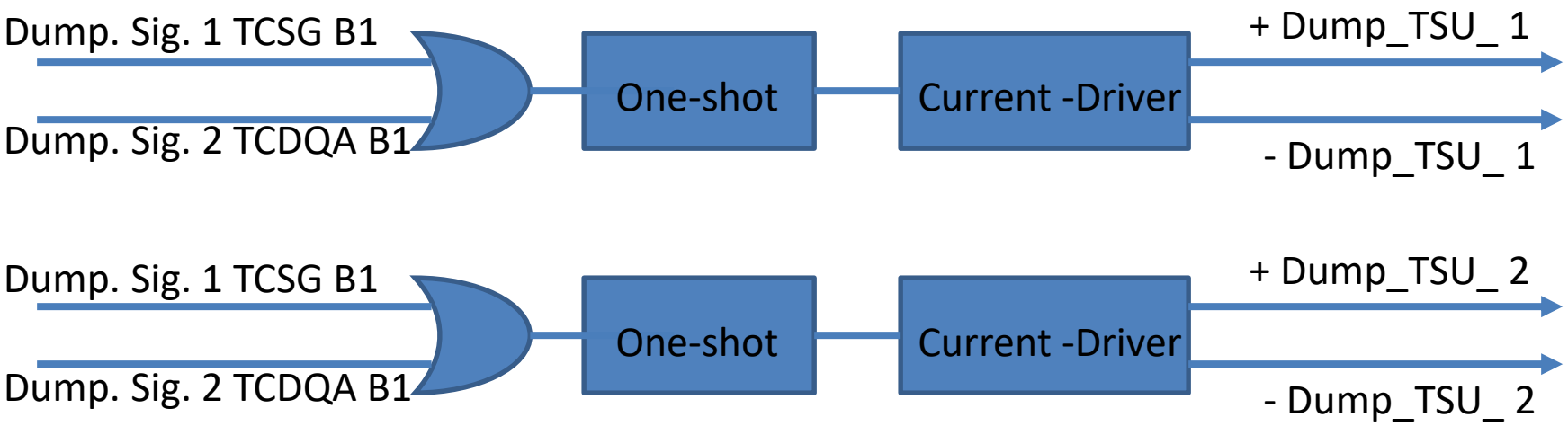


Input circuit of direct dump



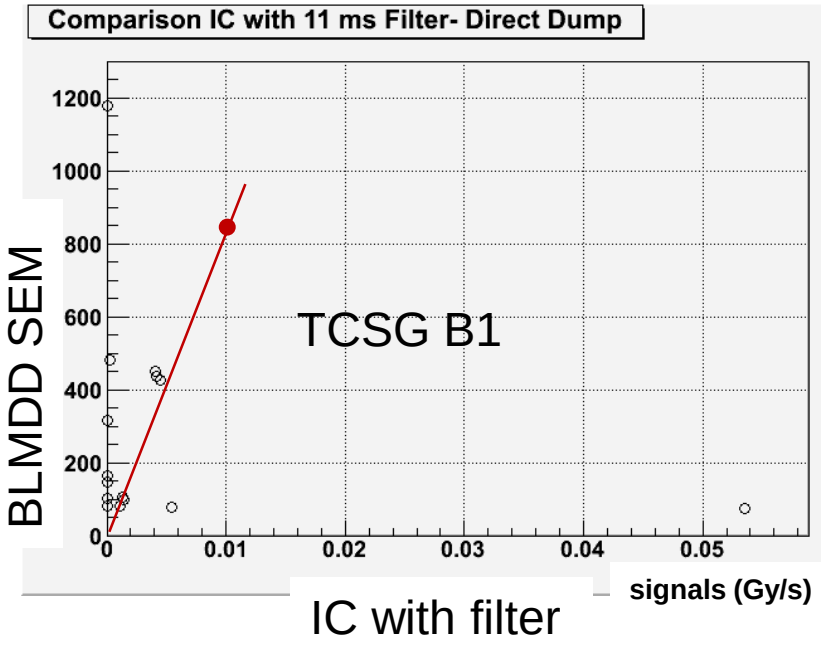
- Dynamic range ~65000 (16 bit ADC)
- Two similar circuits for the 2 SEMs
- Input I to V conversion
- Filter introduced due to noise (T=25us)
- Position SEM 1: TCSG.4L6.B2 & TCSG.4R6.B1
- Position SEM 2: TCDQA.A4L6.B2 & TCDQA.A4R6.B1
- V thres. is set by a potentiometer (one for each monitor)

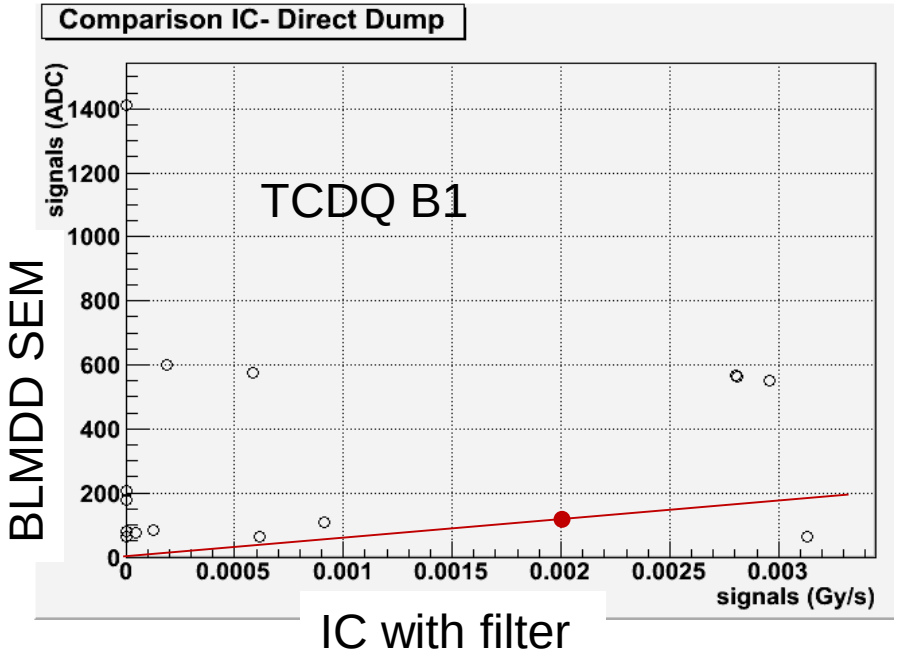
Path of the dump signal



- BLMDD housed in the Triggering and Synchronization Unit (TSU)
- VME installed in UA63 & UA67 in the rack MYDGP07
- 2 separated dump signals connected to the TSU 1 & 2
- Connection done with PCB plugged on the back of the VME
- 100mA current driven to the receiver circuit

Replace SEM by IC

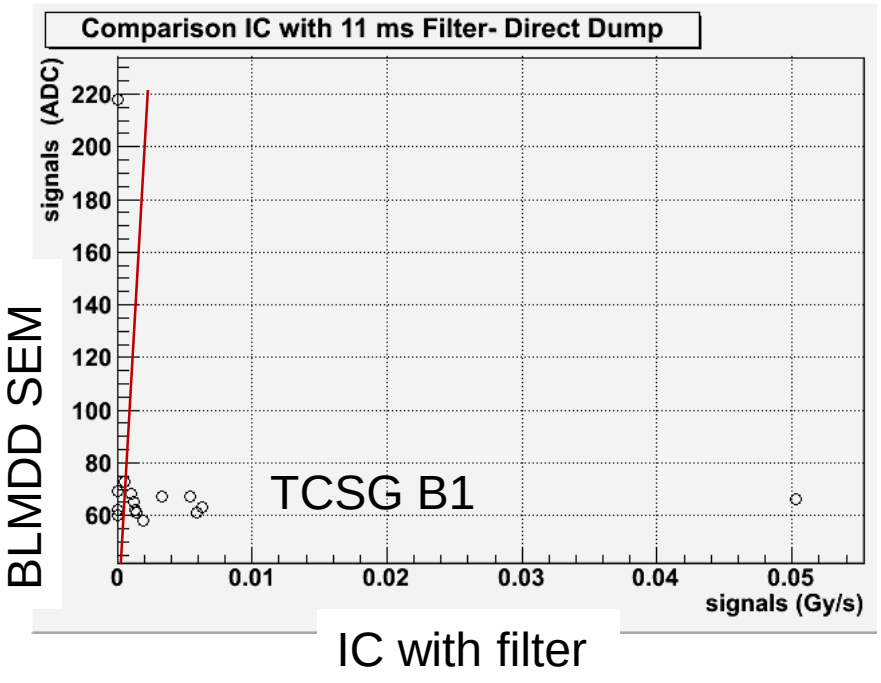


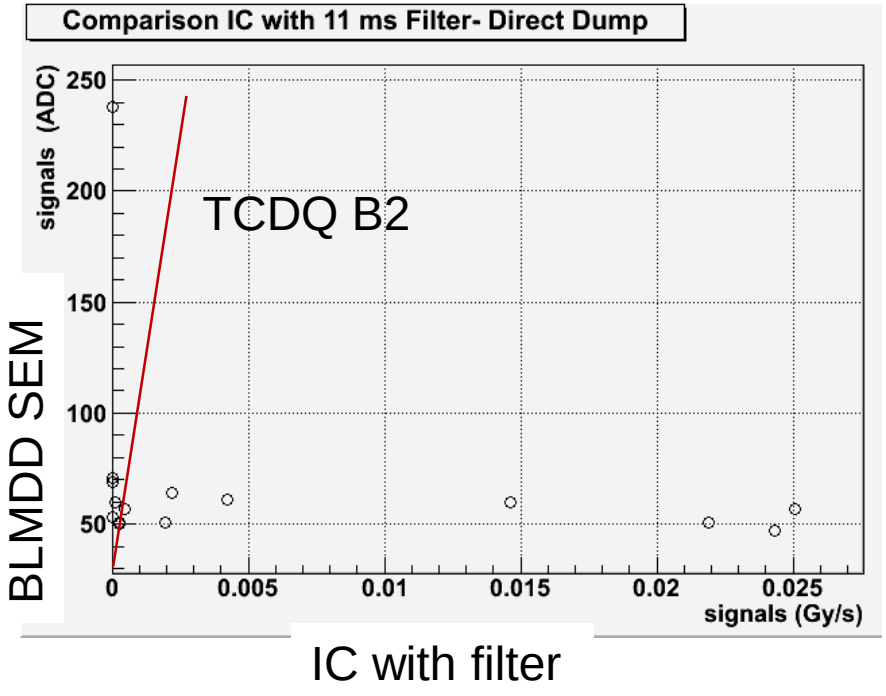


Type	Element	Logging DB name	DCUM
IC	TCSG	BLMEI.04R6.B1E10_TCSG.4R6.B1	16817.8
IC filter	TCSG	BLMEI.04R6.B1E11_TCSG.4R6.B1	16817.9
DD	TCSG	HC.BLM.UA63:CH1	16817.8
IC	TCDQA	BLMEI.04R6.B1E10_TCDQA.A4R6.B1	16808.1
IC filter	TCDQA	BLMEI.04R6.B1E10_TCDQA.B4R6.B1	16811.6
DD	TCDQA	HC.BLM.UA63:CH2	16808.1

Beam 2

Type	Element	Logging DB name
IC	TCSG	BLMEI.04R6.B1E10_TCSG.4R6.B1
DD	TCSG	HC.BLM.UA67:CH2
IC	TCDQA	BLMEI.04R6.B1E10_TCDQA.A4R6.B1
DD	TCDQA	HC.BLM.UA67:CH1





Installation of BLMDD

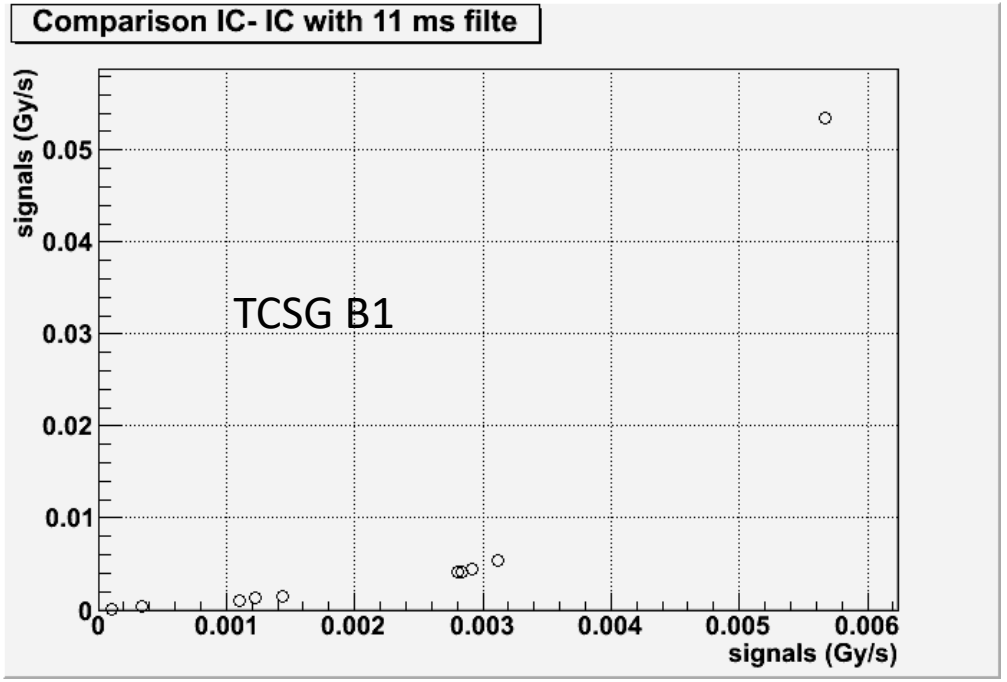
- For installation and testing for both beams an access is needed for approximately 8 hours

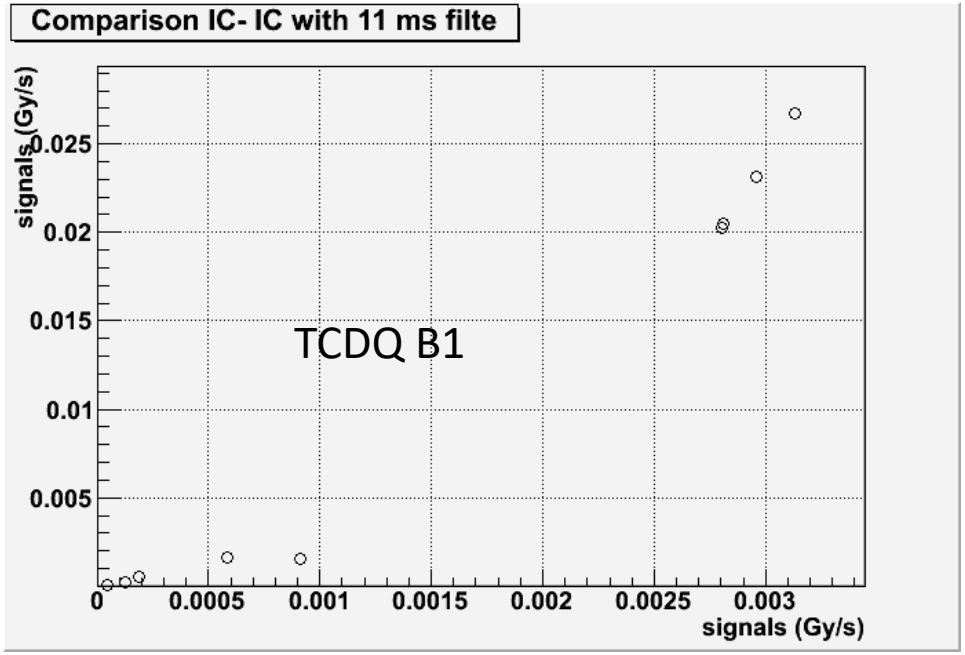
- The new installation needs to be tested with the help of the beam dump (kicker) experts:
  - Connect battery instead of SEM and dump
  - Rearms system by LBDS experts (2 times per beam)

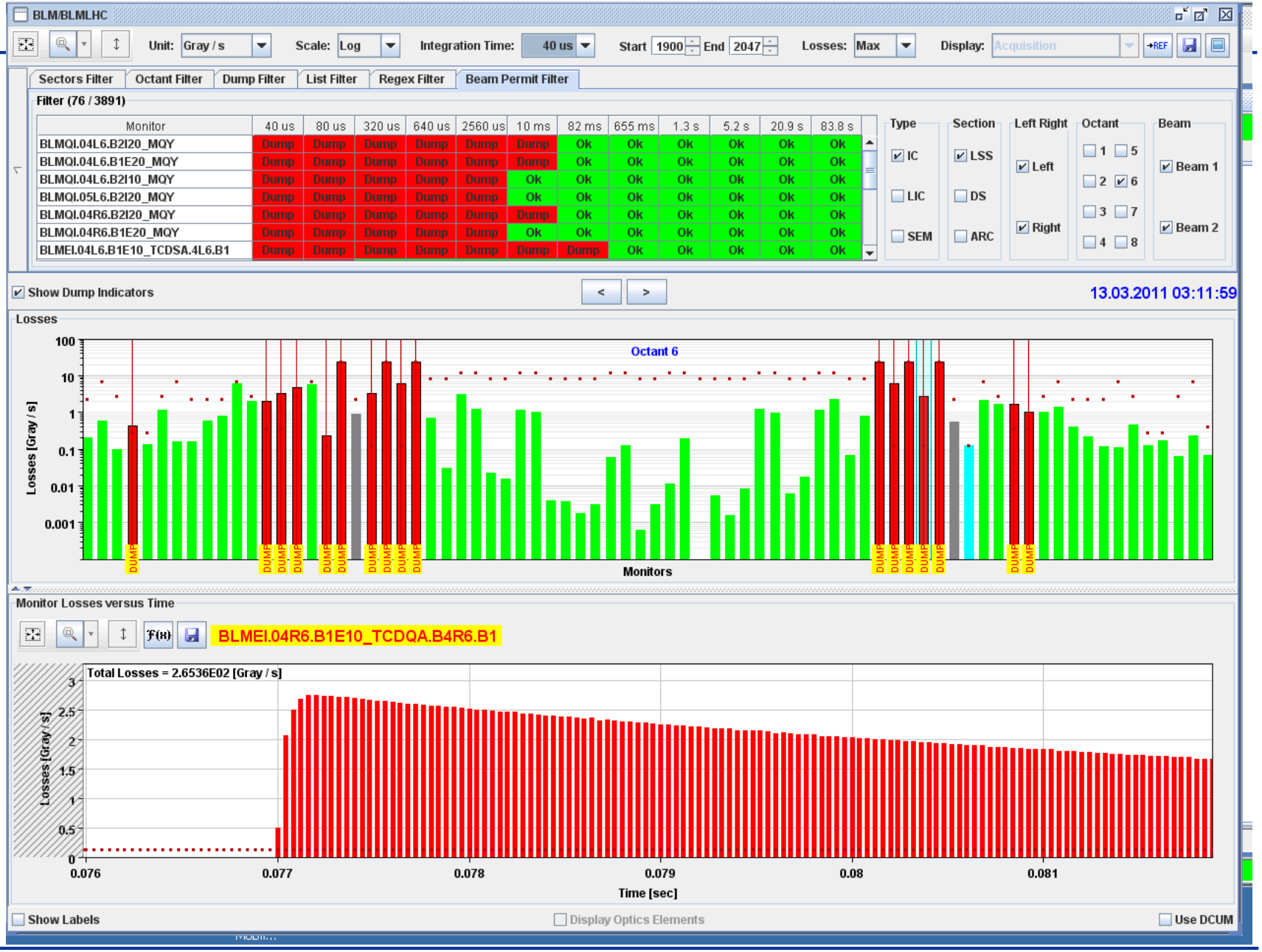
Tests of DD Monitors (LHC-OP-MPS-0009, EDMS 896394)

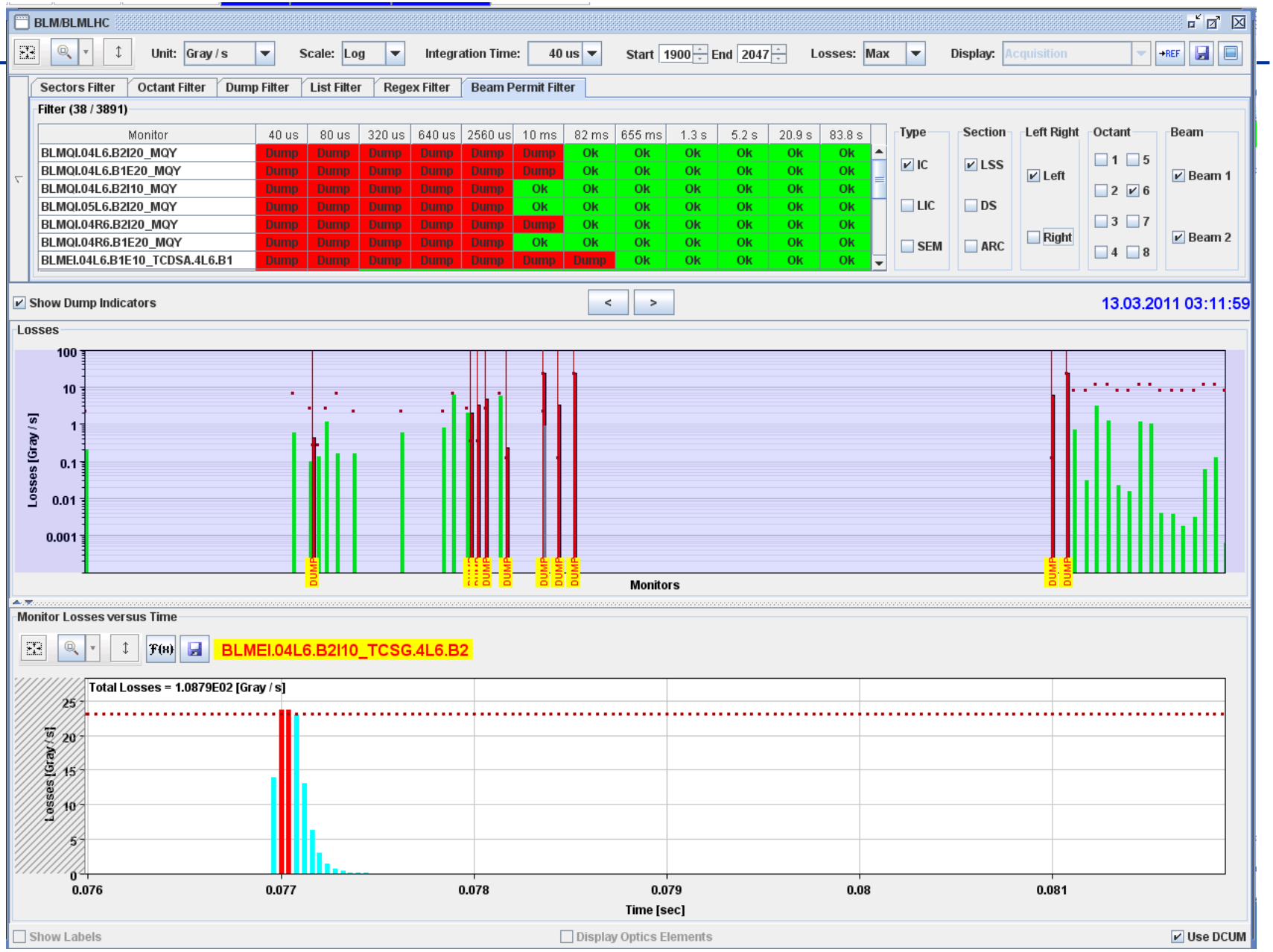
- Test interface of direct BLMs with the BDS by provoking small losses.
  - Beam energy: 450 GeV.
  - Intensity: 1E-11 – 2E-12 Gy/proton on TCDQ (Chiara Bracco MPP review)
- Reduce the voltage setting of the abort threshold.
- Inject beam on the collimator TCDQ and TCSG (local bump) to cause beam abort.
- From the amount of lost beam and the BLM reading, deduce the nominal threshold setting.
- Are there variations with respect to the impact conditions?
- Measure delay between the time where the loss signal exceeds the threshold and the time of the beam dump (time stamps in logging DB).
- Time estimate: 2h + 2 accesses

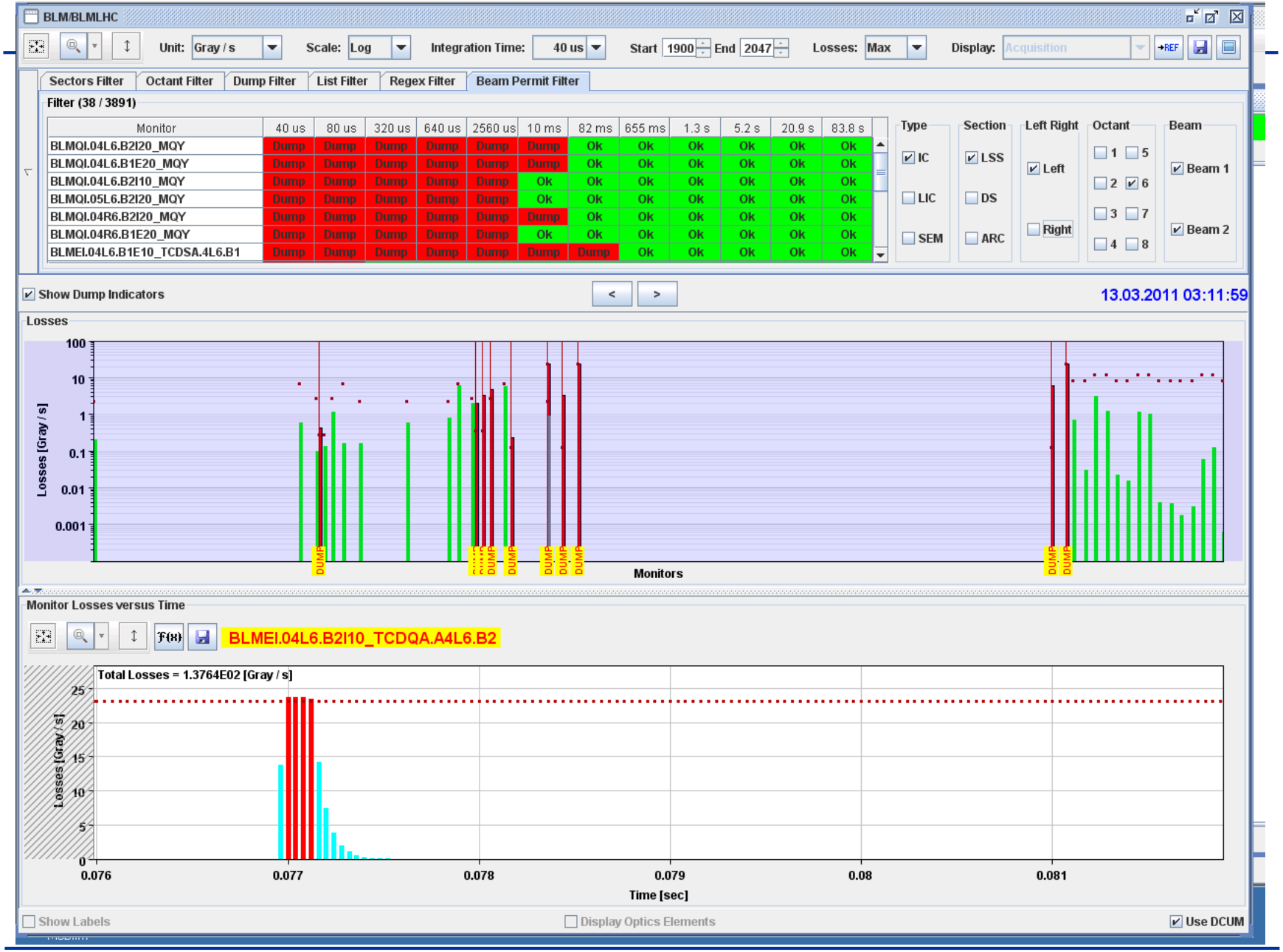
ADDITIONAL SLIDES

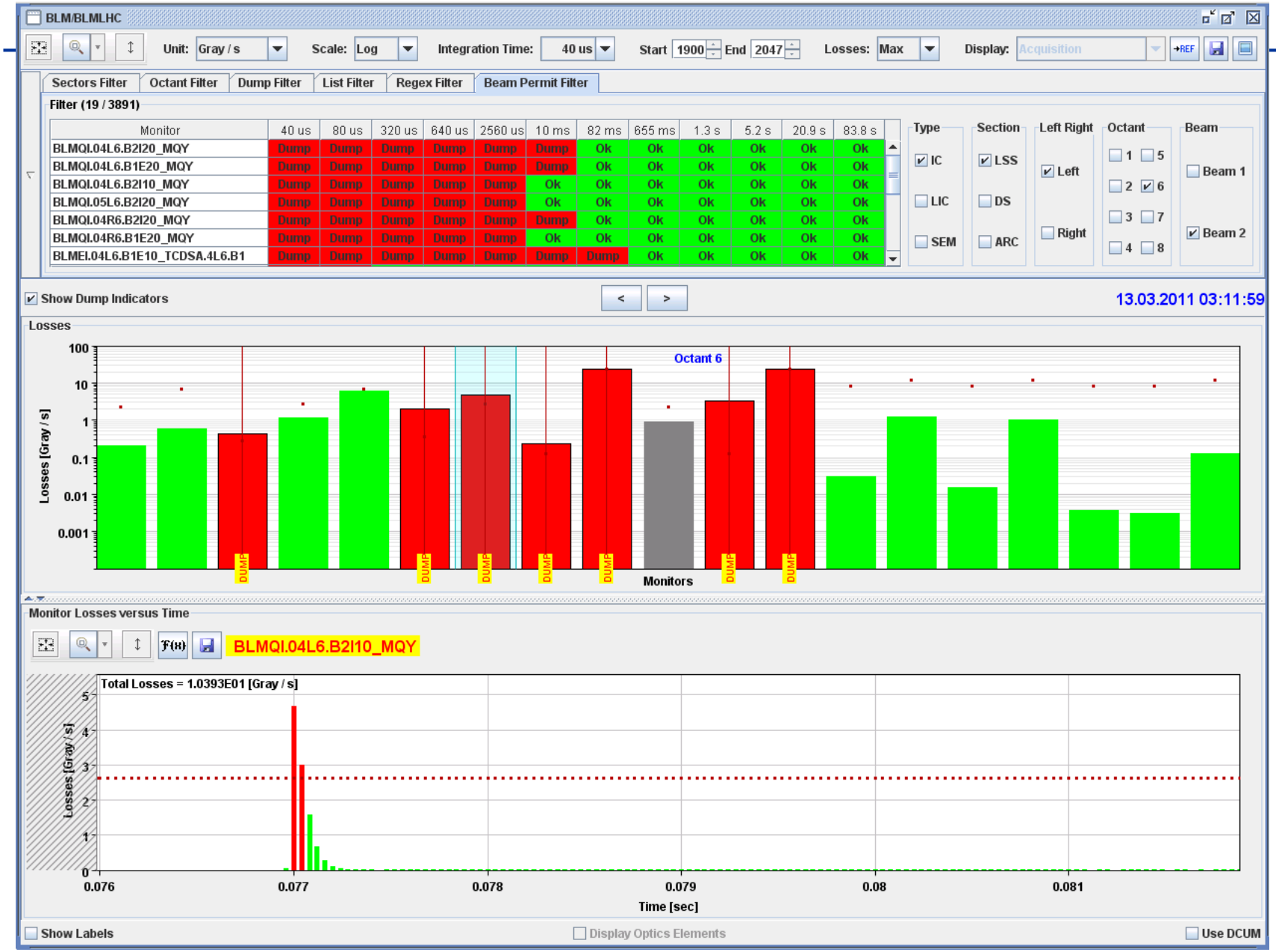

Comparison IC- IC with 11 ms filte
signals (Gy/s)
0.05
0.04
0.03
0.02
0.01
0
TCSG B1
0
0.001
0.002
0.003
0.004
0.005
0.006
signals (Gy/s)

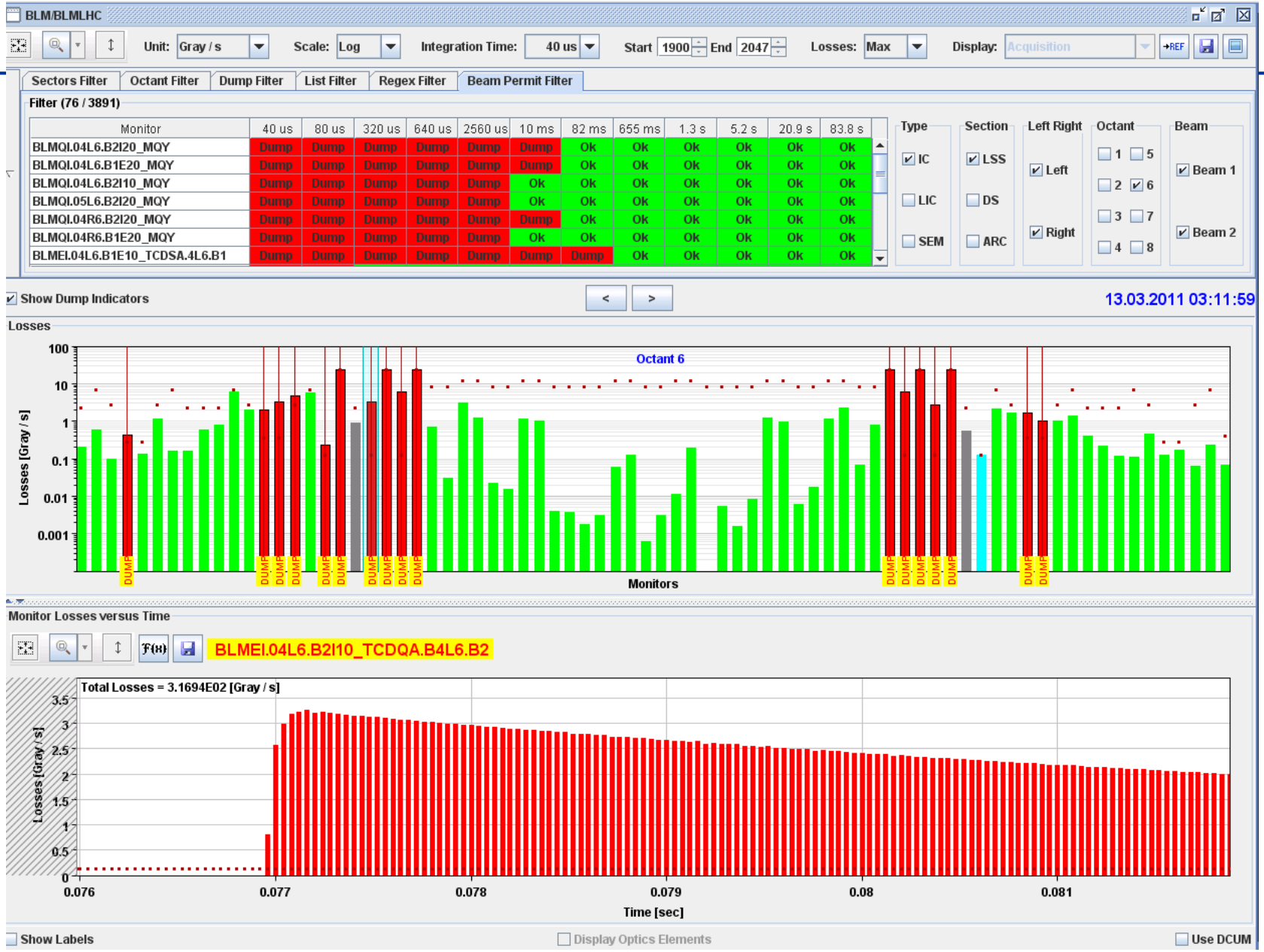

Comparison IC- IC with 11 ms filte
signals (Gy/s)
0.025
0.02
0.015
0.01
0.005
TCDQ B1
0
0.0005
0.001
0.0015
0.002
0.0025
0.003
signals (Gy/s)


BLM/BLMLHC
Unit: Gray / s
Scale: Log
Integration Time: 40 us
Start 1900 End 2047
Losses: Max
Display: Acquisition
Sectors Filter
Octant Filter
Dump Filter
List Filter
Regex Filter
Beam Permit Filter
Filter (76 / 3891)
Monitor
40 us
80 us
320 us
640 us
2560 us
10 ms
82 ms
655 ms
1.3 s
5.2 s
20.9 s
83.8 s
BLMQI.04L6.B2I20_MQY
BLMQI.04L6.B1E20_MQY
BLMQI.04L6.B2I10_MQY
BLMQI.05L6.B2I20_MQY
BLMQI.04R6.B2I20_MQY
BLMQI.04R6.B1E20_MQY
BLMEI.04L6.B1E10_TCDSA.4L6.B1
Type
IC
LIC
SEM
Section
LSS
DS
ARC
Left Right
Left
Right
Octant
1 5
2 6
3 7
4 8
Beam
Beam 1
Beam 2
Show Dump Indicators
13.03.2011 03:11:59
Losses
Octant 6
Losses [Gray / s]
Monitors
Monitor Losses versus Time
BLMEI.04R6.B1E10_TCDQA.B4R6.B1
Total Losses = 2.6536E02 [Gray / s]
Losses [Gray / s]
Time [sec]
Show Labels
Display Optics Elements
Use DCUM


BLM/BLMLHC
Unit: Gray / s
Scale: Log
Integration Time: 40 us
Start 1900 End 2047
Losses: Max
Display: Acquisition
Sectors Filter
Octant Filter
Dump Filter
List Filter
Regex Filter
Beam Permit Filter
Filter (38 / 3891)
Monitor
40 us
80 us
320 us
640 us
2560 us
10 ms
82 ms
655 ms
1.3 s
5.2 s
20.9 s
83.8 s
BLMQI.04L6.B2I20_MQY
BLMQI.04L6.B1E20_MQY
BLMQI.04L6.B2I10_MQY
BLMQI.05L6.B2I20_MQY
BLMQI.04R6.B2I20_MQY
BLMQI.04R6.B1E20_MQY
BLMEI.04L6.B1E10_TCDSA.4L6.B1
Type
IC
LIC
SEM
Section
LSS
DS
ARC
Left Right
Left
Right
Octant
Beam
Beam 1
Beam 2
Show Dump Indicators
13.03.2011 03:11:59
Losses
Losses [Gray / s]
Monitors
DUMP
Monitor Losses versus Time
BLMEI.04L6.B2I10_TCSG.4L6.B2
Total Losses = 1.0879E02 [Gray / s]
Losses [Gray / s]
Time [sec]
Show Labels
Display Optics Elements
Use DCUM


BLM/BLMLHC
Unit: Gray / s
Scale: Log
Integration Time: 40 us
Start 1900 End 2047
Losses: Max
Display: Acquisition
Sectors Filter
Octant Filter
Dump Filter
List Filter
Regex Filter
Beam Permit Filter
Filter (38 / 3891)
Monitor
40 us
80 us
320 us
640 us
2560 us
10 ms
82 ms
655 ms
1.3 s
5.2 s
20.9 s
83.8 s
BLMQI.04L6.B2I20_MQY
BLMQI.04L6.B1E20_MQY
BLMQI.04L6.B2I10_MQY
BLMQI.05L6.B2I20_MQY
BLMQI.04R6.B2I20_MQY
BLMQI.04R6.B1E20_MQY
BLMEI.04L6.B1E10_TCDSA.4L6.B1
Type
IC
LIC
SEM
Section
LSS
DS
ARC
Left Right
Left
Right
Octant
Beam
Beam 1
Beam 2
Show Dump Indicators
13.03.2011 03:11:59
Losses
Losses [Gray / s]
Monitors
Monitor Losses versus Time
BLMEI.04L6.B2I10_TCDQA.A4L6.B2
Total Losses = 1.3764E02 [Gray / s]
Losses [Gray / s]
Time [sec]
Show Labels
Display Optics Elements
Use DCUM


BLM/BLMLHC
Unit: Gray / s
Scale: Log
Integration Time: 40 us
Start 1900 End 2047
Losses: Max
Display: Acquisition
Sectors Filter
Octant Filter
Dump Filter
List Filter
Regex Filter
Beam Permit Filter
Filter (19 / 3891)
Monitor
40 us
80 us
320 us
640 us
2560 us
10 ms
82 ms
655 ms
1.3 s
5.2 s
20.9 s
83.8 s
BLMQI.04L6.B2I20_MQY
BLMQI.04L6.B1E20_MQY
BLMQI.04L6.B2I10_MQY
BLMQI.05L6.B2I20_MQY
BLMQI.04R6.B2I20_MQY
BLMQI.04R6.B1E20_MQY
BLMEI.04L6.B1E10_TCDSA.4L6.B1
Type
IC
LIC
SEM
Section
LSS
DS
ARC
Left Right
Left
Right
Octant
Beam
Beam 1
Beam 2
Show Dump Indicators
13.03.2011 03:11:59
Losses
Octant 6
Losses [Gray / s]
Monitors
DUMP
Monitor Losses versus Time
BLMQI.04L6.B2I10_MQY
Total Losses = 1.0393E01 [Gray / s]
Losses [Gray / s]
Time [sec]
Show Labels
Display Optics Elements
Use DCUM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Scale: Log
Integration Time: 40 us
Start 1900 End 2047
Losses: Max
Display: Acquisition
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Octant Filter
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83.8 s
BLMQI.04L6.B2I20_MQY
BLMQI.04L6.B1E20_MQY
BLMQI.04L6.B2I10_MQY
BLMQI.05L6.B2I20_MQY
BLMQI.04R6.B2I20_MQY
BLMQI.04R6.B1E20_MQY
BLMEI.04L6.B1E10_TCDSA.4L6.B1
Type
IC
LIC
SEM
Section
LSS
DS
ARC
Left Right
Left
Right
Octant
Beam
Beam 1
Beam 2
Show Dump Indicators
13.03.2011 03:11:59
Losses
Octant 6
Losses [Gray / s]
Monitors
Monitor Losses versus Time
BLMEI.04L6.B2I10_TCDQA.B4L6.B2
Total Losses = 3.1694E02 [Gray / s]
Losses [Gray / s]
Time [sec]
Show Labels
Display Optics Elements
Use DCUM