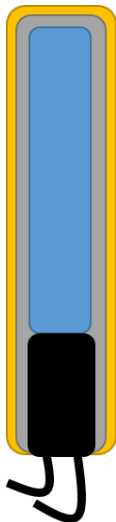




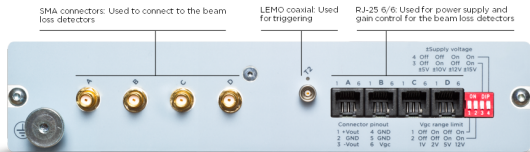
## BLDs system status at ESRF

Laura Torino

DEELS 2018, 18/04/2018



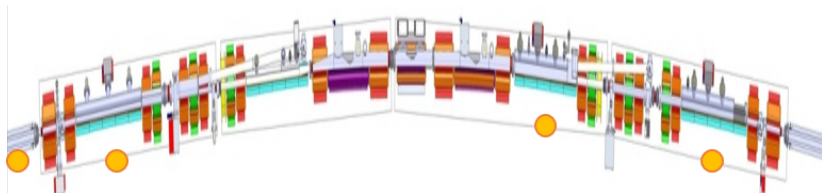
- 128 BLDs PMT+Scintillator+Lead shielding
- Power/Readout electronics Libera-BLM
- 4 BLDs per BLM (32)
- Independent gain and attenuation settings
- Relative calibrated losses
- "Slow" /"fast" losses
- Standard/Injection operation



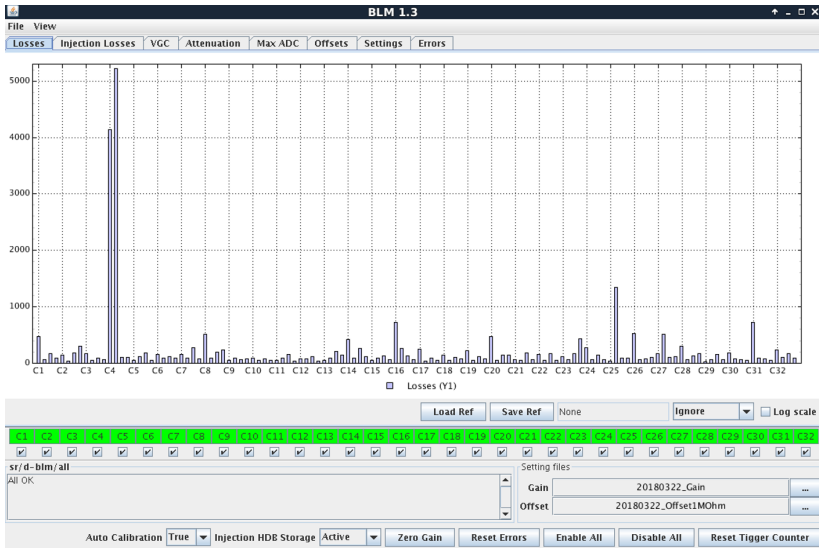
# BLDs Position



# BLDs Position



# General Settings – Standard operation



# ADC-Offset

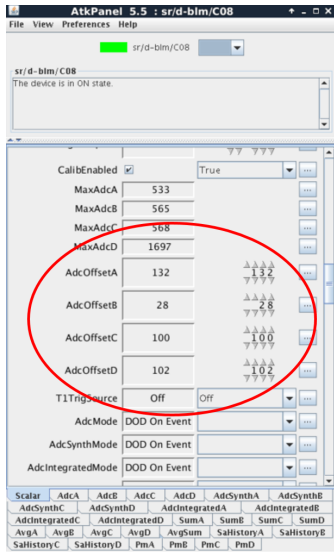
The screenshot shows the AtkPanel 5.5 interface for the device sr/d-bim/C08. The status bar indicates "The device is in ON state." The main control panel includes a "CalibEnabled" checkbox (checked) and a "True" dropdown. Below this, there are four rows of ADC offset settings, each with a value and a status indicator (four triangles pointing up and down):

Parameter	Value	Status
MaxAdcA	533	
MaxAdcB	565	
MaxAdcC	568	
MaxAdcD	1697	
AdcOffsetA	132	▲▲▲▲ 132 ▼▼▼▼
AdcOffsetB	28	▲▲▲▲ 28 ▼▼▼▼
AdcOffsetC	100	▲▲▲▲ 100 ▼▼▼▼
AdcOffsetD	102	▲▲▲▲ 102 ▼▼▼▼

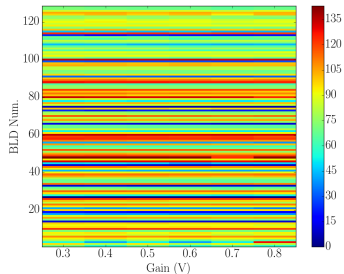
Below the offset settings, there are controls for "T1TrigSource" (Off), "AdcMode" (DOD On Event), "AdcSynthMode" (DOD On Event), and "AdcIntegratedMode" (DOD On Event). At the bottom, there is a grid of data fields including Scalar, AdcA, AdcB, AdcC, AdcD, AdcSynthA, AdcSynthB, AdcSynthC, AdcSynthD, AdcIntegratedA, AdcIntegratedB, AdcIntegratedC, AdcIntegratedD, SumA, SumB, SumC, SumD, AvgA, AvgB, AvgC, AvgD, AvgSum, SaHistoryA, SaHistoryB, SaHistoryC, SaHistoryD, PmA, PmE, PmC, and PmD.

Measure ADC-signal for all the gain, attenuation and termination condition without beam

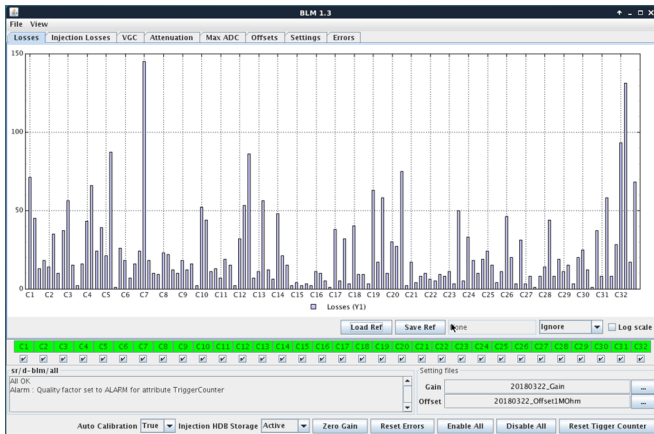
# ADC-Offset



Measure ADC-signal for all the gain, attenuation and termination condition without beam



No beam





# Calibration

AtkPanel 5.5 : sr/d-blm/C08

File View Preferences Help

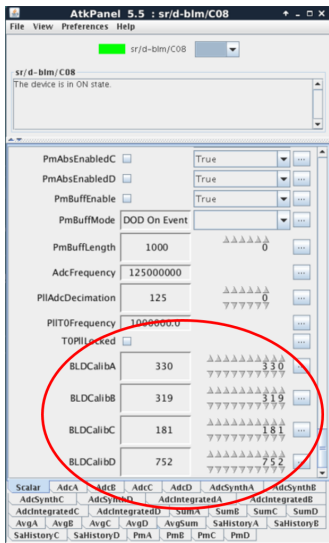
sr/d-blm/C08

sr/d-blm/C08  
The device is in ON state.

SumEnable	<input type="checkbox"/>	False	...
SumLength	100	100	...
SaHistoryEnable	<input type="checkbox"/>	True	...
SaHistoryLength	10	10	...
SaEnable	<input checked="" type="checkbox"/>	True	...
AdcMaskWindow	352	352	...
AdcMaskOffset	0	0	...
BldVgcOutputA	0.500	0.500	...
BldVgcOutputB	0.500	0.500	...
BldVgcOutputC	0.500	0.500	...
BldVgcOutputD	0.600	0.600	...
CalibEnabled	<input checked="" type="checkbox"/>	True	...

Scalar AdcA AdcB AdcC AdcD AdcSynthA AdcSynthB  
AdcSynthC AdcSynthD AdcIntegratedA AdcIntegratedB  
AdcIntegratedC AdcIntegratedD SumA SumB SumC SumD  
AvgA AvgB AvgC AvgD AvgSum SaHistoryA SaHistoryB  
SaHistoryC SaHistoryD PmA PmB PmC PmD

# Calibration



$$SA_C = SA \times G \times C \times A$$

- $SA_C$ : Calibrated Losses
- SA: Losses (Could be SA, TbT, Avg, ADC Synt.)
- G: Coefficient depending on the applied gain
- C: Calibration value (inverse of the sensitivity of the PMT)
- A: Value depending on the BLD Attenuation

# Calibration



# Calibration



In order to avoid saturation gain and saturation are automatically decreased

## Problems:

- ▷ When calibration is on, no raw SA data are available
- ▷ Calibrated SA maximum different for all BLDs

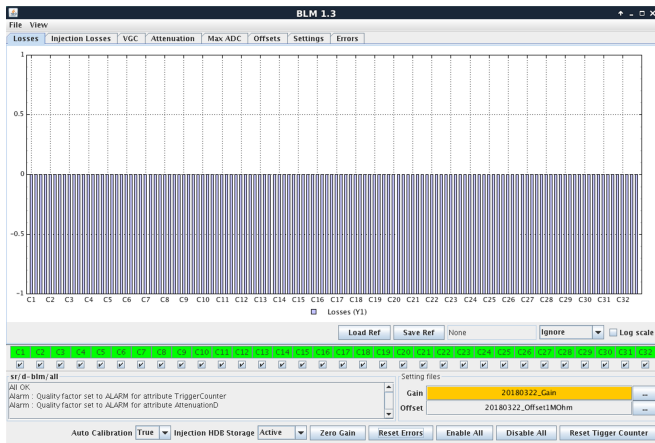
$$SA_{C,M} = SA_M \times G \times C \times A$$



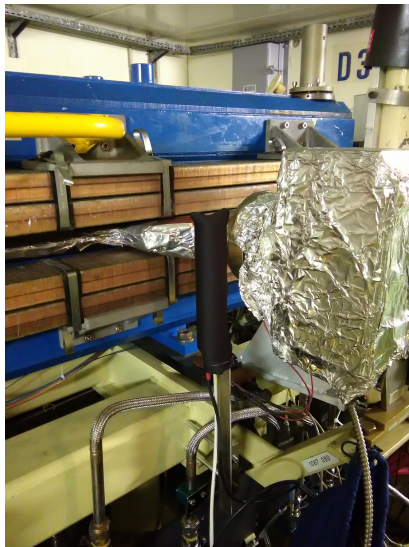
Look-up tables according to gain and attenuation

# Protection from Ambient Light

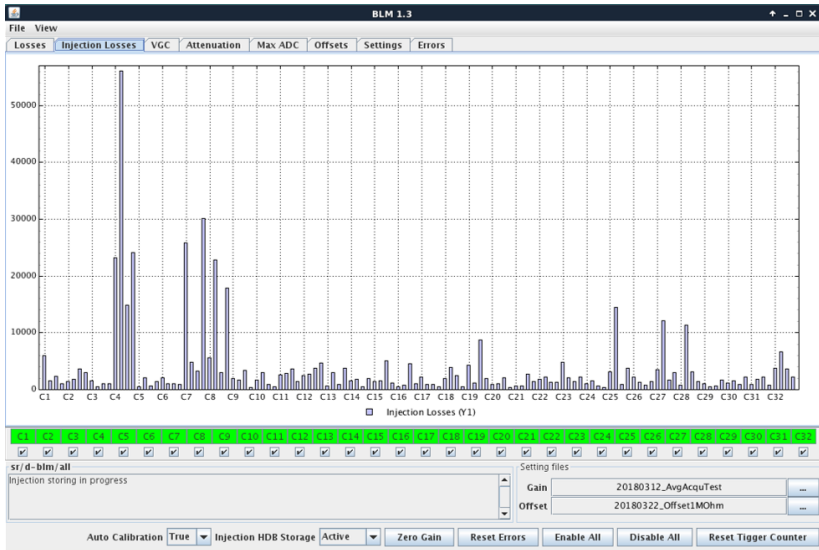
To avoid problem due with ambient light during shutdown  $\Rightarrow$  Zero gain automatically set when current in the storage ring is zero



# Protection from Ambient Light



# Injection Mode





# Injection Settings

- Triggered Mode on
- Termination =  $50\ \Omega$
- Gain and Attenuation chosen not to saturate ADC data
- AVGmode: enabled
- DecimationAvgN = 2
- AVGLength = 10

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Switch to injection mode  
when Linac and septum  
are in ON state

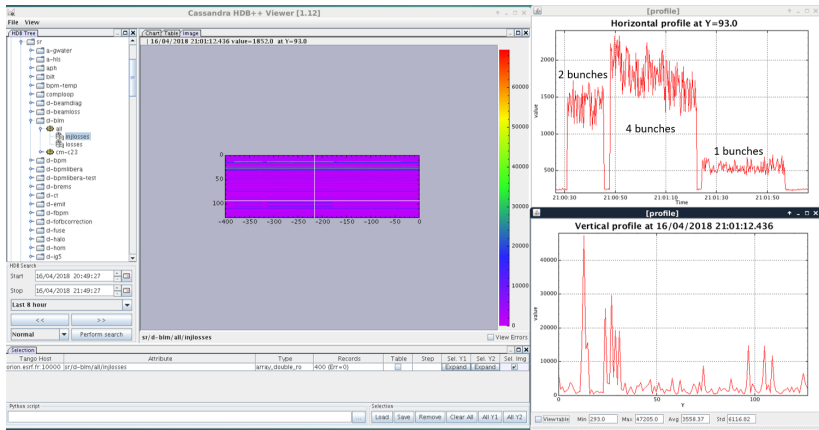
# Injection Settings

- Triggered Mode on
- Termination =  $50\ \Omega$
- Gain and Attenuation chosen not to saturate ADC data
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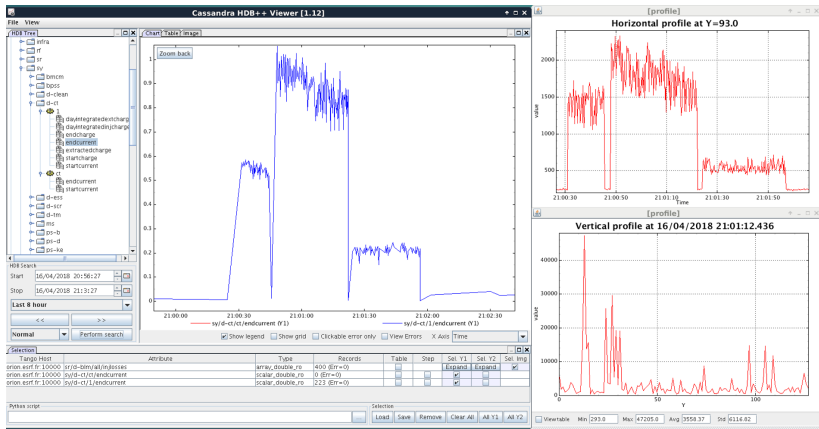
Switch to injection mode  
when Linac and septum  
are in ON state

Losses acquired at 4 Hz  
For each BLD, 1 value per  
shot is saved

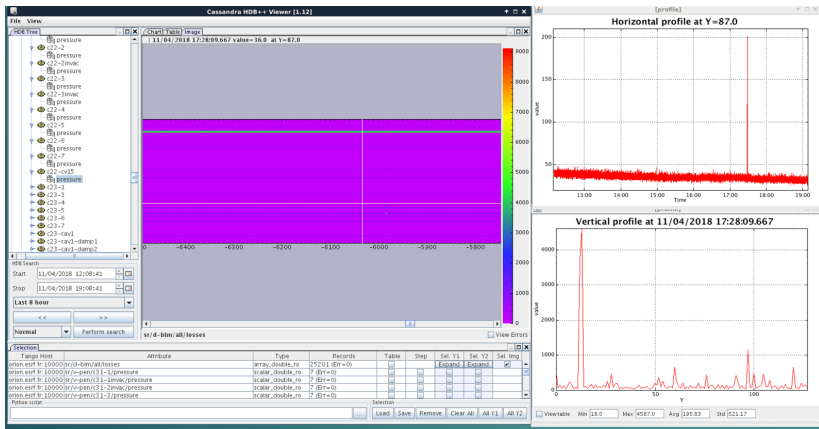
# Archiving – Injection



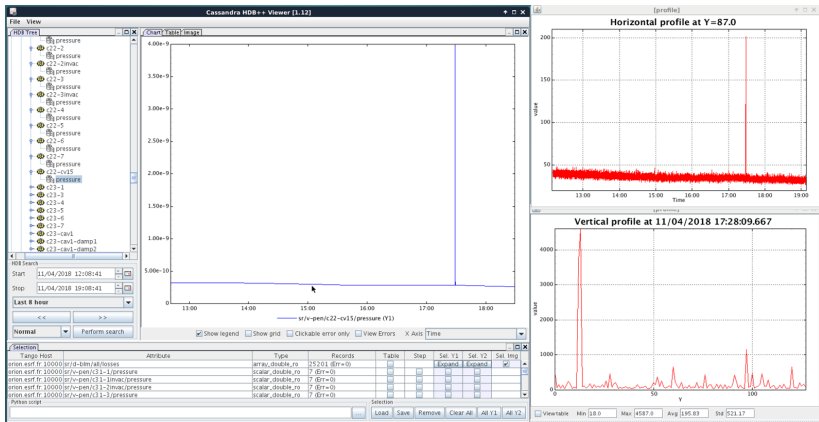
# Archiving – Injection



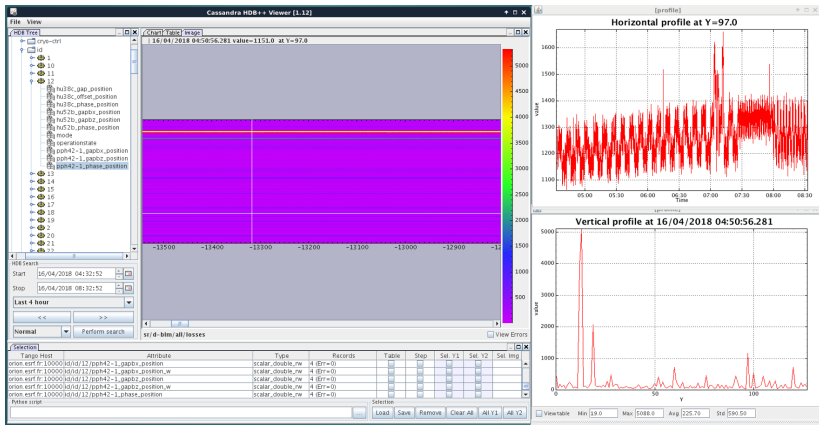
# Archiving – Standard Operation, Pressure Burst



# Archiving – Standard Operation, Pressure Burst

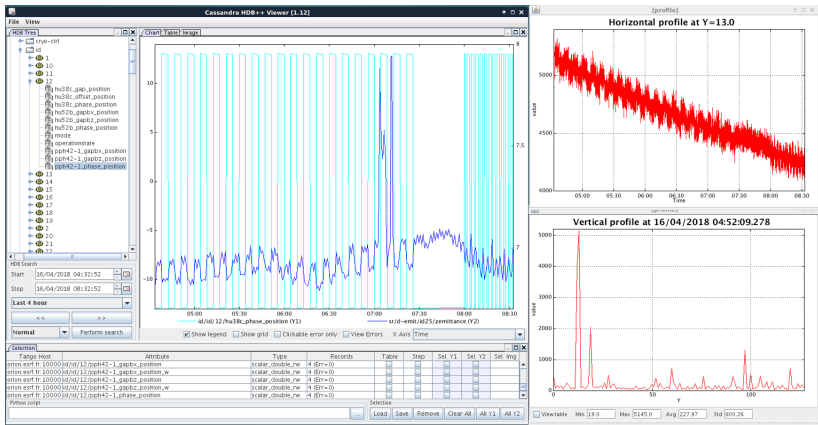


# Archiving – Standard Operation, IDs Scan

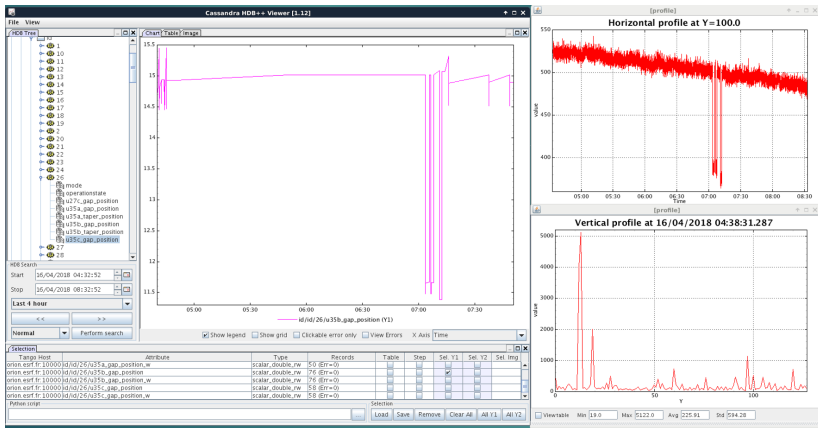




# Archiving – Standard Operation, IDs Scan

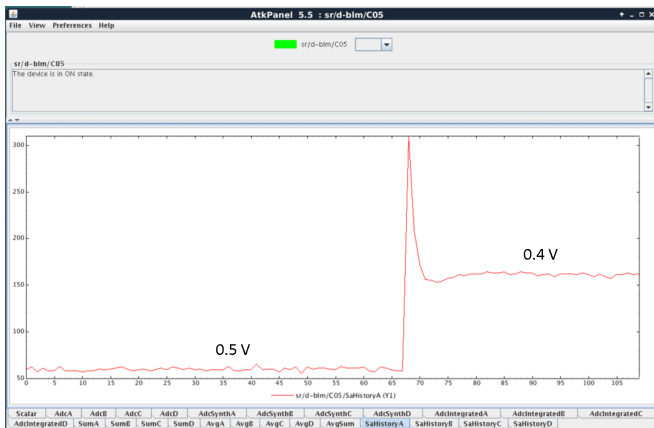


# Archiving – Standard Operation, IDs Scan



# Unsolved...

Problem with low losses and low gain: calibrated data increment drastically and not possible to adjust results with the offset:



- 128 BLDs have been commissioned
- Modifications on Libera BLM server have been performed:
  - To set ADC-Offset
  - To return calibrated data
- An All-Application has been developed
  - Standard operation
  - Injection mode
- Auto-gain routine to avoid saturation
- Data are stored for comparison with EBS

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Many thanks to **JL. Pons**, K. Scheidt, N. Benoist, F. Taoutaou