

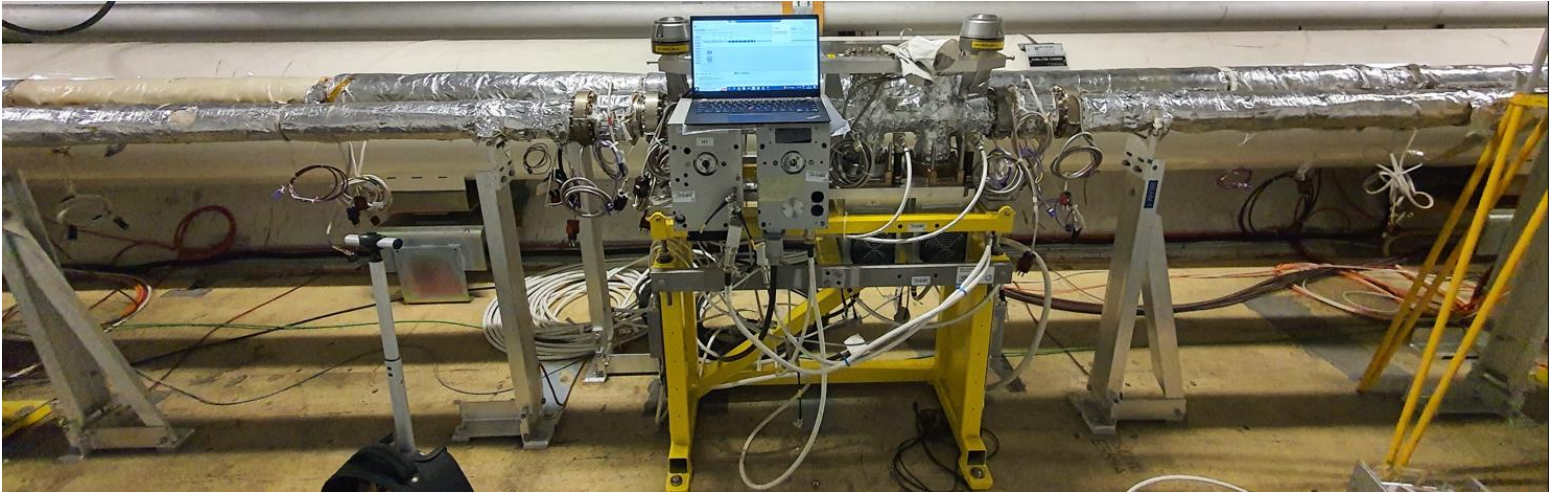


First scans with the hybrid prototype and LIU based electronics on LHC beam 1

LHC Beam Wire Scanner CONS team meeting #8

J. Emery & A. Guerrero
02.05.2023

B1 Pictures



LHC BWS BEAM 1 MOTION PART

5m downstream



30m away

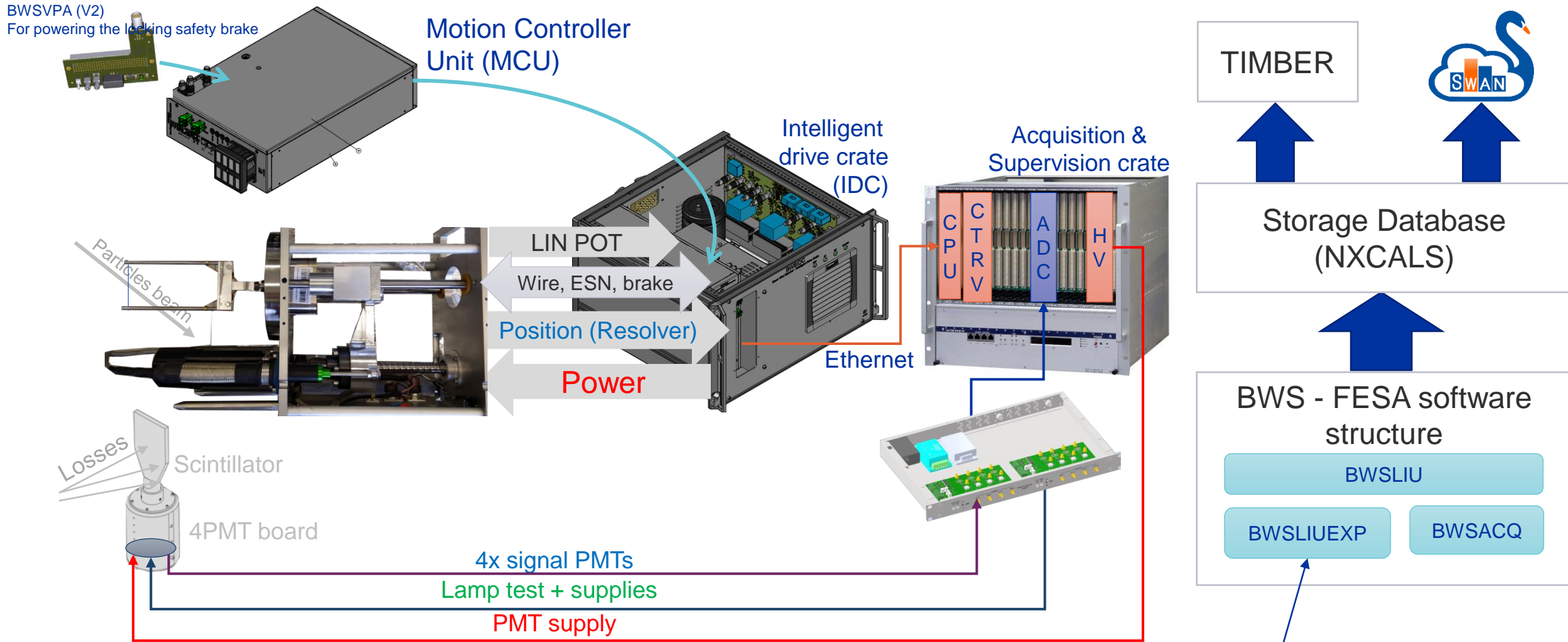


LHC BWS BEAM 1 PMT PART
LIU type (right) OP type (left)



BEAM 1 LIU type crate(UA47)

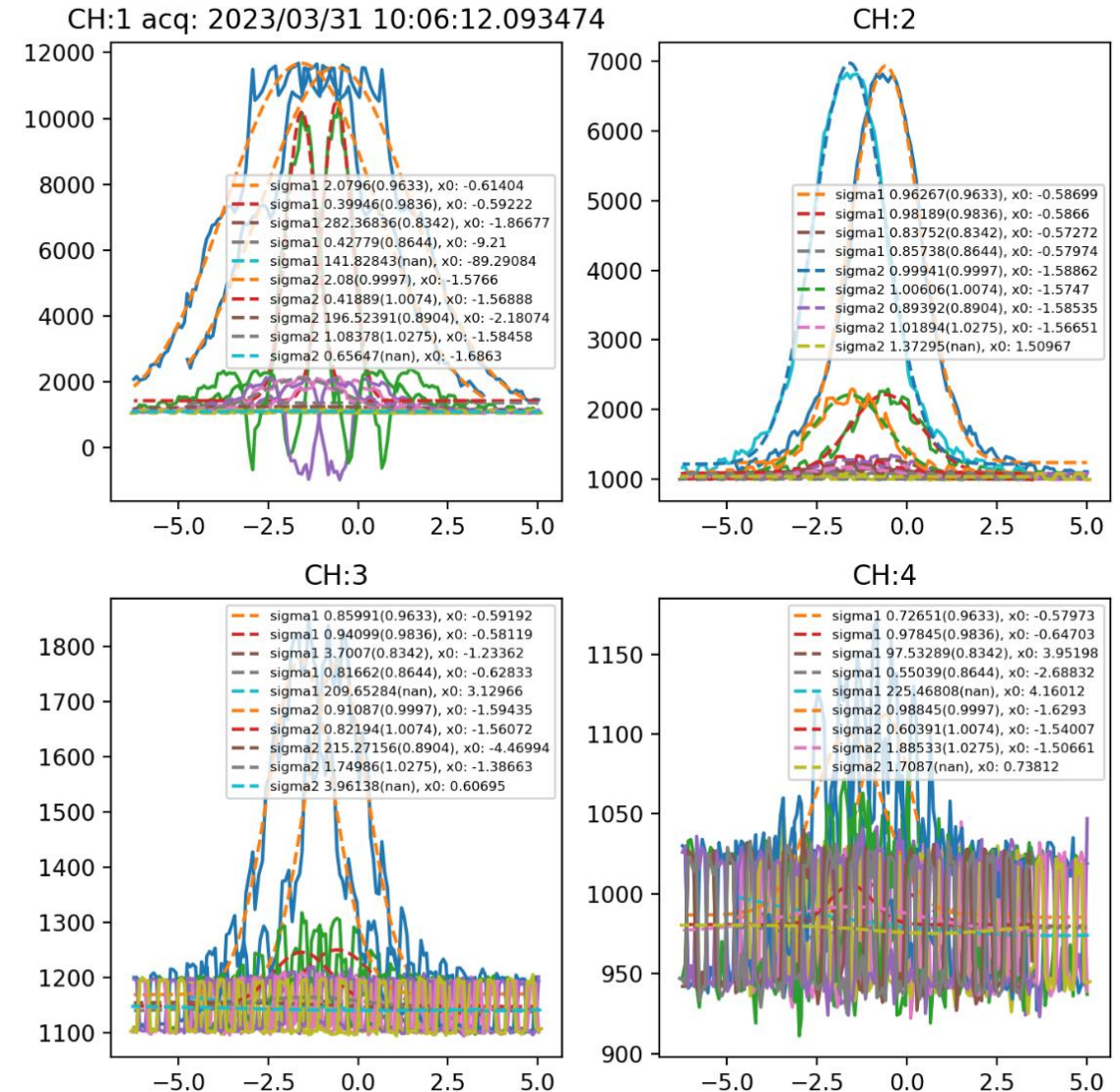
LHC hybrid prototype with LIU electronics



The linear wire-scanner hybrid does not have a linear optical encoder, so the BWSLIUEXP FESA class is now simulating it using the resolver data

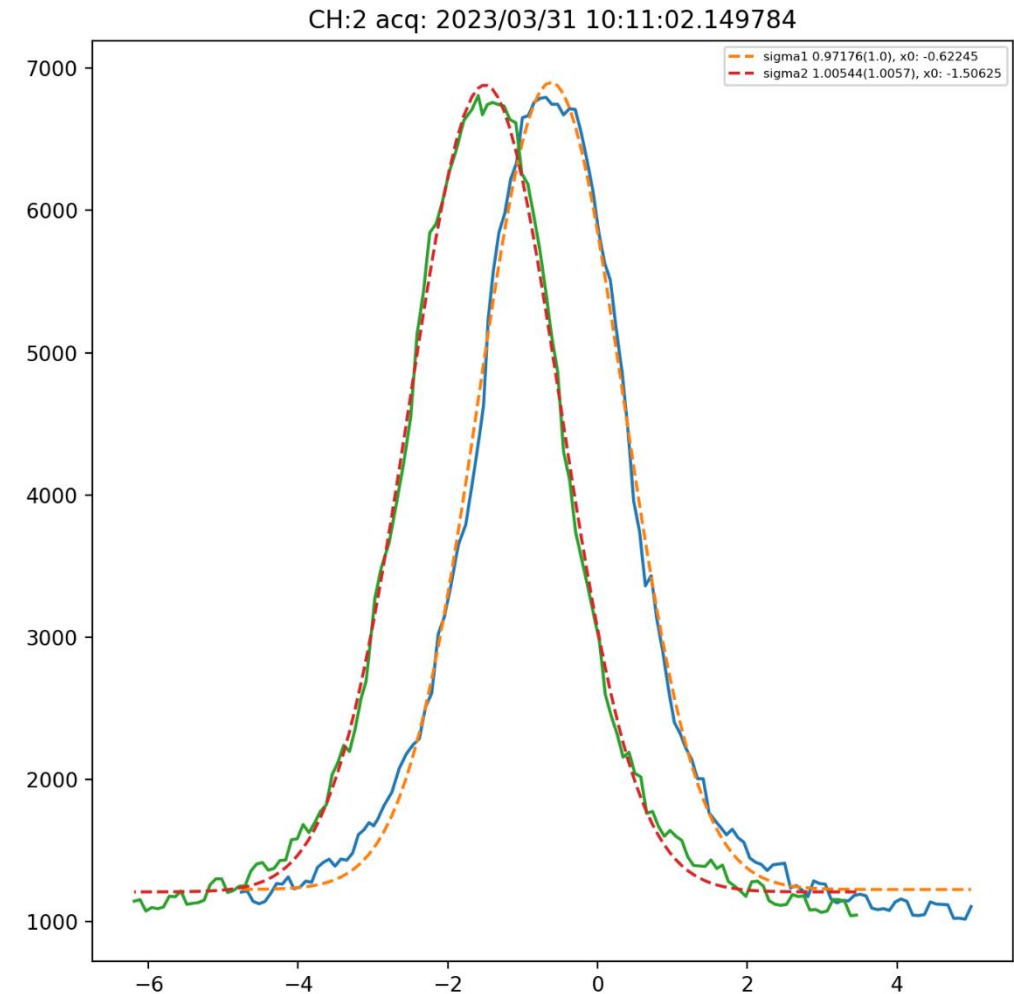
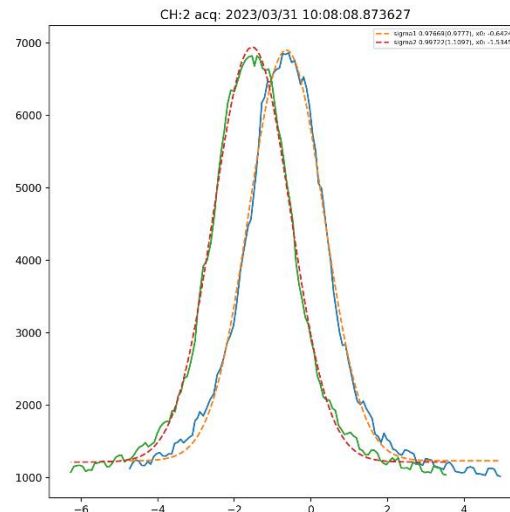
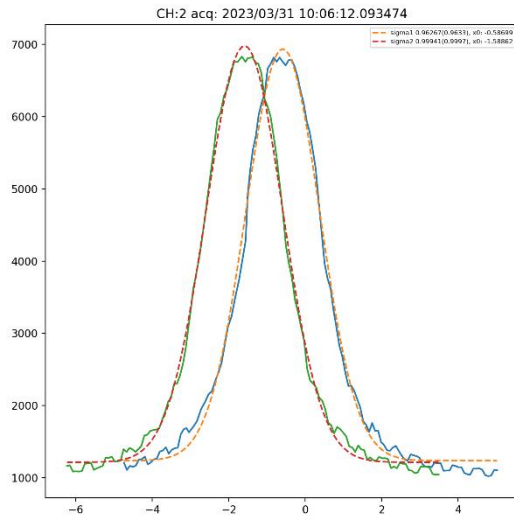
BWS LHC B1 - first scans with the hybrid and LIU based electronics

- Few scans performed with one bunch during commissioning time
- We found the beam quickly by checking the raw PMT data
- After setting up few parameters with beam, we obtained 3 meaningful scans
- Electronics/software worked well and found the optimum channel (CH2)
- With HV=400V CH1 is saturated, CH3 is a little to low and CH4 is the lowest



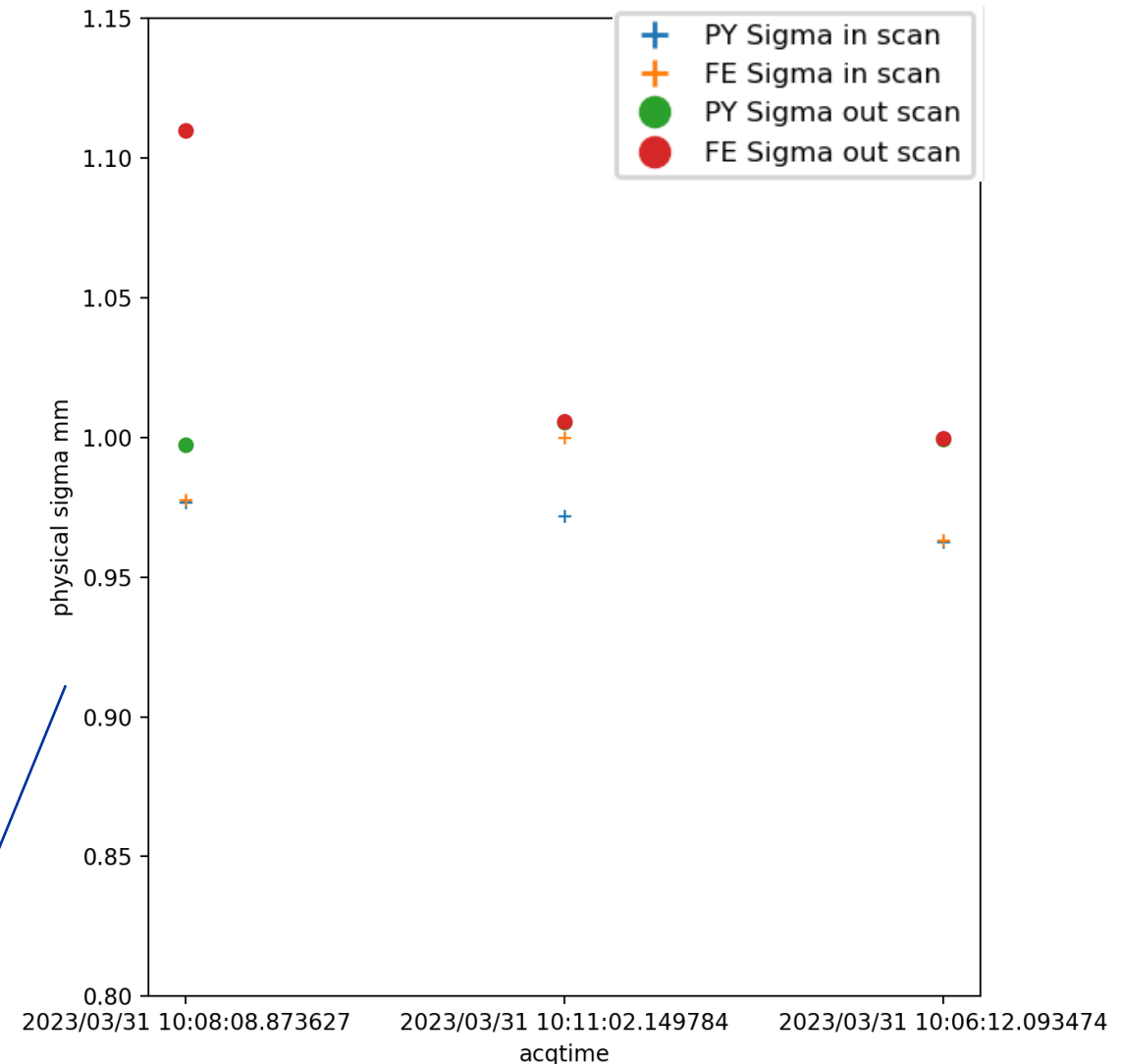
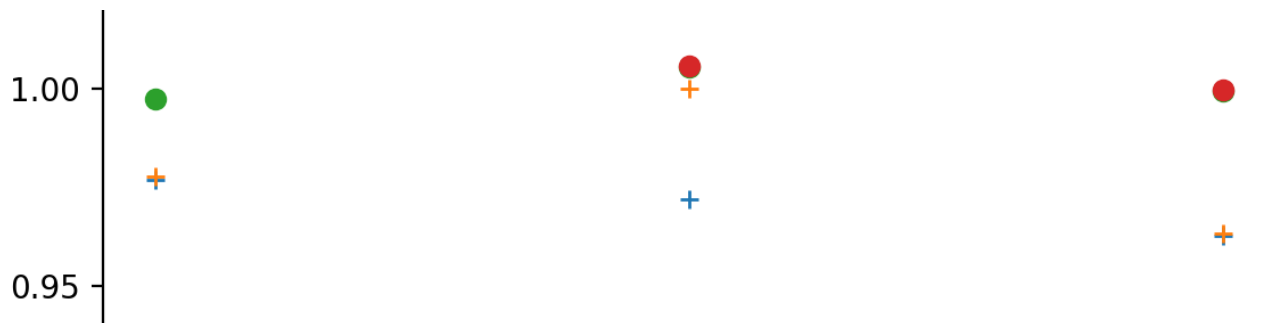
BWS LHC B1 - first scans with the hybrid and LIU based electronics

- Position offset between IN and OUT signal, most probably due to the slack introduced by resolver processing (tbc).
- If found to be the source, this can be fixed by configuration at the FESA software level
- Absolute position already very good considering we only based it on scanner geometry (no laser calibration)

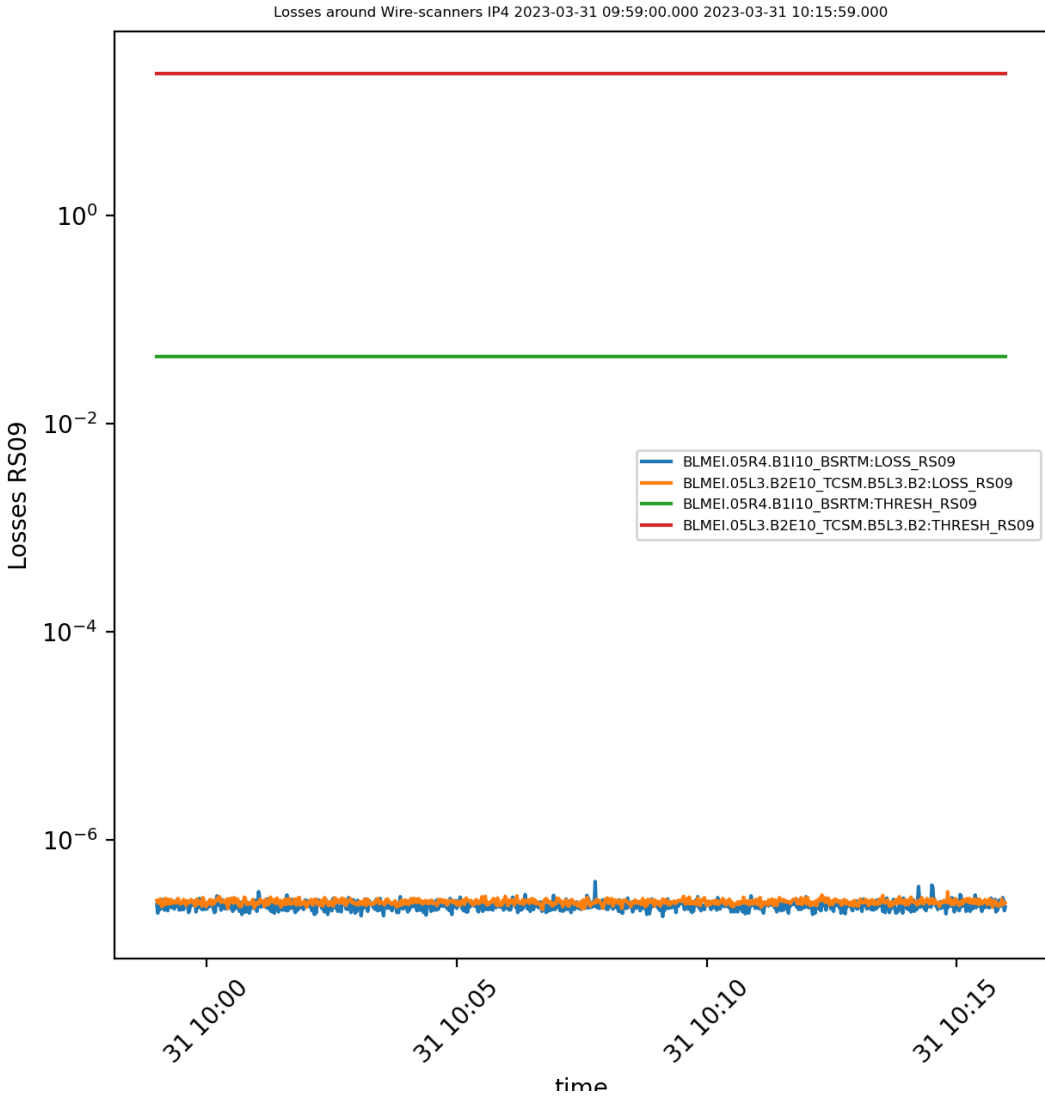
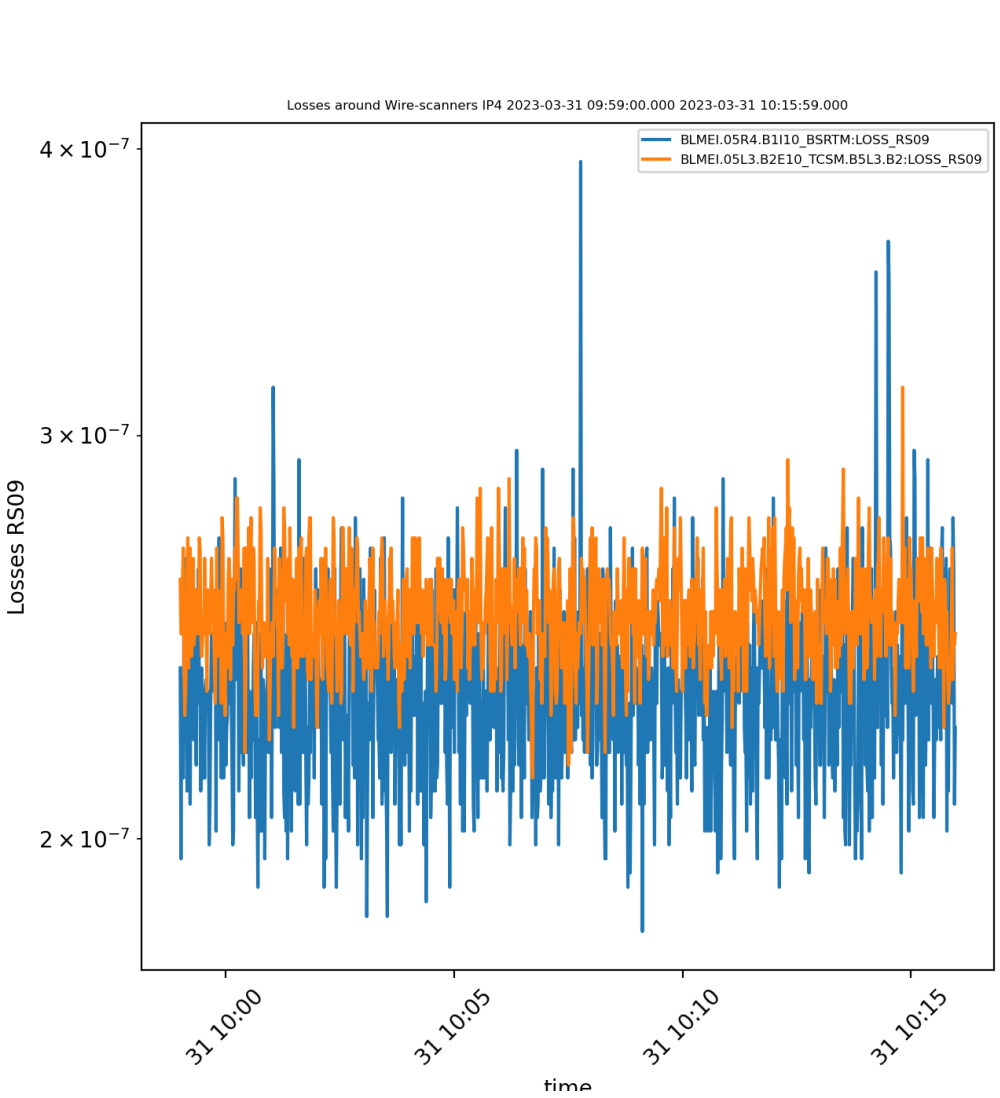


Beam size results summary

- The 3 scans giving very similar beam size
- IN scan always smaller than OUT scan
- Front-End (FE) fit and SWAN python (PY) do not always agree
- 10mm window is probably a bit challenging for the gaussian fit with 5 parameters (baseline).
- to check if it is possible to increase the data range or going faster with the wire...



Beam losses react with a small loss (RS09->1.2s)



Summary

- **Few successful scans were performed on B1.
We have encouraging results with the LIU electronics**
- **B2 will be tested as soon as we have an opportunity**
- **Comparative scans with operational systems planned possibly at the end of the BSRT calibration.
No defined date that I know, it depend on the LHC operation planning.**
- **If not done by the MD bloc 1 (14-18 June), we have requested 2x 4h MD for:**
 - 1) small number of bunch with ramp**
 - 2) large number of bunch at flat bottom to test the PMT system**

<https://indico.cern.ch/event/1278851/>
- **Apart from beam test, we should work in the lab on:**
 - increasing the minimal speed from 0.92 to 1.1 or more
=> PROTO#3 need to be fixed to behave as the ones in the LHC!**
 - Qualify this mechanism with the new laser calibration bench
=> Do we miss any mechanical pieces?
=> Should we start with this one instead of the operational system?**



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