Instrumentation Performance in the PS Complex in 2016/17 & Wishes for the Future
(ISOLDE, AD, PSB, PS, EA)

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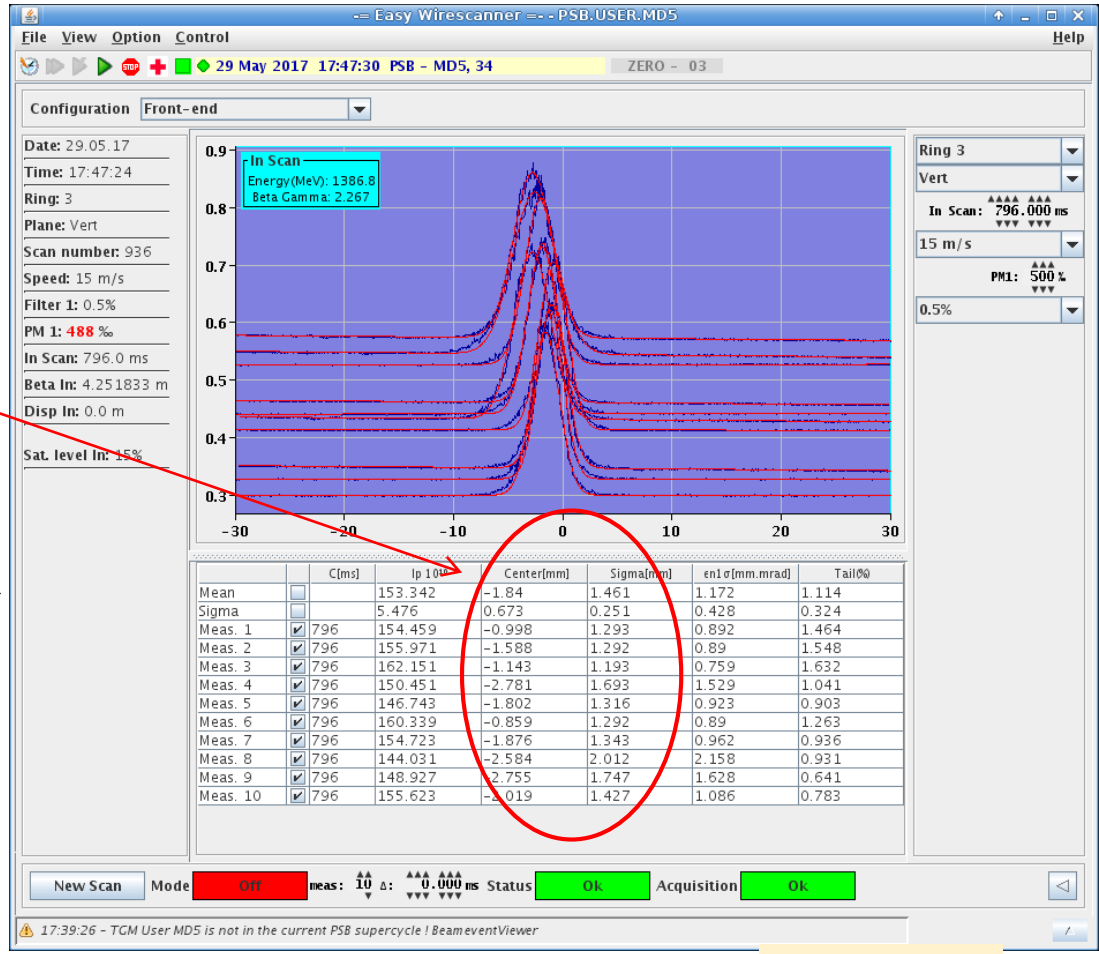
Main changes during EYETS 2016/17

- New turn-by-turn ring PU system (BTMS):
  - Commissioning during 2017 startup
  - Working well now; some issue with reboots (requires specialist) and electronics overheating still to be solved
  - Calibration issue? (tbc by Jeroen)
- Prototype new wire scanner in R3
  - Commissioning started 21/06
- New Flat Ionisation Chambers (FICs)
  - Commissioning still to be done
- New wide-band pickup in PSB-to-PS transfer line
  - Commissioning still to be done

B. Mikulec

PSB Wire Scanners

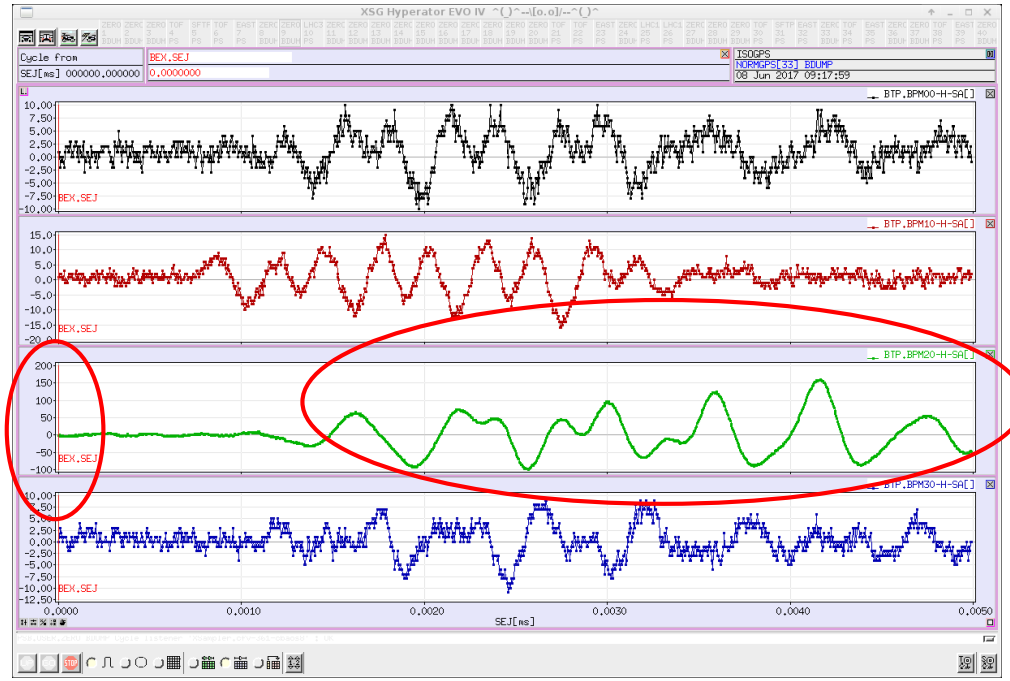
- Already 2 wire scanners exchanged during ITS1 (R1H – 'spikes' and R4V – wire breakage) → are causes understood?
- R3V: ongoing problem of jitter in measured beam position and unreliable beam sigma measurements → investigations ongoing
- Requested a second CTRV for PM cross-talk measurements → OK from BI
- Would help to have soon a FESA class available for the prototype wire scanner to prepare operational application



Other Operational Issues

- BTP.BPM20:
  - Oscillations mainly in hor. plane related to beam passage (even beam not being sent to PS); present since at least March 2016; intervention on amplifier and cables planned during ITS2
- Tune measurement
  - Kick is shifting for rings 1+2; workaround in place, but should be understood

ISOLDE beam to dump (no beam in BTP…)



B. Mikulec

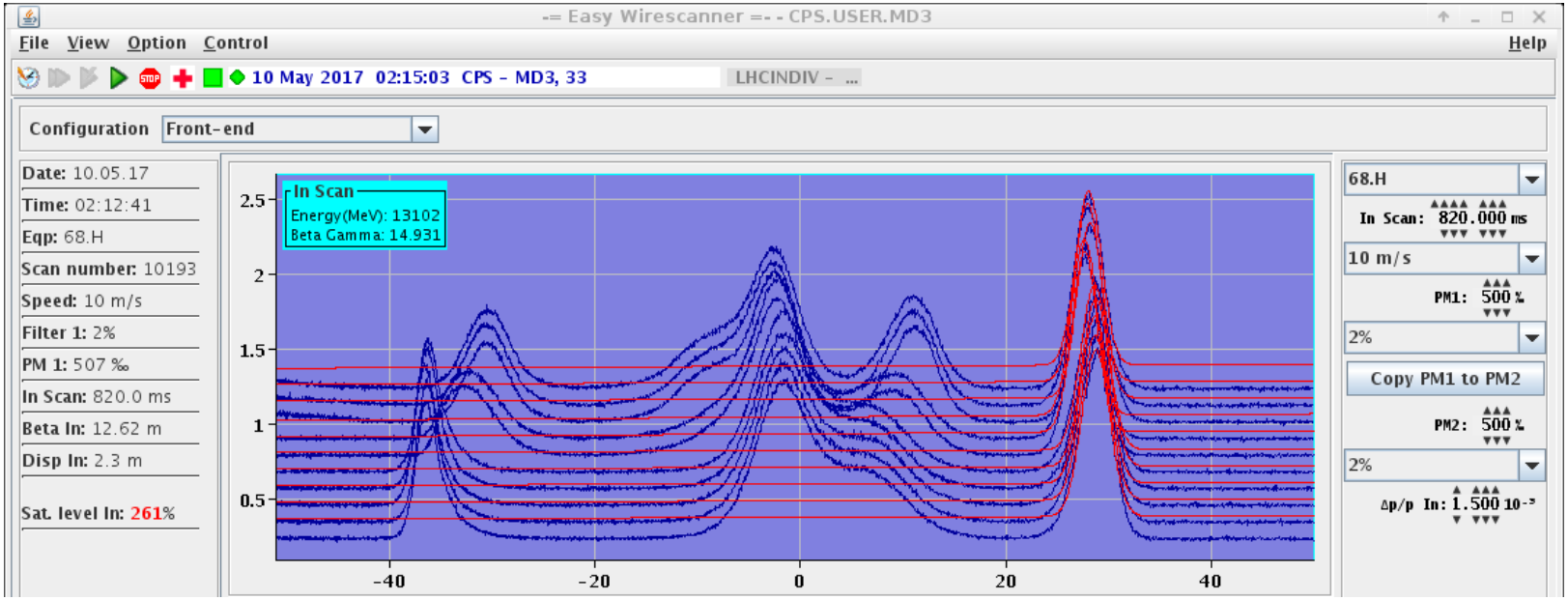
Summary PSB

- Main worry with wire scanners
- BTMS, FICs, prototype new wire scanner and wide-band PU commissioning/optimisation to be finished
- **Good support from BI – thanks a lot!**
- Awaiting installation of new tune PUs and R3 matching monitor during YETS 2017/18
- HST extremely useful for instrument evaluations
  - Check of full functionality of H^0/H^- monitor only outstanding point
  - Non-related BCT issue could be understood and solved
- Make sure through good continued collaboration BI – OP to be in a comfortable situation during restart after LS2

B. Mikulec

Wire Scanners

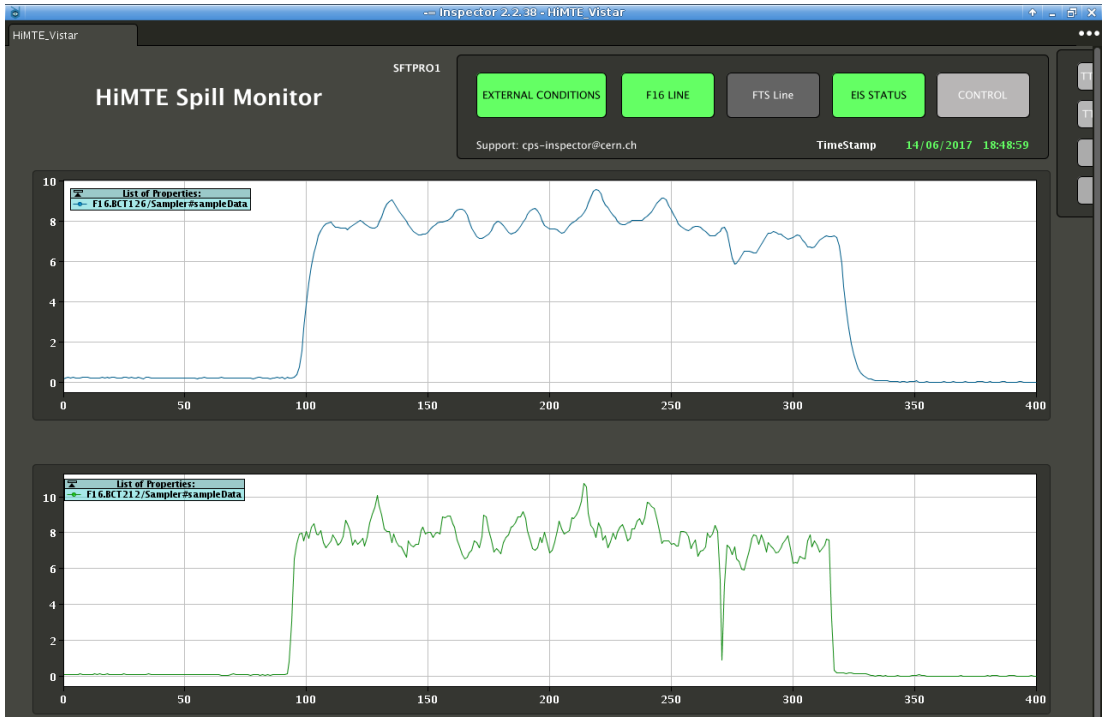
- intense use during 2016/17 for systematic measurement of the LHC beams and to verify the islands of the MTE beam.
- future development of bunch-by-bunch measurement (2018-LS2?)
- OASIS signals for new generation under discussion



D. Cotte

PU in TT2 :

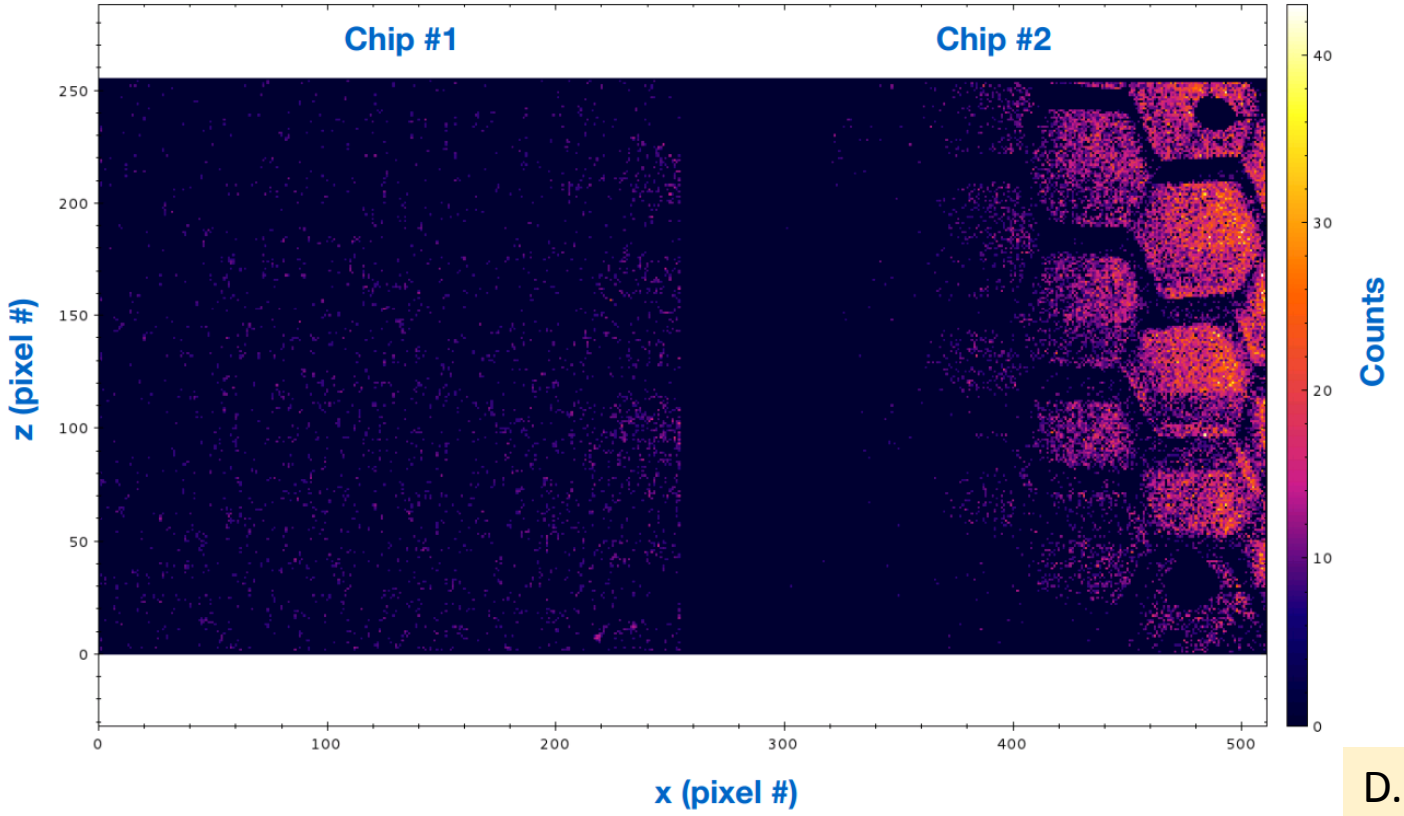
- survey of spill quality of the MTE beam (5 turns-islands-core) using PU 208/228 during 2016/17
- waiting for a signal (sum and frequency) of a PU downstream of the correctors DFA(242, 254) during 2017 run



D. Cotte

BGI82Hz :

- first promising results in 2017; waiting for MD slots in order to better understand the system; in particular cancel the integrated magnetic field seen by the beam



D. Cotte

PS

BLMs:

- good performance in 2016/17; all ACEMs working at PS start-up
- waiting for availability of the 17 diamond detectors to check shadowing between TPS15 and SMH16 for MTE beam (end 2017)
- first tests with 100 LHC-type BLMs in progress 2017

Ring PU:

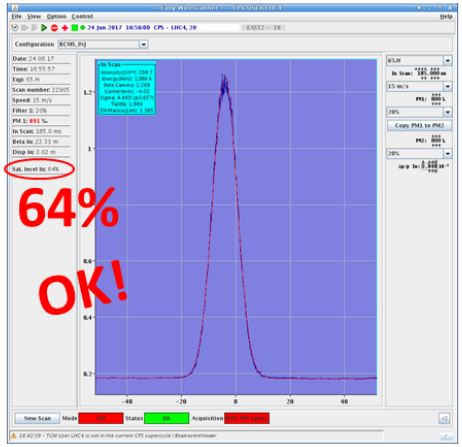
- good performance in 2016/17
- study possibility to have a dedicated tune PU cabled in quadrupolar mode without impacting tune measurement of small beams

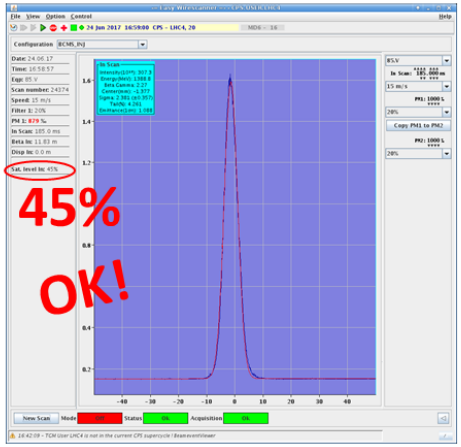
D. Cotte

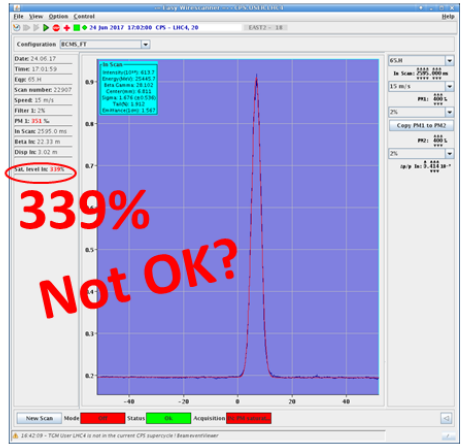
PSB/PS

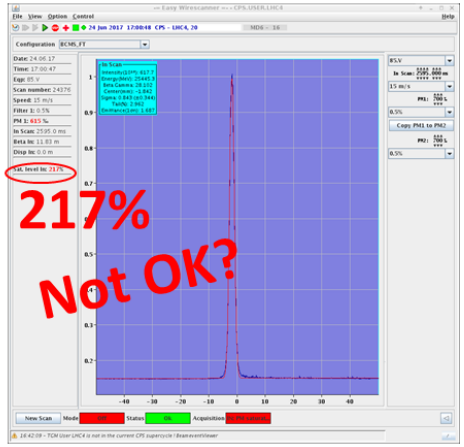
BWS measurements figure of merit needed:

- Not easy to judge if a scan is well done in terms of PM saturation and optical filter choice



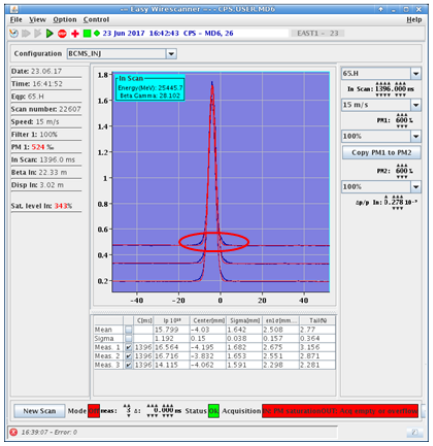


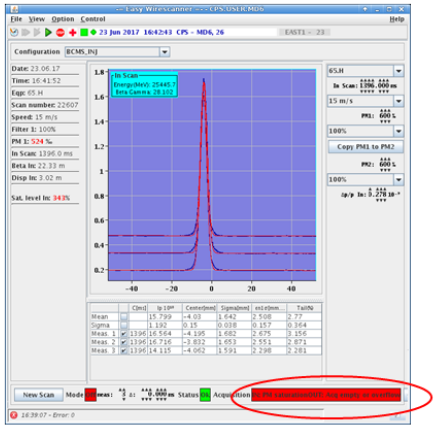


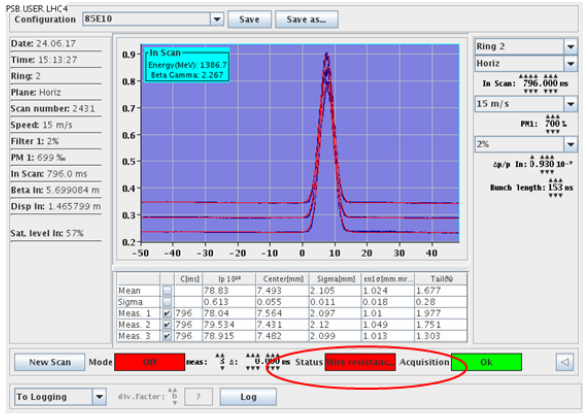


Clear messages in the application :

- Saturation??
- Wire resistance??

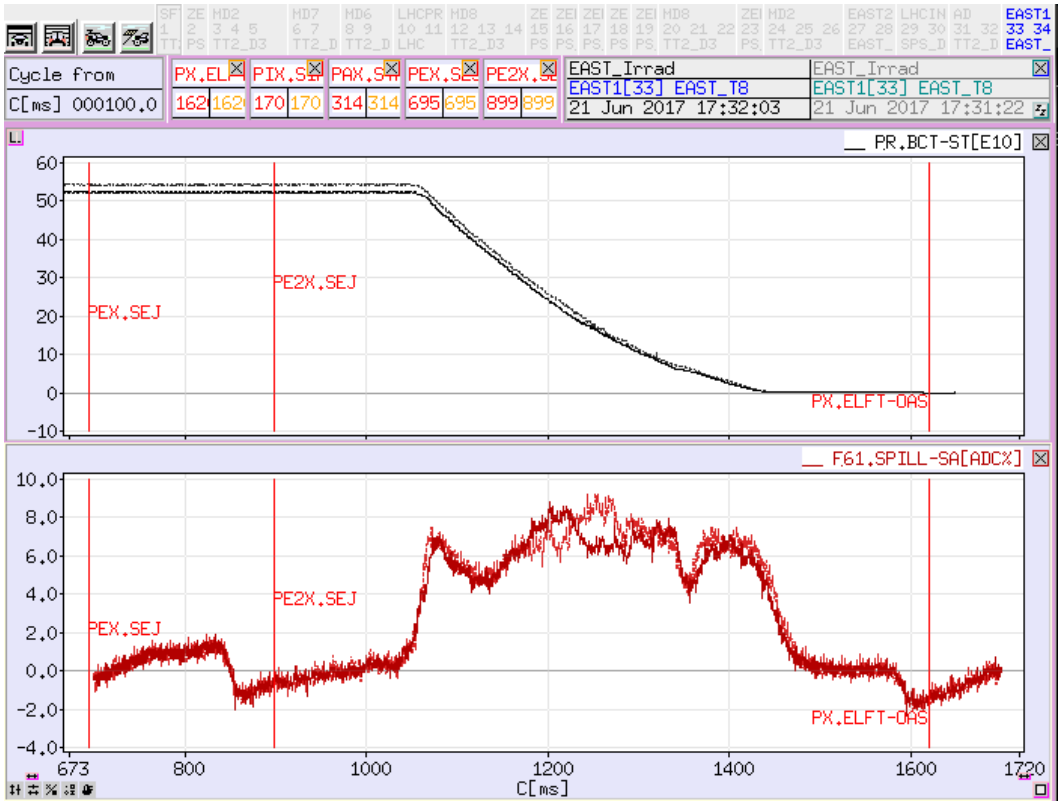






EAST Area

- improvement of the SPILL F61 signal in order to make better use of the ADC (presently around 1%)
- add BLMs/PU in F61, F61S, F61N to facilitate the steering and avoid hot spots (e.g. the one measured at F61.BHZ01 during TS1)
- the BPMs in T8 are very useful to do the steering!



spill

ADC usage

JM Nonglaton

ISOLDE BEAM DIAGNOSTICS:

Separators:
- 8 x Faraday Cups
- 7 x Semgrids
- 8 x Wire Scanners

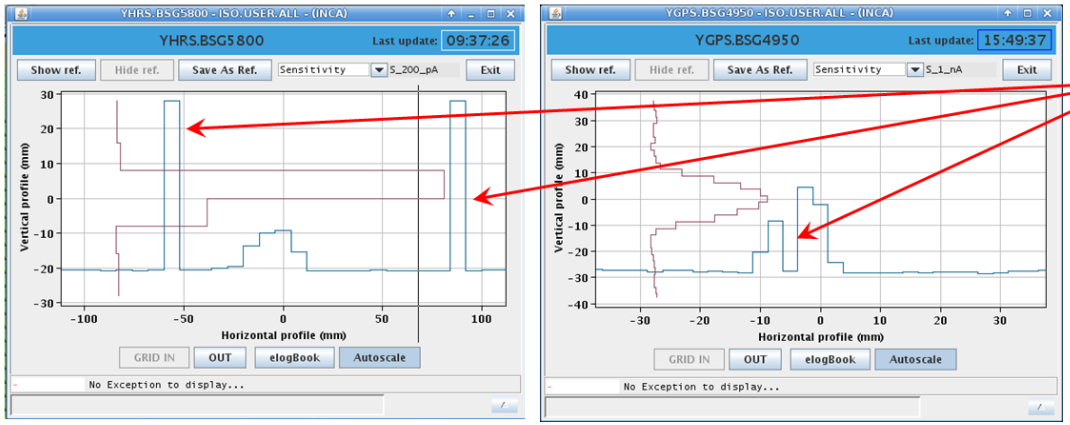
Low Energy Beam Distribution Lines:
- 26 x Faraday Cups
- 18 x Wire Scanners

REX:
- 8 x Faraday Cups
- 7 x MCPs
- 1 x Collimators/Beam Attenuators Wheel

HIE-ISOLDE:
- 18 x Faraday Cups
- 18 x Scanning Slits
- 18 x Beam Collimators
- 6 x Stripping Foils
- 5 x Silicon Detectors

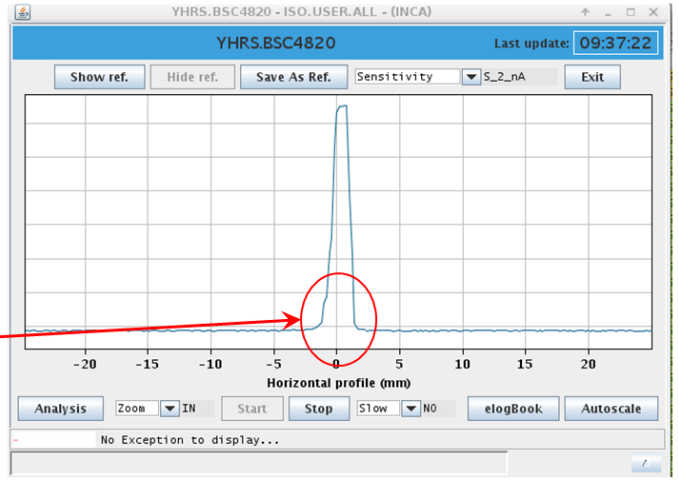
JA Rodriguez

ISOLDE BEAM DIAGNOSTICS: Main Issues



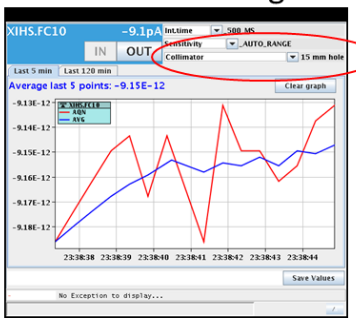
SMGs broken wires:

- Difficult to see the beam profile



Scanner Wires Low-Level Control Software:

- Calibration of the the wire scanners after separator dipoles no longer possible. Functionality lost due to changes in the low-level control software
- Only four scanners can be running at the same time

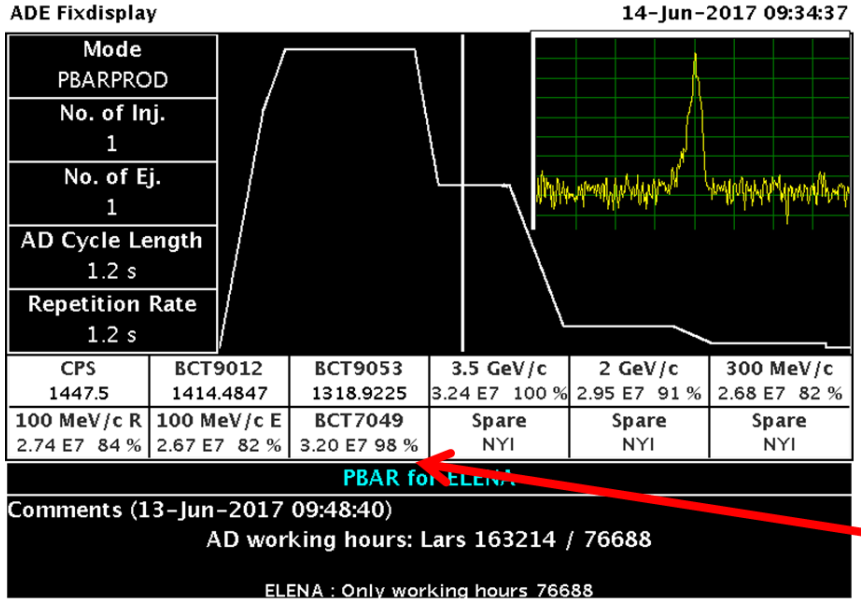


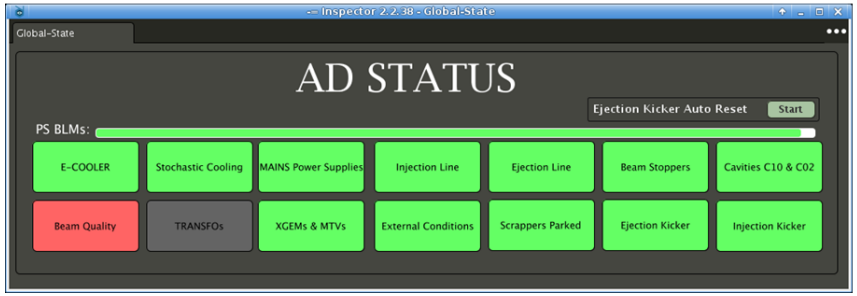
Non-Reliable Collimators/Beam Attenuators Wheel:

- Often skips positions ending up in the wrong attenuation or collimator size (high risk of damaging the Silicon detectors)

JA Rodriguez

High Level Interfaces





VISTAR is the most important control interface.

Shottky real time FFT is still one of the best way to visually detects losses / issues.

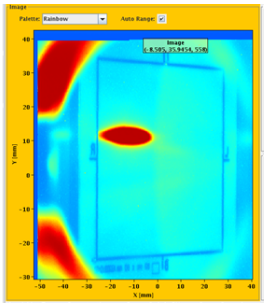
BCT 7049 is *The Reference* for physics but it is very optimistic.

New dog-leg DI.BCT.6052 is still not operational due to signal reflections issues. It could be really helpful to tune the AD-target Settings.

Inspector Interface checks hundreds of conditions and allows to control / restart most of the HW without the need of external tool.

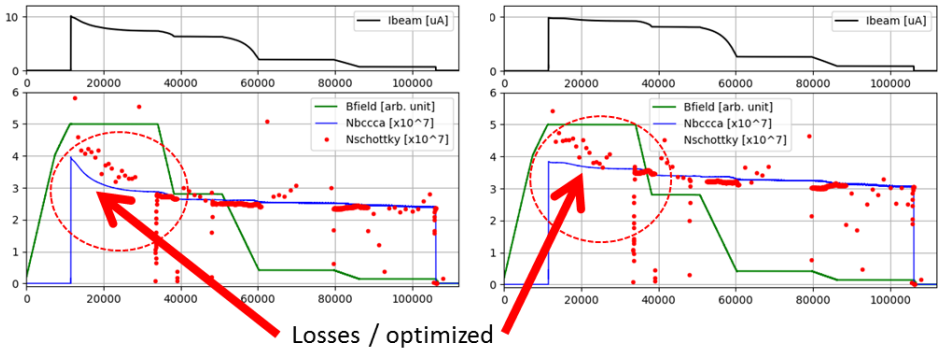
B. Lefort

AD



BTVs

- 11 BTV systems on injection and ejection lines at the AD – as well as one at septum in ring.
- Working well.

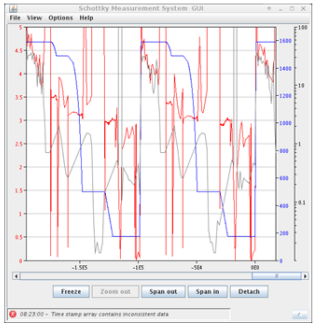


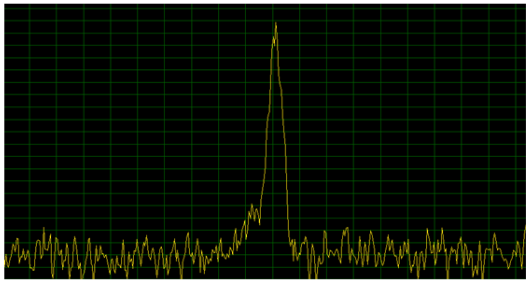
BCCCA

After a few hick-ups this system is now working very well and is being used as a major diagnostic tool.

→ VERY USEFULL, especially during startup !

Will be incorporated into VISTAR later!



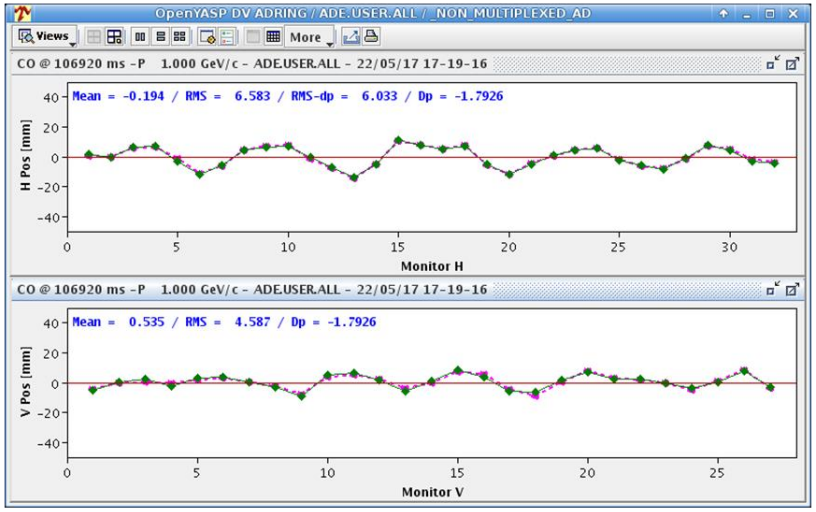


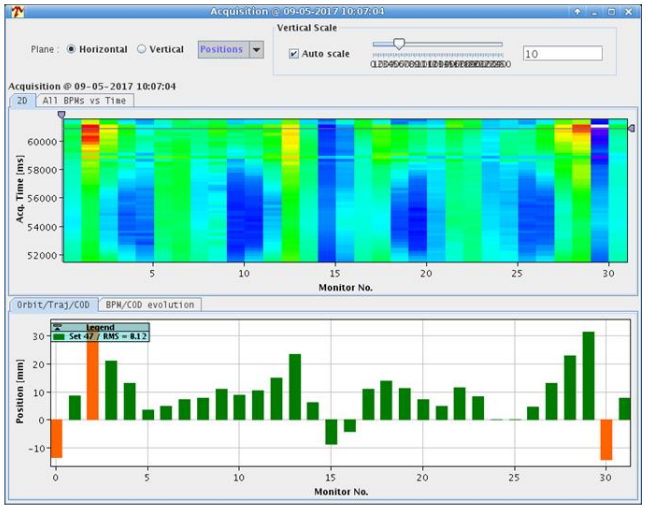
Shottky

- Working pretty well, but also in need of acquisition system upgrade.
- Planned for LS2

B. Lefort

Scraper



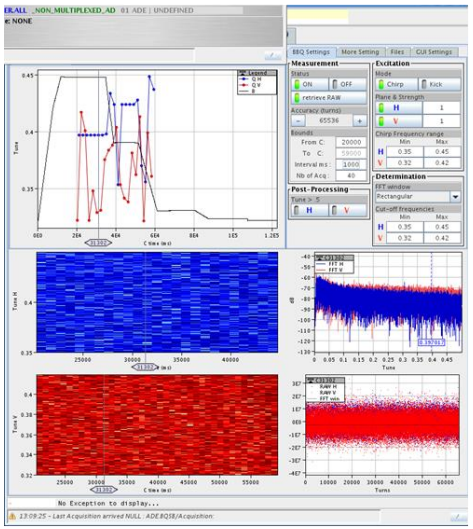


Orbit system and YASP finally working - nearly. Still a few bugs to work out!

Measurement is possible on *Plateaux & Rampes.*

B. Lefort

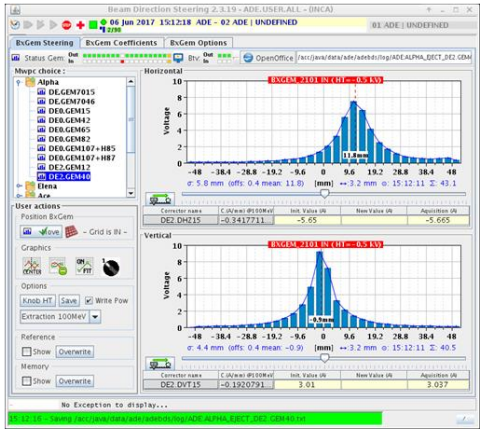
AD



Tune

BBQ system not yet operational.

The AD presently has no tune measuring system as the old system was dismantled to make way for the BBQ system!



GEMs

Perfect!

Electron Cooler

- AD cooler is working extremely well!
- Position pickups not working
- AD electron cooler is getting old! 40 years next year!
- Has worked at ICE, LEAR and AD.
- Electron cooler technology has developed over the last 40 years!
- Spare parts are getting difficult to get.
- Any major problem can easily lead to down times of 1-2 years!
- Planning a new electron cooler for the AD as part of the AD consolidation program.
- Hope to go to tendering at the end of this year.

B. Lefort

Summary

- instrumentation for the PS complex is complex! (beam parameters spanning orders of magnitude; large number of users; historic accelerator hardware)
- LIU upgrade sets new challenges
- we appreciate the constant support from BI to cope with this