



Post-mortem from the LEIR start-up

Could any issue have been caught during hardware/software commissioning or dry-runs?

Eva Barbara Holzer for the LEIR team

Maria Elena Angoletta, Jerome Axensalva, Michael Andreas Bodendorfer, Steen Jensen, Django Manglunki, Sergio Pasinelli

BI Technical Board

CERN

LEIR start-up

- The cold check-out was reduced to less than one week, from the planned 1 month, because of the accumulated delays from the hardware test
- Consequently debugging happened with beam
 - Particularly challenging because of the new ion species (Ar)
- Controls issues mitigated by presence of excellent controls coordinator

- LEIR team appreciates this initiative of a post-mortem

- **In general, start-up for beam instrumentation was very successful**

- Bunched beam orbit: 16 BPMs H+V
- Orbit measurement works
- Not yet completely tested (gains, polarity ,...):
 - data not yet used for corrections
- Questions:
 - How are the BPMs calibrated / re-calibration? → Answer from Lars Soby: calibrated before start-up and several times per year by injecting calibration signal to readout electronics
 - Can they measure turn-by-turn? → Answer from Lars Soby: No

Schottky transversal and longitudinal)

- Only used longitudinal for the moment and for un-bunched beam
- Only the pick-ups are BI, but not the Agilent network analyzers
- Outcome of the meeting 8 September:
 - Aim: new BI signal analysis and post processing, which can be operated from the CCC by 2016
 - use an adapted version of the ELENA system
 - Looking forward to the new instrument
- Timing signal by mistake removed, because an old front-end was removed from the control room
 - Could have been found during a dry-run

Current Transformers

- 5 transformers in injection, extraction and transfer line to PS
- 2 in the ring:
 - ER.MTR12
 - Slow transformer, bunched and un-bunched during the cycle
 - ER.MTRF12 / BCTFT: (semi) fast transformer
 - Accumulation of the injected beam over 70 turns
 - Inversion of signal due to mix-up with the cables
 - Only detected with beam
 - Caused delays, because a negative signal normally means beam losses upstream (e- shower) due to optics problem.

▪ Screens

- Improved during LS1: material changed to Alumine (Al_2O_3), filter wheels added
- Used extensively; very happy with the changes

▪ Pepper pot

- Movement works, but application SW is missing, will try to get an existing application

▪ SEM grids in ETL line

- Improved during LS1 – now it measures also the injected beam (as well as the extracted beam)
- Same device – two applications
- Very happy with the improvement
- A problem with the movement was caught during the dry-run

- Tested and confirmed working by Alexandre Frassier
- Specialist device, only operated from the LEIR control room (switching on the HV)
- The only transverse profile measurement → very important for operation
- Question:
 - Still planned to be made operational by non-specialist from the CCC with a copy of the AD?
 - Can a FESA class be made operation safe for non-experts? A first version of such a FESA call exist.

▪ **Tune and chromaticity**

- BBQ hardware
- Improvement during LS1 by RF and OP: Qmeter application was adapted for LEIR
- Works very well, very happy with the new application

▪ **Tomoscop** using wall current monitor

- System belongs to RF, working fine

▪ **Electron cooler**

- Worked immediately, very happy
- Propose to schedule an MD to measure the cooling performance for Ar with the BI experts for IPM and e-cooler