

Accelerator complex status

End week 44 (Sunday 2nd November 2014)

TI (Jesper Nielsen)

Busy week: <https://wikis/display/TIOP/2014/10/30/TI+summary+week+44%2C+2014>

Linacs (Richard Scrivens)

Linac2

During the technical stop, amongst other works:

- Work done on the vacuum controls for pumping groups.
- Source gas bottle exchanged.
- Source controls hardware was fixed.

Restarting had to wait for the filters on the electrical distribution to be reconnected.

On Thursday it was found that one RF system as not at the correct level, while another one had been incorrectly set since the 16/10 blackout. After correcting these as well as the debuncher, the beam was left at a new "nominal" energy for the PSB.

A communication problem with the timing was seen at the end of the day, and CO programmed an exchange of a CTR-V card on Friday morning.

Linac3

During the Monday MD day

- Tests were made with the spare source HT supply.
- Gas injection tests were performed on the Low Energy Section.
- Quadrupole scan measurements were made.

After the MD it was seen that the spare HT supply still does not provide identical beam performance, and the operational supply was put back on Wednesday.

During the technical stop work was done on the electrical transformer for Linac3, as well as some tests of magnets for 5Hz operation.

At the restart, a poor connection in the RF system was discovered (affecting beam performance), and beam was supplied at 18:00 to LEIR.

Next week the beam is off for at least three days for maintenance work on the ion source.

The pepper-pot installation is postponed, after VSC demonstrated that it leaks when the water circuit is pressurized for an extended period.

ISOLDE (Eleftherios Fadakis)

General news

ISOLDE received the latest InCa update on Tuesday without any issues.

The new access box was installed and tested on Wednesday but they want to do more tests. For now, the access procedure remains as it was.

GPS

Stable beam set up on Tuesday 28th for target #520. Yield checks on Wednesday and then started working with STAGISO beam until Saturday.

Monday morning a target change is foreseen.

HRS

ISOLTRAP working with stable beam and with protons. Some tests for the automatic set up applications were done on Wednesday, beam was taken until after the RFQ. Then stable beam test were performed by the target group. Thursday test irradiation of TiC on MEDICIS station was performed. Also the latest version of the FESA class, responsible for the cycling of both HRS magnets, was tested. Seems stable but more tests need to be done. ISOLTRAP continues taking beam. CRIS performed stable beam tuning. Saturday some problems with the line heating were an open circuit was discovered. Users were instructed to continue taking beam by heating the mass markers. Sunday CRIS performs stable beam tuning on bunch mode.

LEIR (Michael Bodendorfer)

Weekly highlights:

- A strong dependency is observed between the ion beam position in the ITE, ETL and ETP transfer lines and the PS super cycle.
- Since LS1, 37 virtual devices were not reporting error messages to the LASER console. The issue is corrected and all devices are now set to send occurring error messages.
- The longitudinal emittance has been improved from 2.2eVs to 1.8eVs and finally to 1.47eVs to fit the specifications of the PS (1.5eVs) by orbit corrections, electron cooler tuning and RF-capture parameters.

Monday, Oct. 27th:

KFH32 was repaired

Tuesday, Oct 28th:

There are three problems with the LEIR power converters:

- Some power converters to not reporting errors to LASER. On Thursday, 37 virtual devices will be found to having been set not to send occurring error messages to the LASER console.
- On ETL power converters, observed OASIS oscillation at 50Hz fixed by BE/CO (missing earth connection)
- Direct measurements on the power converters do not show the observed OASIS noise.

Wednesday, Oct. 29th: Tech-stop 8am to 4pm.

A vine between PS and LEIR was ordered to be removed but has not been removed due to a delayed organization by the gardening service.

Ar ion beam is back in LEIR by 17:28h. The LEIR ion beam is ready for the PS at 17:56h. By 20:04h the ion beam is injected in the PS, but not yet accelerated due to the lack of RF confinement.

Thursday, Oct. 30st:

- LEIR requires tuning of ITE.BHN40 in order to stabilize the injected intensity. For details: (Entry 9) <http://elogbook.cern.ch/eLogbook/eLogbook.jsp?lgbk=40>
- ETP.BHN10 and ETL.DHN10 needed steering (by D. Manglunki) to improve the PS injection efficiency.
- We discovered again that the LEIR injection efficiency is heavily influenced by the PS super cycle.
- Michal Dudek fixes the error reporting issue devices of the PowM1553 and the PowRs422 FESA class. Now errors of the ETL and the ER power supplies show up in the LASER console.

Friday, Oct. 31st:

- At 8:27h Ar ion beam circulated in the SPS with a nearly rectangular lifetime shape. We are sending to the PS about $1.8E10$ charges per pulse, with 1.8eVs longitudinal emittance.
- No RF-MD can be carried out because of a strong interaction between the Linac3 to LEIR transfer line with the super cycle and a, hence, non-reproducible shot-to-shot LEIR behavior.

Saturday, Nov. 1st:

After some fine tuning of the ITE quadrupoles, the LEIR electron cooling and the LEIR RF capture, the Ar ion is captured, cooled, RF captured and delivered to the PS within longitudinal emittance specifications of 1.47eVs

Sunday, Nov. 2nd:

At 18:55h, LEIR is put into access mode in order to start the correct switch-off procedure. All LEIR vacuum valves are closed, the main magnets and quadrupoles, the electron cooler and the RF cavity are switched off subsequently.

The LEIR team sends good luck and best wishes to the ion source team for their work to replace the GTS ion source plasma chamber during the next three days.

Booster (Elena Benedetto)

The PSB week was characterized by beam setting-up, optimization and "cleaning up":

- LHCindiv has been prepared. The intensity is successfully controlled (down to $1e11$) with the C16 voltage knob. Stability still needs to be checked.
- Isolde requested STAGISO with a low intensity ($\sim 40e10$ ppb) but large emittance beam.
- Adjustments on the SFTPRO splitting.
- LHC25ns: Adjustments of emittances and intensity. Trajectories at extraction are not stable. --> To be followed up, suspecting some magnet fluctuations.

- Orbit corrections have been systematically checked and applied on all the users. The COD is still very large (we have asked for a realignment), but at least it reduces the losses in Period 10. This implied the re-steering of the trajectories at extraction.
- Optimization of the injection frequency at injection took place, after a problem in the RF of Linac2 RF found and fixed on Thursday. We profited to uniform the values of the injection frequency, i.e. to PPM copy the same value for all the users, keeping some small differences between the 4 rings.

Concerning major issues and downtime:

- Technical Stop on Wednesday morning. At 17h50 we started doing all the resets to put the beam back, but at 18:30 the BT.BHZ10 went on fault and it was impossible to reset it. It took 1 hour to reach the Piquet PO and have him on site (couldn't reach his Piquet phone). The change of the CPU card of the power converter solved the issue, related to a timing error.
- On Thursday afternoon, Ring2 was affected by complete losses right at capture, on all users. After 2 hours investigations in all directions, a reboot of the Ring 2 LLRF front end solved the problem. Experts could not find out what was the cause.
- Ring BLMs BE.MBL-S were found disabled on Laser twice this week. Strange. They were reconnected.
- BAD conditions on the new external condition B.DMP_FAN (The dump ventilation). This cut all the beams going to the dump but allowed those sent to Isolde or PS. The Fan was working fine, everything ok for the Access control, the external condition came back after 1/2 hour. Experts investigating on what happened.

PS (Ana Guerrero Ollacarizqueta)

This week has been marked by a long and difficult recovery from the Technical Stop with a total down time of 20h and a weekly total of approximately 30 hours.

On Monday a stop of POPS for a few minutes ended in more than three hours recovery. It is a known issue by EPC and they continue to work on a solution.

On Wednesday, beams were stopped at 4h and the access started at 8h. During the stop a water leak in F16.QDE245 and FTA.QDE9030 was detected. Once the access finished the DSO tests for BT.BHZ10 were done. By 18h POPS was again pulsing and many problems came up. The power supply of BT.BHZ10 was not pulsing anymore so no protons could be injected. The PI RP had to be contacted due to a radiation monitor fault, problem that repeated during the night with another radiation monitor. Since the monitors were not critical they could be disconnected from the alarm. Regarding the ions they could not be accelerated due to an RF problem that was traced to a disjuncteur switched off. Several RF crates including the generation of the harmonic number were not powered and no 10MHz cavity could follow the program. When the protons came back, no beam could be injected in the machine due to a quad power supply, RF and control issues. One by one the beams were put back in service and by midnight all beams were back.

On Thursday two interventions had to be organised to repair cavity C11 (1h) and afterwards the power supply of F16.QFO215 (3 1/2 h). Other equipment, namely, several low energy quads, skew and sextuples do not pulse correctly and work on them will continue this week. The same happens to F61.DHZ01.

On Friday I participated in yet another wire breakage in the PS which allowed me to find the problem causing the breakage, a software error in the initialization sequence.

During this week a big step has been done regarding the B train jitter correction at injection energy. All required elements are now available. G. Sterbini has prepared the computation of the difference in the played sequence between the current B train value using one picking strip and the two coils (focussing and defocussing) and the nominal value using one picking strip per coil. In average the difference is of the order of 3 to 4 Gauss with a jitter of 1.5 to 2 Gauss. N. de Metz Noblat and J. Serrano have modified at our request the real time task controlling the B train burst that will be used to compensate the B train value of the next cycle. A test on a TOF beam has been carried out, which allowed S. Hancock and G Sterbini to redo an energy matching that agrees with the RF expectations in terms of phase and radial position. Tests will continue this week.

Both the LHC25ns and LHC50ns are ready for this week SPS scrubbing run. The work on the LHC25ns beam is still on going, a head tail instability develops at the injection flat top.

Calibrations have been performed for the instrumentation of the new T8 area.

All other operational beams have been delivered normally within the week circumstances.

SPS (Yannis Papaphilippou)

It was a busy but fairly good week for the SPS, with no major faults. It included the delivery of coasting beams for the UA9 experiment, the technical stop, starting the optimisation of Argon beams for fixed target physics and the preparation for the scrubbing run of next week.

A few more details and highlights:

- On Monday morning, the beams were stopped in the North area due to a water cooling problem in the secondary beam areas (GHN11), which was solved by closing a valve. In the evening, TT2/TT10 line optics measurements were performed after the change of the PS extraction bump to take into account the dummy septum. For TT2 and partially for TT10, the dispersion measurements showed excellent agreement with the model.
- On Tuesday morning, the beam was given for 24h to the UA9 experiment (coasts at 270 GeV). Apart from a difficult start (TT10 line MDLH1028 magnet fault due to a circuit breaker, exchanged by the Firstline piquet), the experiment ran quite smoothly.
- On Wednesday, the beam was stopped at 6am for the technical stop. Giving access to the different teams became a quite laborious enterprise due to the interphone malfunctioning in several access points. At the end of the technical stop at 13:00, several areas had to be re-patrolled, before being ready for beam at around 17:00.
- On Thursday, the setting up of the Argon beam for fixed physics started, after having to solve an issue with the injection kicker delay. During the early afternoon and in the shadow of the beam cut from the PS, there was a problem with the water cooling of BA1, which was solved by the specialist (changing the level in the leak detection surveillance software).

- On Friday afternoon, beams had to be stopped for 50min, for giving access to the vacuum team which had to open a valve in the cooling circuit of COLDEX. This enabled the normal cool down of the device, necessary for being operational during the scrubbing run.
- No particular problems occurred during the week-end, apart from various resettable trips of the RF transmitters. In one particular case, on Saturday evening, the overheating of TRX3 triggered a fire alarm, which mobilized the fire brigade and the RF power piquet but without any particular issue for the equipment or the beam deliver.