4 September 2023

ACCELERATORS & EXPERIMENTAL FACILITIES STATUS

SUMMARY OF WEEK 35 - 2023

Technical infrastructure – *C. Pruneaux*

Linac 4 – *P. Skowronski*

PS Booster – *F. Roncarolo*

ISOLDE – *M. Lozano*

PS – *R. Garcia Alia*

PS – East Area – *J. Bernhard*

PS – nTOF – *M. Bacak*

AD – ELENA – *L. Bojtar*

SPS – *K. Li*

SPS – North Area – *J. Bernhard*

SPS – AWAKE – *G. Zevi Della Porta*

SPS – HiRadMat – *No report, not running*

Linac 3 – *R. Wegner*

LEIR – *T. Argyropoulos*

LHC – *M. Solfaroli*

CLEAR – *P. Korysko & W. Farabolini*

Technical Infrastructure (TI)

Facility Coordinator last week	Clément Pruneaux
Facility Coordinator this week	Jesper Nielsen

Statistics

Alarms					
Phone calls		***Incoming***		***Outgoing***	
ODMs					

Facility Status

Summary	
Issues	***Mon 28/08/23 16:22*** Emergency stop button pushed / window broken during an intervention close to the lift in BB4 (SPS point 4). The persons who accidentally broke the window were not identified, however it looked like something hit the button. The emergency stop caused a powercut of the chain "EUB5/B4" that cuts the building (BB4 + BHA4 (921) + BG4 (930)). The button was replaced by EN-EL, after which the power cut be restored. ***Wed 30/08/23 11:48*** High level alarm in the pit of the lift in PX15 (ATLAS). On-site the level was OK, nothing was found to be not working. Investigations on the cabling were done and a bad connection was found in a jonction box, inside the CRYO building. The cause of the bad connection is very likely the high vibrations in this building. A campaign is ongoing to check all these boxes for bad connections. ***Wed 30/08/23 13:04*** Major fault on cooling tower in SFA18 (LHC point 18), Some pipes inside the cooling tower had come off their supports and broken. After visit on-site it was found that several pipes were in the same state. The full load was put on the secondary cooling tower, and CRYO was asked to switch off their standby pumping station to reduce the need for cooling and to allow working with only one cooling tower. During the following days EN-CV managed to do some repairs and put back in service both cooling towers. After which CRYO could switch back on both compressor stations to nominal. ***Thu 31/08/23 09:52:*** Electrical perturbation seen in form of multiple alarms both on 48V and UPS systems. EDF/RTE had not seen anything on their side. SIG, however, confirmed that they had had a problem with a pole that had fallen during a storm. This is most likely the cause of the perturbation that was seen as a dip of -8.4% of voltage during 90ms at CERN.

	 ***Mon 04/09/23 02:08*** ALICE dipole tripped during the night, ALICE was put in contact with LHC operations (TI has no power converter piquet, and no alarms). During the night the ventilation of the building where the power converters are installed tripped twice, which caused a small increase in temperature. The 2 events are most likely not related.
Plans	

Intervention Request				
Yes / No	**Duration**		**Preferred date/time**	
Reason				
Impact				

Linac 4					
Machine Coordinator last week	Piotr Skowronski				
Machine Coordinator this week	Jean-Baptiste Lallement				
Statistics					
Availability	100.0%				
Facility Status					
Summary	Not a second of downtime. Past weeks we found that during warm days (above circa 22 degrees Celsius) the beam energy fluctuates by 50 keV peak to peak. For the operational beams this value is still fully acceptable. On the other hand, it is not for MD beams employing energy painting. We prove that this is related cooling water temperature fluctuations. Naturally, we have communicated the issue to EN/CV and they are trying to find a solution.				
Issues	-				
Plans	Keep going with this pace.				
Intervention Request					
No	***Duration***		***Preferred date/time***		
Reason					
Impact					

PS Booster				
Machine Coordinator last week	F.Roncarolo			
Machine Coordinator this week	J-F. Comblin			
Beam Scheduled				
ISOLDE	Yes		***PS***	Yes
Beam Availability by Destination (AFT)				
ISOLDE	98.5 %		***PS***	98.5%
Facility Status				
Summary	• Beam delivered as planned for operation and MDs, with very limited downtime due to issues listed below. • All was ready for LHC re-start • Planned periodic visual inspection of water leaks (QFO11 and BI.BSW) on Thu 31st completed. Leaks stable.			
Issues	• Tue 29th: ~50 min downtime due to BI.DIST10 (distributor) unbalanced measurement ◦ threshold increased → ok ◦ Thu 31st, for preventive maintenance: changed card in the shadow of planned access • Thu 31st: BI1.BSW1L1.2 trips few times on Thu 31st ◦ Power converter expert intervention → found 2 screws below bumper power-converters, which is very unusual → road works outside PSB building suspected to induce vibrations. ◦ Took ~1h20m to repair, during which Ring1 was inhibited (BIC masking/unmasking following MP procedure), R2,3,4 unaffected. • RF Ring 2 down for few minutes on Fri 1st			
Plans	• Routine operation and MDs • Next 'routine access' for water leaks visual inspections: w#37, **on Wednesday 13th September**			
Intervention Request				
Yes/No	***Duration***	No	***Preferred date/time***	
Reason				
Impact				

ISOLDE

Machine Supervisor last week	Miguel Lozano
Machine Supervisor this week	Alberto Rodriguez

Beam Scheduled

GPS	Yes	***HRS***	Stand by	***HIE-ISO***	Yes

Beam Availability by Destination (AFT)

GPS	%	***HRS***	%	***HIE-ISO***	83 %

Facility Status

Summary	-Preparation of the pilot beam setup A/Q=4 at 4.75 MeV/u to Miniball -Optimization of the beam injection into Miniball . -Proton scan and yield measurements on GPS. -Stable beam setup of the low energy part, GPS separator, REXTRAP and REXEBIS using 67Zn21+. -Precise beam energy measurements and slow extraction scanned and applied. -Radioactive beam, 80Zn21+, delivered to Miniball on Wednesday afternoon (one day ahead schedule). -Miniball took beam until Saturday night. The experiment had to stop due to a target failure.
Issues	-Many trips of the RFQ RF during the run. -Four line heating trips and one target heating trip. -On Saturday morning users reported a total lost of the 80Zn21+ beam at Miniball. -After some investigations it was concluded that the ion source had moved and was misaligned. The electrical resistance had change indicating a bad contact inside the target. RILIS realigned the lasers to the new ion source position, and we continued in this degraded mode until 1:30 PM when the target stopped producing any more 80Zn and the experiment had to stop. -During the degraded mode operation we compensated the target production lost with an increase of the heating power going into to the line.
Plans	On Monday morning the faulty GPS target will be replaced with a spare. Still need to be decided if we will continue with the 80Zn experiment or if we will move to next experiment (79Zn at Miniball).

Intervention Request

Yes / No	***Duration***		***Preferred date/time***	
Reason				
Impact				

PS							
Machine Coordinator last week	Ruben Garcia Alia						
Machine Coordinator this week	Denis Cotte						
Beam Scheduled							
East Area	Yes	***nTOF***	Yes	***AD***	Yes	***SPS***	Yes
Beam Availability by Destination (AFT)							
AD	97%	***EA N***	98%	***EA T8***	97%	***EA T9***	98%
nTOF	98%	***SPS***	97%				
Facility Status							
Summary	• Successful commissioning of ILHC#4b_100_Pb and (in case needed) ILHC_#3b_75_Pb • MTE high intensity MD limited to 3e13 • Several AD TT2 trajectory checks and readjustments (e.g. after intensity increase) • IEAST commissioning ongoing – steering until end of T8 not yet accomplished • Temporary use of 4 bunch AD beam due to issue in PSB (one of the rings not available)						
Issues	• Very good availability; no faults above 1h30 • C66 not following function and triggering losses at transition on TOF – required cable replacement • KFA71m11 pulsing somewhere else in the cycle and triggering recurrent radiation alarms and surpassing BLM threshold – problem disappeared after setting it to standby • PR.MPS tripping on LHC INDIV due to too long cycle – shortening flat top by 5ms solved the issue • Not possible to restart KFA45 after several tries (i.e. no beam for AD and STFPRO) – circuit breaker had to be rearmed • Issues with AD quad which required Front Line on-site intervention (twice)						
Plans	• Analysis of ion beam lifetime, in view of increased vacuum levels (and also to study possible impact of BGI gas injection) • Active monitoring of RF gap relays in relation to recent failures						
Intervention Request							
No	***Duration***		***Preferred date/time***				
Reason							
Impact							

PS East Area							
Facility Coordinator last week	J. Bernhard						
Facility Coordinator this week	L. Nevay						
Beam Scheduled							
T8	Yes	***T9***	Yes	***T10***	Yes	***T11***	No
Beam Availability by Destination (AFT) General:90.8%							
Running T8	97.4%	***T9***	97.4%	***T10***	97.4%	***T11***	N/A
Facility Status							
Summary	**T09/T10:** Good operation week. **T11:** No user.						
Issues	**T10:** Brief downtime from magnet BHZ027, solved with reset, no other issues.						
Plans	**T09:** HERD continues. **T10:** MPGDCAL → RE7 GAMMA MEV						
Intervention Request							
Yes	***Duration***		***Preferred date/time***				
Reason							
Impact							

PS nTOF				
Facility Coordinator last week	Michael Bacak			
Facility Coordinator this week	Michael Bacak			
Beam Requested				
Yes				
Facility Status				
Summary	Progressing with physics programme according to planning. • EAR1: 12C(n,cp) with silicon and GEMPix detectors for dosimetry/hadron therapy. • EAR2: 26Al(n,p) and (n,a) for Astrophysics			
Issues	No issues on experiment side			
Plans	Continue programme in EAR1/2. NEAR: stop/access – installation of SiC detector (Wed)			
Foreseen Beam Stop				
Yes	***Duration***	7h	***Date/Time***	WED 06.09.23; 09h00

AD - ELENA				
Machine Supervisor last week	Lajos Bojtar			
Machine Supervisor this week	Laurette Ponce			
Beam Scheduled				
AD	Yes		***ELENA***	Yes
Availability (AFT)				
AD	91.3 %		***ELENA***	96.4 %
Facility Status				
Summary	Good week, no major fault in AD/ELENA. We have record intensity ejected from the AD, above 4E7 pbars. This was mainly due to an increase of the production beam intensity, but also have good deceleration efficiency. MD was done Wednesday on AD coherent oscillations at ejection and AD injection bunch rotation.			
Issues	DR.QUAD went down several times during the week, First line had intervention during Saturday night. Restart of the quad is still problematic. Sunday morning a fast valve in the LNI line (AD to ELENA) closed due to a pressure rise. Vacuum piquet had to be called to open it. It took a bit longer than usual due to phone network issues.			
Plans				
Intervention Request				
Yes / No	***Duration***		***Preferred date/time***	
Reason				
Impact				

SPS							
Machine Coordinator last week	Kevin Li						
Machine Coordinator this week	Verena Kain						
Beam Scheduled							
LHC	Yes	***NA***	Yes	***AWAKE***	Yes	***HiRadMat***	No
Beam Availability by Destination (AFT)							
LHC	97.3%	***NA***	92.7%	***AWAKE***	95.9%	***HiRadMat***	-
Facility Status							
Summary	An eventful week for the SPS without any major faults or downtimes. Availability is at a good 91% overall. On the plan was NA and AWAKE beam delivery, with the LHC coming back online from Wednesday onward. Parallel ion beam commissioning has also started in the SPS. In addition, Wednesday was booked for a dedicated MD on fixed target beams and non-local crystal shadowing. Monday and Tuesday were focused on delivery of physics beams for the North Area (after a slight increase in intensity) as well as running parallel MDs. Ion beams hardware commissioning took place on Monday afternoon. AWAKE was not yet able to take beam due to issues on the experiments side. LHC beams were taken Tuesday night and extracted to TEDs. Wednesday two dedicated MDs could successfully be carried out for automated blow-up studies and for progressing with fixed target beams in preparation for operational tests on non-local crystal shadowing. LHC started taking PILOT and INDIV beams in the afternoon; this went rather smooth. LHC beam delivery continued all over the week without major issues, taking also first trains of 12 bunches. On the weekend, BIC interlocks on the safe beam flag hampered filling. This was traced down to faulty readings on BCT 4 which will need to be fixed next week. AWAKE could only start taking beam late in the week but has since then been running reliably over the weekend. Ion beam commissioning is progressing with difficulties. General beam setting up has been done using nominals from the PS on the short slip-stacking cycle and the beam looks good overall. However, slip stacking was not yet achieved and the results from last year could not yet be successfully reproduced. Issues seem linked to the RF control, but the source of the difficulties has not yet been understood and is still under investigation. Likely commissioning will continue with the short ions cycle for the moment.						
Issues	• Erroneous power cut in BB4						
Plans	• LHC beam delivery according to LHC program (tbd, Van der Meer scans, pp reference run,…) • Continue ions beam commissioning • RP robot access Monday from 8-9 and Tuesday 7:30-8:30; SFTPRO2 run for 24h in between						
Intervention Request							
Yes / No	***Duration***		***Preferred date/time***				
Reason							
Impact							

SPS North Area

Facility Coordinator last week	J. Bernhard
Facility Coordinator this week	L. Nevay

Beam Scheduled

H2	Yes	***H6***	Yes	***K12***	Yes	***P42***	Yes
H4	Yes	***H8***	Yes	***M2***	No	***TT20***	Yes

Beam Availability by Destination (AFT) General: 92.4%

H2	92.8%	***H6***	92.8%	***K12***	92.8%	***P42***	92.8%
H4	92.8%	***H8***	91.9%	***M2***	91.3%	***TT20***	92.8%

Facility Status

Summary	**H2/H4/H6/H8**: Good operation. **M2**: Slight delay in the installation of the ventilation duct modification for the MUonE tent, completed on 31.08. All beam files tuned and available. **P42/K12**: Good operation. **Sharing**: **50 (T2) - 56 (T4) - 50 (T6)** Note: T4 always to be adapted to **give 22 on T10**. Already from Monday, **04.09.23: 50 (T2) - 56 (T4) - 100 (T6)** due to late MUonE request. From Wednesday, 13.09.23, one could reduce T4 to about 37 units, as Tilecal stops.
Issues	**H2:** Moving beam issue still present due to magnet / power converter problems that need to be identified, SY-EPC following. Tests planned for next week, to be confirmed with SY-EPC availability. **H4:** Goliath and David magnet power converters take too long to ramp up, issue solved. **H6**: One power converter fault caused 2 h downtime. **H8:** Issue with patrolling PPE148, access door unit restarted as it was not synchronising access rights from the database, will be checked again in the coming days. **M2:** Read value of XCMH.061752 muon scraper went to –6 mm on 28.08. (not physical, minimum is –25 mm). Piquet fixed the reading, 45 min downtime.
Plans	• H2: LHCb → NA65 (DsTau) • H4: RD51/GIF++ continues. • H6: MONOLITH, EP PIXEL → ATLAS HGTD, AIDAINNOVA, RD42. • H8: ATLAS TileCal continues, LHCb+SND continue parasitically. • M2: MUonE continues.

Intervention Requests

No	***Duration***		***Preferred date/time***	

SPS AWAKE

Facility Coordinator last week	Giovanni Zevi Della Porta
Facility Coordinator this week	-

Facility Status

Summary

Summary of Laser issue:
Most of the week spent understanding and solving a laser pre-pulse issue which caused unstable/unusable plasma conditions. The problem was solved by tuning laser timing, and proton+plasma experiments have been possible since Saturday morning. Unfortunately, the current solution prevents UV (needed for electron line photocathode), so additional work is planned during the MDs of Tuesday/Wednesday to bring back the electron beam.

Other activities in the shadow of laser access:

- Installed additional µs camera for plasma light
- Electron beam steering tests
- Plasma light PMT calibration

Proton beam:

- Short tests (~200 extractions) on Monday and Thursday to check laser pre-pulse
- Data taking on Saturday and Sunday: density step and plasma light studies

	M	T	W	Th	F	S	S
SPS extractions	139			279		1390	1073
Hours of beam to AWAKE	1.3			2.6		8.7	6.6
Hours without beam (including density step changes)	0			0		4.8	2.1

Issues

- Laser pre-pulse issue solved on Friday after a full week of investigation
- Vapor source OTC circuit failure bypassed but not understood, under investigation. Another OTC failure on Sunday: 1.5 hour access to patch it. Contractors intervention planned during next Wednesday MD.
- Electron line power supply (RCIBH.412349) high jitter solved on Monday by EPC calibration.
- SPS: another RBI.410010 issue on Thursday (repeat of last Sunday), solved by Piquet.

Plans

Proton run: study the effect of a plasma density step using plasma light and potentially probe electrons

Foreseen beam stop

Yes / No	***Duration***		***date/time***	

LHC				
Machine Coordinator last week	M.Solfaroli			
Machine Coordinator this week	E.Metral			
Statistics				
Availability	55.1%		***Stable Beam Ratio***	3.2%
Facility Status				
Summary	Powering tests completed on Wednesday morning. RQX.L8 and RD1.L8 commissioned to nominal current without quench. Long investigation for unusual interlock propagation of RCBXV1.L8. Problem identified on the CIPA PIC unit. After replacement, PIC tests repeated for all circuits in XL8. Beam operation restored on Wednesday afternoon. Beams directly circulating. Horizontal orbit perturbation in IP8 found much smaller than expected. Measured optics (inj, 1.2m, 60cm, 30cm) and aperture (inj and after LHCb rotation), B2 injection setup and performed loss maps at injection on pp nominal cycle. All results are in line with the measurements taken in April. Impressive reproducibility. Four hours of stable beams at injection on Friday for detector recommissioning. All different configurations tested, cleaned and prepared: • intermediate energy run (up to TCT/XRP alignment) • VdM (TCT/XRP alignment + LMs) • 3/6 km high beta (optics measured and cycle cleaned, ready for background test) IP8-TDIS vacuum degraded between Thursday and Friday evening. Investigation (on saturday) revealed a leak on module B, right (bottom) jaw. As small intensity operation was foreseen for the weekend, the jaw was condemned (driver blocked by CEM) and the interlock limits adjusted. Impact for ppref and IONS runs to be evaluated to decide on possible exchange (spare being prepared). Two trips of RB.A78 on Earth_fault (4 events this year). Visul inspection did not reveal any evident issue. Few pending access for RQ4.L8 PC, BLM in IP6 (XPOC), 60A and RSS converter.			
Issues	TDI-IP8 vacuum (module B, bottom jaw) RB.A78 earth_fault (intermittent)			
Plans	Very high beta (background test and run) Van der Meer run Finalization of pp ref commissioning			
Intervention Request				
Yes / No	***Duration***		***Preferred date/time***	

Linac 3				
Machine Supervisor last week	R. Wegner			
Machine Supervisor this week	G. Bellodi			
Statistics				
Availability	98.4%			
Facility Status				
Ion species	lead			
Summary	• Monday oven refilled, quick restart, NO vacuum issue • From Tuesday afternoon mostly stable beam >35 mA out of Linac3 • RF remote reset capabilities extended • digital LLRF timings included to timing working set (see issue below), cycle cloning is working now			
Issues	• some digital LLRF timings not propagated from FESA to LSA => cloned cycle did not accelerate beam • Restart issues of digital LLRF systems (RFQ, Tank1, Buncher). Expert informed. Work-around: contact RF amplifier specialist who repeats restart until digital LLRF works. Buncher: Same issue + phase setpoint might need to be re-adjusted by a multiple of 45 deg, depending on LLRF phase locking.			
Plans	continue stable beam production			
Intervention Request				
Yes / No	***Duration***		***Preferred date/time***	
Reason				
Impact				

LEIR				
Machine Supervisor last week	Theodoros Argyropoulos			
Machine Supervisor this week	Theodoros Argyropoulos			
Statistics				
Availability	Beam Commissioning			
Facility Status				
Ion species	Pb			
Summary	- Commissioning of NOMINAL beam continued. - Good injection efficiency (~40-50%) achieved for almost all 7 injections. - Issue with the accumulation of the beam. No efficient cooling of some parts of the beam in the longitudinal plane. - Investigations of the e-cooler and other possible issues (LINAC3 settings, beam sizes etc.). No clear conclusion yet. - The 75ns beam was tested and extracted to the PS.			
Issues				
Plans	-Continue commissioning of NOMINAL cycle.			
Intervention Request				
Yes / No	***Duration***		***Preferred date/time***	
Reason				
Impact				

CLEAR	
Facility Coordinator last week	Pierre Korysko & Wilfrid Farabolini
Facility Coordinator this week	Pierre Korysko
Facility Status	
Summary	Last week was dedicated to two experiments: - **Uniform beam irradiations** using a double-scattering foil system (with the University of Oxford). - **Dosimetry studies** for Cancer Therapy with VHEE at UHDR.
Issues	No major issue.
Plans	This week is dedicated to two experiments: - **AWAKE ChDR BPM measurements** (with Univ. of Oxford and CERN-BI). - **Chemistry studies** with Very High Energy Electrons (**VHEE**) at Ultra High Dose Rate (**UHDR**) to observe the **FLASH** Effect (with CHUV).