23 October 2023

ACCELERATORS & EXPERIMENTAL FACILITIES STATUS

SUMMARY OF WEEK 42 - 2023

Technical infrastructure – *J. Nielsen*

Linac 4 - *A. Topaloudis*

PS Booster – *S. Albright*

ISOLDE – *A. Rodriguez*

PS – *E. Maclean*

PS – East Area - *N. Charitonidis*

PS – nTOF – *M. Bacak*

AD – ELENA – *L. Joergensen*

SPS – *F. Velotti*

SPS – North Area - *N. Charitonidis*

SPS – AWAKE – *G. Zevi Della Porta*

SPS – HiRadMat – *No report*

Linac 3 - *R. Scrivens*

LEIR – *T. Argyropoulos*

LHC – *No report*

CLEAR – *No report*

Technical Infrastructure (TI)

Facility Coordinator last week	Jesper Nielsen
Facility Coordinator this week	Ronan Ledru

Statistics

Alarms	4672				
Phone calls	879	***Incoming***	559	***Outgoing***	320
ODMs	132				

Facility Status

Summary	Thu 19/10/23 - 02:22 High pH alarm on discharge water station WMS103 (b.1153) Fire brigade sent on site, this was due to water runoff on the concrete Thu 19/10/23 - 09:18 400kV Glitch on RTE side, fault on the line between CREYS and GRAND ILE 1 et 2 -18,55& during 80ms, 7 quench in the LHC Thu 19/10/23 - 22:32 High pH alarm on discharge water station WMS902 (b.3077) pH = 9,7 Fire Brigade sent onsite Fri 20/10/23 - 08:24 inundation of the pit below the TCC8 lift. This has caused the loss of patrol in TCC8. Fire brigade on site to pump the water Sat 21/10/23 - 22:31 Fire in TCC2, due to a water leak on the magnet MSN10 Access of Fire Brigade after green light of RP, Fire quickly stopped. Water circuits and puisards manually stopped by the TI operator No access to the area due to high radiation
Issues	
Plans	

Intervention Request

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

Linac 4

Machine Coordinator last week	A. Topaloudis
Machine Coordinator this week	J.B. Lallement

Statistics

Availability	90.1%

Facility Status

Summary	This week has been a busy week. Several issues occurred during the week and some of them for the first time (e.g. MTG issue on Tuesday, PIMS0708 issue on Tuesday night and Friday night). PIMS0708 particularly was difficult to diagnose because of the complexity of the system and the various stake holders.
Issues	Tuesday morning: • Master Timing Generator (MTG) issue. Caused an issue to several RF equipment (POPSB, DTL1, CCDTL1-2, Chopper, CCDTL7) that had to be reset. (~1h) • Intervention for changing an electronic card to avoid similar issues in the future (~25mins) Tuesday night: • PIMS0708 system tripped due to a klystron interlock. The origin was complicated to identify as all klystron hardware seemed to work correctly. The interlock came from the fast interlock card due to the focus power supply bit. Once the problem was understood, the klystron piquet team called the equipment specialist and exchanged the concerned comparator card and re-adjusted the interlock threshold. The issue was solved around 4 am with the help of 5 people from RF (3 on piquet + 2 specialists) (~6h 40mins). • The restart of the high voltage was complicated because the modulator lost the reference voltage and could not be set remotely. The EPC piquet set the voltage locally and the system could be restarted around 6:40. The issue is understood, and it will be permanently solved during the IST in November (~3h). • Around 7:50 the modulator-klystron system stopped again. Equipment specialists from EPC and RF used the opportunity to stop and cleanly restart modulator and klystron. From the restart around 8:30 the PIMS0708 was back in normal condition (~50mins) Wednesday afternoon (~1h 20min): • Issue with the Chopper. Piquet had to replace the amplifier of module 2P Thursday morning: • Electrical glitch required several equipment (source, RF, power converters…) to be reset before beam was back (~40mins). Friday night: • PIMS0708 system tripped again. Similar fault as Tuesday/Wednesday. HL klystron piquet solved the issue by replacing a faulty comparator card for the focus power supply fast interlock
Plans	Regular operation

Intervention Request

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

Impact	

PS Booster				
Machine Coordinator last week	Simon Albright			
Machine Coordinator this week	Foteini Asvesta			
Beam Scheduled				
ISOLDE	Yes		***PS***	Yes
Beam Availability by Destination (AFT)				
ISOLDE	92.8%		***PS***	88.2%
Facility Status				
Summary	• Mostly a good week, with a few notable exceptions • New cycles to 1.5 GeV and 1.6 GeV top energy were prepared for a dedicated ABP MD on the 31st • Operational and MD beams delivered as standard			
Issues	• There were a scattering of typical short equipment trips requiring a reset • On Monday, a fault on BT2.SMV20 required an unplanned access by the equipment expert • The timing fault on Tuesday morning caused a trip of POPS-B • Starting on Wednesday evening, there were regular trips of BTY.QFO122 (a few per day) due to a thermal interlock. On Friday morning, there was an unplanned access to check for any problems with the magnet. No problems were seen, but the cooling water flow rate was increased. No trips were reported since the access. • On Saturday night, there was a problem with the LLRF on Ring 2. After an intervention by the piquet, beam was accelerated but the root cause still requires expert investigation.			
Plans				
Intervention Request				
Yes	***Duration***	30 min	***Preferred date/time***	0830: 30/10
Reason	Regular magnet inspection			
Impact				

ISOLDE

Machine Supervisor last week	Alberto Rodriguez
Machine Supervisor this week	Simon Mataguez

Beam Scheduled

GPS	Yes	***HRS***	No	***HIE-ISO***	Yes

Beam Availability by Destination (AFT)

GPS	%	***HRS***	%	***GPS+HIE-ISO***	86 %

Facility Status

Summary	Very busy week at ISOLDE with physics, MDs and preparation of preirradiated targets for the winter physics in parallel. HRS+REX: - End of experiment IS702 on 16.10 (130Sn33+ at 4.4 MeV/u to Miniball). - MD at REX-TRAP (ABP) on 16.10: Injection of bunched beam from cooler/buncher in HRS into the REX-EBIS. REX/HIE-ISOLDE: - MD SRF (17.10): Longitudinal beam capture in SRF02 after bypassing SRF01. The results of this MD demonstrate that physics without the first superconducting cavity (SRF01) is possible. Therefore, swapping of CM1 and CM3 during the 2023/24 YETS to mitigate the risk of this cavity failing will not be necessary. HRS: - MEDICIS target irradiation on 16-17.10. - Winter physics target (#826) installed in the MEDICIS irradiation point on 17.10. Currently being irradiated whenever protons are available. Temporary increase to 2.5 uA of the total beam current to ISOLDE approved on 20.10. - New target installation (#817) on 19.10. Preparation of the separator for physics in week 43. GPS + REX/HIE-ISOLDE: - Setup of the linac using a pilot beam with A/q=4.0 in preparation for physics from GPS front-end to Miniball (IS697, 131Sb33+ and 127In32+ at 4.0 MeV/u). - Start of physics on 18.10 (131Sb33+). - Switch to 127In32+ on 20.10. - End of experiment on 23.10 at ~08:30
Issues	- GPS target and line heating trips (7 times, ~ 11.8 h downtime). - Trips of superconducting cavity SRF06 (~ 40 x 5m = 3h20m). - Trips of 7GP3 (x2) during linac setup. - Vacuum leak in RA0.BFC0900. Leak rate measured by VSC (~> 2.5E-2 mbar l/s). Agreed to continue running with the leak until the experiment IS697 is completed on 23.10 if the leak does not get worse.
Plans	GPS + REX/HIE-ISOLDE: - MD REX-EBIS (23.10): Test ionization efficiencies for high charge states of heavy elements (238U). REX/HIE-ISOLDE: - Preparation of the linac for the next experiment (7Be to ISS) HRS: - Preparation during the week and physics at VITO starting on 26.10 GPS: - MD RILIS (23.10) - Physics at COLLAPS (23-14.10) - Physics at GLM (25.10) - Target change (#760)

Intervention Request

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

Reason	
Impact	

PS							
Machine Coordinator last week	Ewen Maclean						
Machine Coordinator this week	Matt Fraser						
Beam Scheduled							
East Area	Yes	***nTOF***	Yes	***AD***	Yes	***SPS***	Yes
Beam Availability by Destination (AFT)							
AD	88.3%	***EA N***	88.3%	***EA T8***	88.3%	***EA T9***	88.3%
nTOF	88.3%	***SPS***	88.3%				
Facility Status							
Summary	Decent availability. Switch of T8 over to ion beams. Lots of energy scans for CHIMERA/HEARTS Preparation of 10e10 parasitic ntof on T9 east user which can survive without T9 request Preparation of intermediate intensity 350e10 on dedicated ntof cyles PS/SPS energy matching						
Issues	SMH57 trip Sunday due to temperature excess in colling water Repeated trips of 80MHz cavities due to spurious LLRF signal. Solved by adding attenuation on LLRF output. VTFB amplifier replaced Monday TMS down for all users briefly Monday morning due to bad cable placement after intervention. Replacement of MTG board Trips of F16.QFN265 and resulting loss of beam mode for TT2 caused further trips of SMH16 Sunday night some shots of SMH42+inj-bump not pulsing						
Plans	Continuation with EAST_T8 ions. No low intensity 10e10 parasitic ntof anticipated. Dense MD schedule.						
Intervention Request							
No	***Duration***		***Preferred date/time***				
Reason							
Impact							

PS East Area							
Facility Coordinator last week	**N. Charitonidis**						
Facility Coordinator this week	**D. Banerjee**						
Beam Scheduled							
T8	Yes	***T9***	Yes	***T10***	Yes	***T11***	Yes
Beam Availability by Destination (AFT)							
Running T8	100%	***T9***	100%	***T10***	100%	***T11***	100%
Facility Status							
Summary	T9: Good operation. T10: Good operation. T11: No issues.						
Issues							
Plans	T9: ShIP contuin T10: ALICE Timing, ALICE ToF → ALICE ITS3						
Intervention Request							
Yes / No	***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	Physics programme according to schedule			
Issues	No issues			
Plans	• **EAR1:** Data taking for transmission experiments continues • **EAR2:** X17 test setup continues • **NEAR:** data taking completed			
Foreseen Beam Stop				
no	***Duration***	-	***Date/Time***	-

AD - ELENA				
Machine Supervisor last week	Lars Joergensen			
Machine Supervisor this week	Lajos Bojtar			
Beam Scheduled				
AD	Yes		***ELENA***	Yes
Availability (AFT)				
AD	87.4%		***ELENA***	87.5%
Facility Status				
Summary	Antimatter Factory generally running well all week with the exception of the issue noted below. We will most likely have to run the Horn in reduced current mode for the last three weeks of the run.			
Issues	During the night Friday to Saturday there was a flashover at the horn PS-OP called the expert, Yann, who tried to fix it by reducing the high voltage of the horn and thus also the current. Nominal bias is 6.9 kV. The flashovers kept recurring at lower bias until in the end the bias was reduced to 5 kV. The reduced bias severely reduced the number of extracted pbars. The system was left in this mode overnight. Saturday morning the AD supervisor together with the expert changed the distance between the target and the horn, using measurements made by M. Calviani in 2022 to try to recuperate some of the lost beam. This resulted in about 3.8E7 extracted from the AD to ELENA and bunches of about 8E6 sent to the experiments			
Plans				
Intervention Request				
No	***Duration***		***Preferred date/time***	
Reason				
Impact				

SPS

Machine Coordinator last week	Francesco M. Velotti
Machine Coordinator this week	Michael Schenk

Beam Scheduled

LHC	Yes	***NA***	Yes	***AWAKE***	Yes	***HiRadMat***	No

Beam Availability by Destination (AFT)

LHC	96.7%	***NA***	76.3%	***AWAKE***	96.5%	***HiRadMat***	-

Facility Status

Summary	• Week dedicated to NA ion physics, AWAKE and LHC ion run • Ion parallel MD on Monday dedicated to LHC ion beams • Long flat top LHC cycle (5 s at 400 GeV) re-checked for the dedicated MD of Wednesday W43 – INDIV bunch injected and ramped to flat top after cycle re-mapped into operational timing users • Beam stopped to NA at 22:31 on Saturday evening following a fire on the MSN10 wobbling magnet of T2 • Dedicated AWAKE run after interruption on NA physics

Issues	• Stop of about 1h due to issue in timing card - needed about 30 min for repair
	• Recurrent problem (over 2 days) on RF cavities affected beam quality to AWAKE, and prevent acceleration of SFTION beam
	• Problem on FMCM intermittently appearing on MSE.4. First assessed that the PC was OK. Then investigation on MPE side. Finally tried to replace FMCM PS, no change and finally the card itself and problem solved
	• TCC8 water infiltration flooding the elevator in TCC8.
	  ○ There is a blockage that prevents water from draining to the surface, which then flows into the lift pit below, via the shaft cable trays – about 4kL of water found.
	  ○ This caused the loss of the patrol as well as some damages to the lift machinery and access system. Company on situ to identify the blockage.
	  ○ Installed a pump in the pit to avoid future flooding. Constant monitoring needed. Zone now in restricted access and still needs RP to give access
	• Saturday night at around 10:30 beam interlocked by the SIS ventilation check → fire in BA80 on MSN10 just after T2 (wobbling magnet)
	  ○ most likely due to overheating following a water leak (which was also found on this magnet)
	  ○ still not clear though why the thermo-switch that is installed on this magnet did not stop it and prevent the fire
	  ○ Fire brigade evacuated EHN1 too (experiments areas) and access was given back after filters analysis on Sunday
	  ○ RP analysed the filters and did not find any significant activation, so access was given back to EHN1.

Plans	• Follow up the MSN10 issue and agree on strategy for replacement and run continuation • Ion parallel MD on Tuesday afternoon – to be seen if it can be extended • Dedicated proton LHC MD on Wednesday with very high intensity for WS stress test

Intervention Request

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

SPS North Area							
Facility Coordinator last week	**N. Charitonidis**						
Facility Coordinator this week	**D. Banerjee**						
Beam Scheduled							
H2	Yes	***H6***	No	***K12***	No	***P42***	No
H4	Yes	***H8***	Yes	***M2***	No	***TT20***	No
Beam Availability by Destination (AFT)							
H2	99.6%	***H6***	N/A	***K12***	N/A	***P42***	N/A
H4	99.6%	***H8***	99.6%	***M2***	N/A	***TT20***	N/A

Facility Status	
Summary	H2: Smooth operation. Some observed moving of ~1mm from time to time. H4: Smooth operation. H8: Good operation, completed intensity test with NA60+ in collaboration with RP, reaching up to 2.4e6 primary ions / spill (220x230 um beam) with the small 2mm TAX hole, exhausting the available intensity. Test to reach goal of 1e7 ions / spill foreseen for next year with large TAX hole. Beam set up for R2E.
Issues	H2: Some observed moving of ~1mm from time to time connected with the LHC fillings seems highly corellated with hysteresis – not easy to tackle. Not a showstopper for NA61, but good to study / understand in the future. H8: Repeated LHC filling highly disruptive for intensity test.
Plans	H2 : NA61 continues H4: MEDIPIX→ RE1 AMS L0 H8: R2E → Gamma MeV

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

SPS AWAKE

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

Facility Status

Summary

Proton run:

- Good availability outside LHC fills and power cuts
- Proton bunch length changes from day to day, O(10%). SPS RF experts say this is upstream of SPS, as SPS settings are not changing. We are interested in keeping track of RF changes upstream.
- Occasional RF instability: bunch length changing from event to event, requires tuning by experts

	M	T	W	Th	F	S	S
SPS extractions	MD	1285	1305	1258	827	963	>2000
Hours of beam to AWAKE	MD	6.1	6.4	6.0	4.1	4.5	~7

Detailed program:

- Monday: electrons in 1E14/cm3 plasma during the MD
- Tuesday-Saturday: plasma light measurements with different density steps at 3.7E14/cm3, 6E14/cm3, 7E14/cm3 densities
- Sunday: dedicated supercycle (no NA). Density up to 9E14/cm3
- R&D for Cherenkov Diffraction Radiation BPMs on Thursday and Saturday

THANK YOU TO SPS AND INJECTORS FOR THE GREAT AVAILABILITY!

Issues

- SPS septum magnet FMCM issue on Tuesday
- 3 digital cameras replaced during short accesses
- Malfunctioning vacuum probe: bypassed in interlock but will need replacement (identical problem last week, different probe)

Plans

- Electron beam tests: laser intervention to improve UV on photocathode, optics measurements, steering in vacuum and in plasma

Foreseen beam stop

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

Linac 3				
Machine Supervisor last week	R. Scrivens			
Machine Supervisor this week	D. Kuchler			
Statistics				
Availability	98.7%			
Facility Status				
Ion species	Pb			
Summary	Very calm week with excellent beam stability and availability.			
Issues	17/10 – Timing fault – General timing issues. 19/10 – Electrical perturbation – Recovery took about 50 minutes.			
Plans	Ramp up of oven2 later in the week (if needed).			
Intervention Request				
No	***Duration***		***Preferred date/time***	
Reason				
Impact				

LEIR				
Machine Supervisor last week	Theodoros Argyropoulos			
Machine Supervisor this week	Christian Carli			
Statistics				
Availability	98.8%			
Facility Status				
Ion species	Pb			
Summary	- LEIR operational with average extracted intensities ~8e11 charges - Scanning of DEBUNCH and RAMP cavity phases to understand the effect on the beam parameters. - Optics measurements at injection in MD6 (copy of NOMINAL)			
Issues				
Plans	-Optimize the NOMINAL cycle to increase the intensity			
Intervention Request				
Yes / No	***Duration***		***Preferred date/time***	
Reason				
Impact				