24 April 2023

ACCELERATORS & EXPERIMENTAL FACILITIES STATUS

SUMMARY OF WEEK 16 - 2023

Technical infrastructure – *R. Ledru*

Linac 4 – *G. Bellodi*

PS Booster – *G.P. Di Giovanni*

ISOLDE – *S. Mataguez*

PS – *A. Lasheen*

PS – East Area – *No report recevied*

PS – nTOF – M. Bacak

AD – ELENA – *L. Ponce*

SPS – *A. Spierer*

SPS – North Area – *No report received*

SPS – AWAKE – G. Zevi Della Porta

SPS – HiRadMat – *No report – not running*

Linac 3 – *No report – not running*

LEIR – *No report – not running*

LHC – *S. Readelli*

CLEAR - *W. Farabolini & P. Korysko*

Technical Infrastructure (TI)					
Facility Coordinator last week	Ronan Ledru				
Facility Coordinator this week	Clément Pruneaux				
Statistics					
Alarms					
Phone calls		***Incoming***		***Outgoing***	
ODMs					
Facility Status					
Summary	Eventful weeks				
Issues	Wed 19/04/23 12:25: Loss of communication with TIM Viewer. See major event Wed 19/04/23 17:00: Suspected leak in the Prevessin compressed air network. Found the day after in the BA81 surface building. See major event Thu 20/04/23 08:31: ODH alarm during BIW due to technical faulét from Sniffer gaz sensor. See minor event. Thu 20/04/23 12:00: TIOC : LHCb magnet couldn't be ramped up due to issue with power converter. See minor event Thu 20/04/23 15:16: A wrong manipulation leads to release of fire screen door in point 4 SPS during a LED test from CCC panel. Access needed in order to open the doors and restart the ventilation. See major event. Sat 22/04/23 13:30: Loss of Single Sign On authentification an impossibility of authentication and use of many applications like ROG, EAM, adams, logbook, remote access etc. Back to normal at 16:05 (see OTG for more details). Problem caused by "Static copy of expired CERN CA certificate". See minor event.				
Plans					
Intervention Request					
Yes / No	**Duration**		**Preferred date/time**		
Reason					
Impact					

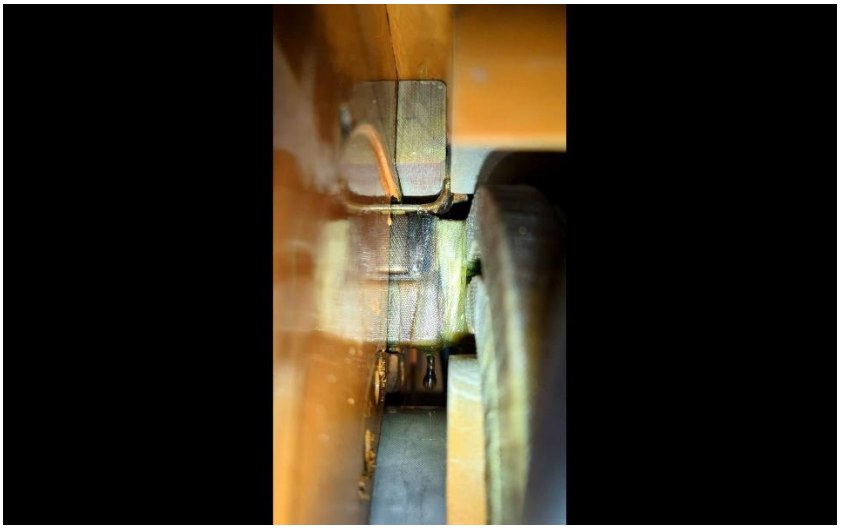
Linac 4				
Machine Coordinator last week	Giulia Bellodi			
Machine Coordinator this week	Piotr Skowronski			
Statistics				
Availability	%90.4			
Facility Status				
Summary	Not a smooth week and a busy life for HLRF piquets			
Issues	1. On Tuesday evening, a faulty card in the main RF PLC made all cavities modulators trip. A HLRF Piquet intervention was needed to replace the card (3h18' beam downtime). 2. Scheduled beam stop on Wednesday morning with several RF interventions (3h20' downtime) 3. On Saturday morning the focus power supply component of PIMS01-02 klystron came on fault. The HLRF piquet intervention was slowed down by a control issue affecting the inspector panel (incorrect information displayed). A fully burnt terminal block was finally identified as root cause of the problem and the part was exchanged (7h40' beam downtime).			
Plans	Regular operation			
Intervention Request				
Yes / No	***Duration***		***Preferred date/time***	
Reason				
Impact				

PS Booster				
Machine Coordinator last week	G.P. Di Giovanni			
Machine Coordinator this week	F. Asvesta			
Beam Scheduled				
ISOLDE	Yes		***PS***	Yes
Beam Availability by Destination (AFT)				
ISOLDE	90.2%		***PS***	90.2%
Facility Status				
Summary	• An intense week for the PSB. • During the HRS run, we had issues with higher-than-expected BTY.BCT325 readings which cut several shots to HRS. The issue disappeared by itself. BI experts investigated but the origin of the problem could not be found. • We profited from the planned stop in the SPS on Wednesday and performed a few interventions in the PSB. Among the activities, there was an investigation of the main quads by the TE-MSC team. Another water leak was discovered, this time in QFO11 and patched in situ. • Clean-up of the PSB LSA cycle to avoid a proliferation of users. • Investigation on the energy mismatch at PSB injection (reported last week). More measurements needed. • Prepared a first version of the EAST + parasitic TOF beam extracted at 1.4 GeV (instead of 2.0 GeV). More work still needed by the PSB experts before testing the beam in the PS. The rationale is to check if by having more users at 1.4 GeV, without remarkable loss of performance for the downstream machines/facilities, we could reduce the yearly mechanical stress on the main PSB quads, following the issues mentioned with the water leaks. • Restarted the regular measurements of the LHC beams with the start of stable beam production in the LHC.			
Issues	• Issue with the BTY.BCT325 reading for HRS destination. During the HRS data taking, in a couple of occasions the BCT has been reporting higher-than-expected number of charges. As a result, several shots to HRS were cut because the current was wrongly measured to be above the 2 uA mark. In both instances the issue lasted 1h30 mins and disappeared by itself. No anomalous BLMs activity recorded during the issue. To be monitored if it comes back in the future, as the second part of the week was dedicated to data taking on the GPS target. • Water leak on R2 aperture of QFO11 in Sector 1. Water drops at a rate of ~1 Hz. TE-MSC experts applied a drainage with a flexible water hose catching the drops and evacuating them into the sump just in front of the magnet. A barrier was put in place with the help of EN-ACE, as the sump cover plate had to be slightly lifted for the hose. The magnet covers are not completely fixed as before as that would have moved the hose which was put in place. **Images below.** • On Friday and Sunday night we started observing intermittent loss in the cycle for high intensity users. On Saturday morning the investigation was interrupted by the fault on the PIMS0102. And then it disappeared until on Sunday night. To be followed-up.			
Plans	Deliver beam to downstream machines/facilities			
Intervention Request				
Yes	***Duration***	1h	***Preferred date/time***	tbd

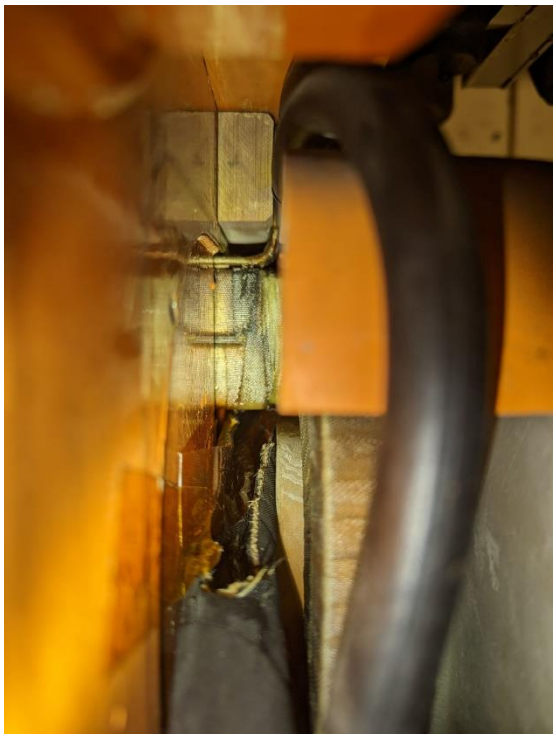
Reason	Possible access needed by TE-MSC experts to follow-up on the water leak in QFO11. To be discussed with the experts and confirmed at the FOM.
Impact	

Timeline and fix on the water leak in QFO11:

- TE-MSC access at 9h00.
- At 9h15 A. Cretin informed that a leak was discovered on the QFO11 R2 aperture.
- POPS-B lockout, intervention to redirect the water away from the live part of the equipment, and removal of the lockout.
- Beam back at 13h25.
- All interventions were originally planned to be finished at the latest at 12h30, so only a minor delay wrt the original schedule, and accounting for a problem which could have been a showstopper for the proton injector complex.
- Thanks a lot, to A. Cretin and M. Dumas for the intervention and to M. Albert for all the support and help with the fencing of the area.
- Photos below courtesy of A. Cretin and M. Albert.



Water leak on R2 aperture of QFO11.



“Draining” system put in place to collect and dispose of the water.

Fencing of the concerned area.

ISOLDE Week16

Machine Supervisor last week	Simon Mataguez
Machine Supervisor this week	Erwin Siesling

Beam Scheduled

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

Beam Availability by Destination (AFT)

GPS	97.3%	***HRS***	100%	***HIE-ISO***	%

Facility Status

Summary	GPS: - Target: #818 UC n, Stable setup 50kV, 138Ba+, protons on convertor, Proton scan, Yield - Physics: IS693 TAS (RC3) taking neutron-rich 132-134indium isotopes HRS: - Target (#743) standby - MEDICIS Target #723M to irradiation point for 24 hours (18.04) REX/HIE-ISOLDE: - Giampaolo Piccinini took over the REX RF system. REX amplifiers have been running with different repetition rates (Long term test)> - SRF cavities at ~ 9 K as of 21.04.
Issues	- 18.04 10' GPS HT2 - watchdog interlock -> HTFactory.cfx-170-mkisht2 rebooted. - 19.04 1h15' YGPS.TARGET-HEAT trips - 20.04 1h30' YGPS.LINE-HEAT trips - OP remote intervention - 21.04 10', 2.00 RILIS (SY-STI) remote intervention (control issue with VM Laser Shutter) - 21.04 1h, 21.00 YGPS.TARGET-HEAT trips - 23.04 10' x5, 22.00-23.40, GPS HT2 dropped to 0
Plans	GPS: - New target (#812 Ta) installation and heating up (27.04). - Stable beam to GLM (28.04). - Physics: Terbium-149 for targeted alpha therapy (IS688) starting on 01.05 HRS: - New target (#791 ThC VD5) installation and heating up (25.04). - Separator and LEBT lines set up. Stable beam to ISOLTRAP (26.04) - Proton scan, yield measurements and optimization (27.04). - MEDICIS irradiation of target (25-27.04) - Physics: TISD FTS/ ISOLTRAP

Intervention Request

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

PS

Machine Coordinator last week	Alexandre Lasheen
Machine Coordinator this week	Matthew Fraser

Beam Scheduled

East Area	Yes	***nTOF***	Yes	***AD***	Yes	***SPS***	Yes

Beam Availability by Destination (AFT)

AD	88.9 %	***EA N***	89.6 %	***EA T8***	89.6 %	***EA T9***	89.6 %
nTOF	87.0 %	***SPS***	89.0 %				

Facility Status

Summary

- Fair beam availability with main beam stops due to faults in upstream accelerators.
- Polishing and adjustments took place this week. All beams are now considered operational in the PS ring.
- Beams
  - Continuation of the FTA commissioning towards AD.
  - Optimization of the working point for the TOF beam to keep constant tune towards the flat top. Smaller transverse beam size on SEM grids.
  - EAST spill delivered to all destinations T8-T9-N, parasitic TOF set up under same operational conditions as in 2022.
  - Adjustments of machine parameters at PS-SPS transfer for SFTPRO beam (energy matching, trajectory correction by adjusting extraction bump and DFAs)
- Access: many activities could take place profiting from the L4/PSB stop.
  - The broken Finemet cavity amplifier was replaced.
  - The C20-92 cavity tripped before the access and was fixed right away (fix in the amplifier), the cavity is still being monitored.
  - The coupling of the C200-2 cavity was improved as large reflected power was observed.
- MDs with operational aspects
  - Beam measurements of the effective voltage of high frequency cavities (C40, C80) was done and will be used for accurate dispersive information for the wire scanner measurements.

Issues

- An issue on SEM grids towards TOF caused 3h beam stop (bad readings of the SEM grids triggering software interlocks). The issue was traced to a wrong amplifier gain setting which affected specific wires. The issue was fixed by BI expert but the source of the setting change remains unclear.
- Various issues still observed on the KFA71-79. Notably, bad shots were reported by TOF and traced to intermittent bad pulses of module 10. This module is disabled pending further investigations.
- The fault of the 80 MHz cavities remains frequent, analysis of the fault history revealed systematic faults which will be investigated specifically.
- The control of RF settings and longitudinal beam adjustments was reported at the IPP as an important efficiency bottleneck to maintain and keep consistent the high number of cycle variants in absence of adapted tools.

Plans

- Verification of the conditions of PS-SPS transfer of LHC type beams to investigate potential sources of jitter.

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

PS n_TOF				
Facility Coordinator last week	M. Bacak			
Facility Coordinator this week	M. Bacak			
Beam Requested				
Yes				
Facility Status				
Summary	Progressing with physics programme according to planning			
Issues	• SEMgrid issues related to wrong gain at ADC level (fixed by OP/BI) • Horizontal beam position on target in some shots (+- 30mm) related to a non-pulsing KFA module – investigated by OP on Fr -> solved(?) • Miscommunication with PS resulted in patrol mode for all our sectors Friday (not too late) afternoon – no TOF beam for about 2h			
Plans	• EAR1: In beam gamma spectroscopy with HPGE for (n,n') cross-section measurements ○ EAR1 neutron escape line: TimePix-3 ATLAS • EAR2: Novel capture setup characterization • EAR3 (NEAR): spectral/Maxwellian averaged cross-section setup			
Foreseen Beam Stop				
Yes	***Duration***	5h	***Date/Time***	We 26/04/23 9h-14h

SPS							
Machine Coordinator last week	Arthur Spierer						
Machine Coordinator this week	Carlo Zannini						
Beam Scheduled							
LHC	Yes	***NA***	Yes	***AWAKE***	No	***HiRadMat***	No
Beam Availability by Destination (AFT)							
LHC	66.8%	***NA***	37.3%	***AWAKE***	%	***HiRadMat***	%
Facility Status							
Summary	**North area**: Beam commissioning continued this week. The second injection was taken by Friday for a total of 1e13 p/spill. Losses were reduced to nominal in BA80 and Crystal (TECS) was aligned. Fine tuning of the cycle and optimization of the steering of the transfer lines/splitters lead to stable beam to targets. Note that the availability reflects the nights of scrubbing where NA beam were stopped. **LHC**: The 12-bunch beam was setup with scrappers and extracted, with up to 1.5 p/bunch. **Scrubbing**: During all nights, with up to 1.8 p/bunch, 4 batches of 72 bunches. The ZS voltage was reduced during scrubbing to avoid pressure related sparks. Longitudinal blow-up used to maintain minimum bunch length. A current measurement has been put in place to investigate the wire scanners issue. **Long access on Wednesday** for tunnel cracks inspection and wire scanners replacement (only verticals): (8h-20h) + 12 hours cooldown without NA beam. Vacuum in sector 4 recovered on Thursday at 9h. Other urgent accesses took place in all BAs and in the North area. - A compressed air leak was detected by EN/CV on Wednesday night, identified on equipment in BA81 on Thursday morning. The investigations blocked the extraction to NA until 11h30. Many thanks to the teams that patrolled the SPS during the night. **Other progress**: - Testing cavity power limits. 200MHz Cavity 5 reaches about 1MW as expected. Work will continue on cavity 4 that is limited to around 730kW. Amplifiers rebalancing on both cavities. - Longitudinal damper fine delay adjusted per cavity. - Double extraction optics during the same cycle in TT20 tested successfully. - Test for dedicated filling issue with PC tripping in NA with missing timing: Historical behaviour of power converters electronics, no actual voltage limiting. - 800 MHz controls issues are sorted. - Measurements on the MKP-L in preparation for optimization of the LHC 200 ns rise time (see plans).						
Issues	* Vacuum valve VVFA_610213 in undefined state and did not interlock extraction to LHCB1: Investigating the behaviour of the control crates of these valves, should be ready this week with the proposal of a solution and its deployment. * Several issues with access system in BA1,4,5; Problem with the PAD causes sector 0 dropping and propagation to other sectors that needed to be patrolled. * Water leak found on MSI.11855: repaired but will need proper fix next TS. * Issue with the SIS (1h), Data base problem followed up by CSS/MPE, currently fixed on SIS side. * Cavity 6 power piquet intervention from 1h00 to 2h30 on Thursday. * TI informs that there is an oil leak on the main magnet water pump in BA3. All seem normal without overheating. Will switch to the spare pump in case of overheating.						

	* Investigation on RQID.660404 660409 coupling; Confirmed issue with WIC, will wait until we change the configuration in ~1 month to make an update (409 trips when 404 trips). * Septum in 6 has a filter problem, intervention needed first thing on Monday, shut when not used for LHC.
Plans	Start of physics for NA EHN1 Parallel MD on Thursday - Required Interventions * Filter of MSE6 septum water circuit needs intervention (~1.30). * MKP-L alignment for 200ns LHC require access to TA1 for ~4H00 (Cable numbers already gathered in the tunnel). *Ideally the two interventions will be combined on Friday morning - Pending * BTV FEC requires intervention, no access needed (BIS ok). * 1h access requested to fix the valve (VVSA210758). * Transverse damper to be checked on Monday on SFTPRO although reducing the bandwidth 14 to 10 MHz seems to solve the instability issue. * TT20 optics measurement on Monday discussed with physics coordinator, SFTSHIP. * Potential access needed if a sextupole around 62007 is misaligned (LHC 12 bunch chromaticity issue). * From 02/05/2023 PAD/MAD Access points maintenance during the run (mode Beam). * HiRadMat (fire ball) - should check the beam spot size (adjusted with SPS optics, assuming 1.5um emittance from PS). Can extract to BTV on Monday of Wk 21, ideally before. * BQM check on any LHC-type beam. * Check if we can interlock on BQM bunch length in the SIS. * Study of single bunch instability at 3e11 (Awake/HiRadMat).

Intervention Request				
Yes / No	***Duration***	4 hours	***Preferred date/time***	Friday morning
Reason	Intervention on MKPL for 200ns batch spacing			
Impact				

SPS AWAKE				
Facility Coordinator last week	Giovanni Zevi Della Porta			
Facility Coordinator this week	-			
Facility Status				
Summary	Plasma discharge tests for new 1-microsecond exposure cameras Alignment of streak camera optical lines Electron beam tests for Cherenkov diffraction Radiation BPMs			
Issues	Synchronization of diagnostics with calibration trigger in non-AWAKE cycles: potentially solved, to be tested again with all diagnostics			
Plans	Continue DPS commissioning. Full DAQ/Trigger test with plasma and all diagnostics.			
Foreseen beam stop				
Yes / No	***Duration***		***date/time***	

LHC				
Machine Coordinator last week	S. Redaelli			
Machine Coordinator this week	M. Solfaroli			
Statistics				
Availability	83%		***Stable Beam Ratio***	15%
Facility Status				
Summary	The availability of the LHC was mainly affected by the 24h+ stop of the SPS for the CE inspection and wire scanner replacement. The planned LHC cryogenics reconfiguration was well in the shadow and required about 1.5 shift. Other experienced faults can be considered minor. The longest one was the issue with the Linac4 RF (minor impact on the LHC as beams could be kept in collision). The key achievement last week was the first "stable beams" (SB) collision at 6.8 TeV with the new 2023 configuration. This was achieved on Friday evening and by the end of the weekend, we achieved already 2 complete intensity steps (with more than 40h in SB — TO BE CHECKED ON MONDAY). The LHC is now fully in the intensity ramp up phase. This was achieved thanks to the completion of the missing outstanding commissioning steps: completion and validation of ring and transfer line collimation system setup; aperture verification; setup of train injections. In particular, the complete "loss map matrix", used to validate the machine configurations in all steps of the cycle, were completed and validated. The first fill showed an excellent control of the collision process, featuring a more complex scheme than in 2022.			
Issues				
Plans	LHC scrubbing run (3 days, starting Tuesday), then intensity ramp > 400b			
Intervention Request				
Yes / No	***Duration***		***Preferred date/time***	

CLEAR	
Facility Coordinator last week	W. Farabolini & P. Korysko
Facility Coordinator this week	P. Korysko
Facility Status	
Summary	- MD on dispersion free steering using BPMs calibration and response matrix code. - Optic fiber dosimetry. - Film dosimetry. - Flat beam using space charge in the gun. - Beam flattening scatterers and collimators
Issues	No major issue.
Plans	Plasmids irradiation with VHEE at UHDR with the University of Manchester.