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	Clément Pruneaux				
Facility Coordinator this week	Jesper Nielsen				
Statistics					
Alarms					
Phone calls		***Incoming***		***Outgoing***	
ODMs					
Facility Status					
Summary	Another busy week in TI with quite a few events and interventions. Good coordination between the teams in CCC for several interventions requiring coordination between the islands resulted in very efficient interventions.				
Issues	Tue 25/04/23 04:47: Electrical perturbation with a voltage dip of -27% for 55ms seen CERN wide. EDF/RTE confirmed the perturbation on the 400 kV line Génissiat / Bois Tollot. Tue 25/04/23 09:12: Electrical problem with 220V auxiliary supply for CRYO compressor in LHC8. When switched on, the fault was seen on the power supply supply further up the line, and caused a cut of the supply EMD407/8E (18kV supply for CRYO). All was back in service rapidly. Tue 25/04/23 09:38: During a maintenance on the surface ventilation in BA6, that required some welding, the smoke was seen by the fire detection system and caused the evacuation of the zone. Tue 25/04/23 19:54: During a "cleaning flush" of the BA6 demineralized water circuit the circuit was stopped and caused a stop of the SPS.				
Plans					
Intervention Request					
Yes / No	**Duration**		**Preferred date/time**		
Reason					
Impact					

Linac 4				
Machine Coordinator last week	Skowronski Piotr			
Machine Coordinator this week	Timeo Luca			
Statistics				
Availability	95.2%			
Facility Status				
Summary	Regular operation. Unfortunately suffering from unstable intensity due to failing H_2 valve in the source, which was fixed on Friday morning. During access on Wednesday found the elevator broken. Failed attempt to repair it on Friday morning, in parallel to the source valve exchange.			
Issues	1. Tuesday at 4h40: Electrical glitch. Multiple system tripped, including all of the klystrons. 52 minutes downtime. 2. Tuesday and Wednesday: source checks (including one access) and readjustment attempts aiming at the beam current stabilization. Total downtime of 95 minutes. 3. Wednesday at 10h36: trip of power supply for quadrupole LT.QDE65. 2 minutes downtime. 4. Friday at 8h00: Access to exchange the valve of the source and to repair the elevator. Total downtime 4 hours 31 minutes. The source is stable since then. It was also tuned to get better intensity flatness along the pulse. The elevator could not be repaired because spare motor of the doors was not available. See the access request below for more details. 5. On Friday at 15h48 PIMS0910 klystron tripped. Piquet had to intervene as it could not be restarted due to the klystron vacuum interlock. 40 minutes downtime. 6. On Friday at 17h22 access to replace voltage divider on pre-chopper. The expert spotted an anomaly in the measured pulse shape indicated imminent failure, therefore, decision to replace the element immediately. 44 minutes downtime.			
Plans	Regular operation.			
Intervention Request				
Yes	***Duration***	3 hours	***Preferred date/time***	
Reason	Elevator repair. I believe it should not be kept on hold until the next Technical Stop and we rather should use the first good opportunity to fix it. Otherwise, in case of a failure of some equipment in the tunnel, we won't be able to quickly bring any heavy material down. For example, even leak detection could not be done. The stairs are very narrow and steep, and the only alternative is the crane, which requires opening the shaft covered with shielding (concrete slabs).			
Impact	All proton beams stopped.			

PS Booster				
Machine Coordinator last week	F. Asvesta			
Machine Coordinator this week	C. Bracco			
Beam Scheduled				
ISOLDE	Yes		***PS***	Yes
Beam Availability by Destination (AFT)				
ISOLDE	94%		***PS***	93.5%
Facility Status				
Summary	• All operational beams were delivered as requested, but an intense week nonetheless. Many thanks to the OP crew and all the experts that had to intervene. • Preparation of a special LHCINDIV user for the BSRT calibration in the LHC, available emittance ranges 1-5um. • Set up some monitoring tools to follow up the Quadrupoles situation from the CCC. In particular, the volume of water added in the system and the frequency of the opening of the valve. Indeed, the frequency of water refills in the PSB cooling system seems to have increased since mid-April, when the water leak was found. Any further pattern changes will be monitored by the operators and reported accordingly. • Several reference measurements on the operational users taken during the week.			
Issues	• Electrical glitch on Tuesday morning caused issues in several systems including: POPS-B, Finemet cavities, Transverse Feedback and several elements on both injection and extraction lines. Beams were blocked for about an hour until all systems recovered. • Intervention on Wednesday morning to check the water leak situation on the main quadrupoles (as discussed on FOM). The situation was stable as no new leaks were found and the drainage fix on QFO11 is still in place. • The recombination septum, BT4.SMV10, tripped on Saturday night, with a WIC interlock. The expert had to intervene and an urgent access in the machine was prepared, as the electrovalve was faulty and the head had to be replaced. The beam was stopped for 2h30 while the intervention was ongoing. • Minor issues with the gain settings of the BPMs caused losses for some high intensity users, quickly identified and resolved. • Ring BPMs stopped publishing data during the weekend and rebooting the FEC didn't resolve the situation. No impact on operational users – will be followed up on Tuesday.			
Plans	• Deliver beams to downstream machines • Intervention for the main quadrupoles (as discussed on FOM)			
Intervention Request				
Yes	***Duration***	1h	***Preferred date/time***	Wednesday at 8h00 – beam stop 7h30 (already discussed on FOM)
Reason	Follow-up on the water leak situation in the PSB main quadrupoles			
Impact				

ISOLDE

Machine Supervisor last week	Erwin Siesling
Machine Supervisor this week	Emiliano Piselli

Beam Scheduled					
GPS	Yes	***HRS***	Yes	***HIE-ISO***	No
Beam Availability by Destination (AFT)					
GPS	95.7%	***HRS***	95.6%	***HIE-ISO***	%

Facility Status

Summary

GPS:
- Target #818 UC. Physics continued: IS693 TAS (RC3) taking neutron-rich 132-134 Indium isotopes. Run finished successfully on Wedn-afternoon 26.04.
- RILIS lasers during IS693 run for In ionization.
- Target changed for old target #626 Ta (issues with oil in the newly produced targets) on Friday-morning 28.04. Setting-up 30kV done to GLM.
- RILIS lasers for Dy and Eu ionization on Sunday 30.04.
- IS688 Tb Collections from Monday 01.05 till Friday-morning 05.05.

HRS:
- Target changed to #791 ThC VD5 (Plasma) Tuesday 25.04. 30kV Stable setting up to ISOLTRAP and LA1 line. P-scan done Thursday.
- TISD run to tapestation and ISOLTRAP for AcF, PaF and UF development till Monday-morning 08.05.
-MEDICIS Target #790M foreseen for Tuesday 25.04 has been postponed due to target being too hot to modify

REX/HIE-ISOLDE:
- REX: Giampaolo Piccinini working on improvements for the REX RF amplifiers and recommissioning at different repetition rates.
- HIE ISOLDE: Cryo Cooldown finished, Cryo Modules / SRF cavities at 4.5KSRF cavities. First reconditioning of the SRF by Daniel Valuch over the long weekend.

Issues

- Main downtime due to non-available protons from injector chain (LINAC4, PSB)

Others:
- 25.04 30min. YGPS.LINE-HEAT tripped. Immediate restart to minimize downtime.
- 26.04 YHRS.BSG2100 Semgrid horizontal plane not working – non blocking. Was solved on Friday 28.04 by SY-BI
- 26.04 YHRS.BSC4820 Scanner not running – non blocking. Switched replaced and solved Friday 28.04 by SY-BI.
- 29.04 20min. YHRS.SEPMAG60 not cycling – blocking. Solved by phone with users.

REX EBIS:
- Quite serious issue occurred last week when removing the drift tube inside the EBIS charge breeder: three small screws holding the inj/eject extraction and alignment disc ripped out of their threads. Crash repair ongoing (F. Wenander, ABP team with help of ISO-OP, main workshop). Hoping for minimum delay on recommissioning of the REX EBIS (and hence REX/HIE beam commissioning). Being followed up closely.

Plans

GPS:
- Running used target #626 Ta.
- GLM Collections: (Dysprosium decaying into) Terbium-149 for targeted alpha therapy (IS688) started on 01.05 until Friday-morning 05.05.

HRS:
- Running target #791 ThC VD5.
- TISD (Target and Ion Source Development) on Actinides. AcF, PaF, UF until Monday-morning 08.05.

Intervention Request

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

PS							
Machine Coordinator last week	Matthew Fraser						
Machine Coordinator this week	Denis Cotte						
Beam Scheduled							
East Area	Yes	***nTOF***	Yes	***AD***	Yes	***SPS***	Yes
Beam Availability by Destination (AFT)							
AD	90.8%	***EA N***	90.8%	***EA T8***	90.8%	***EA T9***	90.8%
nTOF	90.8%	***SPS***	90.8%				
Facility Status							
Summary	A very smooth week for the PS operation team: - First version of 1.4 GeV (injected kinetic energy) EAST cycle ready - Optimisation of fast extraction settings without TPS15: promising tests of AD and TOF cycles with 4 extraction bumpers (now possible with TPS15 retracted, instead of 2 BSWs) indicating that the KFA71/79 voltage can be significantly reduced - Commissioning with SY-BI of new East Area dBLM (in SS63) showed first fast acquisitions - Optimised BTP quadrupole settings (result of turn-by-turn SEM grid measurements) show little effect on FT emittance of LHC beam indicating that mismatch at injection is not a dominant source of emittance blow-up: detailed investigations needed to quantify effect						
Issues	No major issues: - Loss of PSB-PS synchronisation on Monday morning caused by a settings issue on the barrier bucket front-end: power-cycle of the barrier bucket controller, along with reboot of most of the RF front-ends, fixed the problem: detailed follow-up by SY-RF underway - Network glitch on Tuesday morning: piquet needed to restart QSE - Cavity gaps not opening automatically when cavity is reset by OP from Working Set - KFA71/79 modules continue to trip intermittently - KFA71/79 settings issue allowed pulse length (2350 ns) > PFL length (~ 2150 ns) SW limits to be set correctly in KITS next week						
Plans	- Work to continue to deploy M-TOF (2 bunches): timings PEX.WEJTOF-EAR1 and PEX.WEJTOF-EAR2 not triggering on second extraction - 4 extraction bumper settings to be rolled out on operational AD and TOF beams						
Intervention Request							
No	***Duration***	-	***Preferred date/time***	-			
Reason	-						
Impact	-						

PS East Area							
Facility Coordinator last week	**J. Bernhard**						
Facility Coordinator this week	**N. Charitonidis**						
Beam Scheduled							
T8	Yes	***T9***	Yes	***T10***	Yes	***T11***	Yes
Beam Availability by Destination (AFT) - including / excluding injectors							
Running T8	Unknown (AFT issue)	***T9***	91.4% / 100%	***T10***	91.4 % / 100%	***T11***	91.4% / 100%
Facility Status							
Summary	Smooth operation in all secondary beam lines. New secondary beamlines stand-by service: **67500** / sba-operation@cern.ch						
Issues	No issues.						
Plans	Continue physics. User changes: • T09: ALICE Timing cancelled. • T10: ALICE ITS3 coming in.						
Intervention Request							
Yes / No	***Duration***		***Preferred date/time***				
Reason							
Impact							

PS n_TOF				
Facility Coordinator last week	M. Bacak			
Facility Coordinator this week	N. Patronis			
Beam Requested				
Yes				
Facility Status				
Summary	• Progressing with physics programme according to planning • Requested 350e10 ppp on all pulse types since We 26/04/23 - beneficial for the EAR1 experiment. Big thanks to the PS for providing high average intensity despite the low pulse intensity. Back to nominal (850e10 ppp dedicated) on Wednesday afternoon.			
Issues	• No issues			
Plans	• EAR1: ○ In beam gamma-ray spectroscopy with HPGE for (n,n') cross-section measurements till Wednesday. ○ Wednesday morning setup change (HPGe -> sTED, BICRON C6D6) ○ From Wednesday on ^{181}Ta(n,g) measurement ○ EAR1 neutron escape line: TimePix-3 ATLAS (parasitic) • EAR2: Capture setup auxiliary measurements • EAR3 (NEAR): spectral/Maxwellian averaged cross-section setup			
Foreseen Beam Stop				
Yes	***Duration***	8h	***Date/Time***	We 03/05/23 9h-17h

AD - ELENA				
Machine Supervisor last week				
Machine Supervisor this week				
Beam Scheduled				
AD	Yes/No		***ELENA***	Yes/No
Availability (AFT)				
AD	%		***ELENA***	%
Facility Status				
Summary	* Beam commissioning in AD target and AD ring suspended on Tuesday lunch time: - rolled back the change in timing system to not pulse DI line during AD cycle, number of pulses before injection depending on PS supercycle and inducing change in dipoles current affecting transmission in DI (half intensity for a change of 10A) * quadrupole QFC54 back in the machine after repair and magnetic measurement: - magnet realigned to position before extraction * investigation on spurious IGBT error on BHZ-TRIM stil on-going * Commissioning with Hminus continuing in ELENA: - check of quadrupole connection in STEP line - new calibration card install for intensity measurement in ELENA and transfer lines - gaz carthridge exchange, refilling with ABP-HSL installation			
Issues				
Plans	- Quadrupole welding, pumping and leak detection in AD ring - continue beam commissioning in ELENA			
Intervention Request				
Yes / No	***Duration***		***Preferred date/time***	
Reason				
Impact				

SPS

Machine Coordinator last week	Carlo Zannini
Machine Coordinator this week	Francesco Maria Velotti

Beam Scheduled

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

Beam Availability by Destination (AFT)

LHC	%95.4	***NA***	%80.4	***AWAKE***	%	***HiRadMat***	%

Facility Status

Summary

North area (SFTPRO beam):

- Start of physics.
- Intensity has been increased as requested on T4 to 60 units on Monday and on T6 to >100 units on Thursday. Total intensity of SFTPRO beam is now ~2.1e13 protons.
- Adjustment of RF settings (phase jump, blow-up) to improve beam quality.
- Adaptative Bayesian optimization for 100 Hz and 50 Hz correction.
- Optics test on TT20 with SFTPRO2

AWAKE: setup with 3e11 protons and 1ns bunch length at extraction in preparation of the AWAKE run starting on Monday

LHC:

- Trains of 72 bunches provided on Wednesday and Thursday for scrubbing~1.5e11 ppb.
- Filling with trains of 36 bunches ~1.5e11 on Thursday and Friday
- Filling with hybrid beam Saturday/Sunday (one 8b4e batch and 2x36 ~1.5e11ppb)

Long parallel MD:

- Pushing intensity at flat bottom: trains with about ~2.3e11 ppb were taken at flat bottom (up to 3x72) to verify scrubbing status at these intensities. With 2x72 bunches a vacuum interlock was triggered in sector 4
- Investigating ZS behaviour with SFTPRO and high intensity LHC beam in parallel: with ZS on at -220kV it was possible to have SFTPRO beam (~2.1e13 protons) in parallel with 1x72 at ~2.2e11 ppb at flat top with 1.9ns bunch length. Limitations coming from the high vacuum activity on MKDH and MSE6.

Planned accesses on Friday: Beam stop from 8h to ~12h. Several activities performed in parallel.

- MKP-L recabling done (to be checked next week if we can have 200ns batch spacing)
- Investigation on sextupole 62004: resistor measurments, capacitor discharge", alignment and apparently all seems to be correct. Sextupole shunted.
- Replacement of 3 predriver on cavity 4, now we have the nominal 1 MW
- Changing leaking component for VVSA210758
- Tunnel cracks, MSE6 and scraper inspection: a scraper spring was removed.
- Work on the access system during cooldown time: change of safety card output on BA1,2,3,6,7,80
- LLRF Radial pick-up frontend changed.

	• Change a probe temperature on cooling circuit beam dump in BA2 The intervention on the MSE water circuit filter took place on Monday 24th in the shadow of PS downtime.
Issues	• SPS is presently without operational wire scanners • T2 wobbling NR22.003 (~5h downtime) • Consequences of electrical glitch on Monday night (~3h downtime) • Fire alarm due to welding smoke entering accidentally in the ventilation (~1.5h downtime) • Access needed to open fire doors (~1h downtime) • MKDV fault (~1h downtime) • 800 MHz cavity 2 trips • Several trips of cavity 5
Plans	NA physics, first AWAKE run, parallel MD on Thursday Follow-up: • Check if after the intervention on MKP-L we can now have 200ns batch spacing. • Following the intervention on the sextupole the orbit has been found significantly different and had to be adjusted. However, now there is no dependence on chromaticity. • Scrapers' behaviour after Friday intervention • Test DSO crab cavities possible from week 18

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

SPS North Area

Facility Coordinator last week	**J. Bernhard / Beam Commissioning EHN2/ECN3**
Facility Coordinator this week	**N. Charitonidis**

Beam Scheduled

H2	Yes	***H6***	Yes	***K12***	BC	***P42***	BC
H4	Yes	***H8***	Yes	***M2***	BC	***TT20***	Yes

Beam Availability by Destination (AFT)

H2	100%	***H6***	%	***K12***	N/A	***P42***	N/A
H4	100%	***H8***	100%	***M2***	N/A	***TT20***	%

Facility Status

Summary	Commissioning fully completed; physics started on 24.04. for the EHN1 lines (see IEFC report), on 27.04. for EHN2, and on 28.04. for ECN3. M2: Commissioning completed earlier and beam handed over to AMBER on 27.04.. P42/K12: Commissioning successfully completed on 28.04., now muon and kaon beams to NA62. New secondary beamlines stand-by service: **67500** / sba-operation@cern.ch
Issues	H6: Instabilities observed in the beam in terms of position. After investigation Bend1 and 2 was isolated as the cause and electronic cards changed on Friday (~3 h downtime). No instabilities observed afterwards.
Plans	Continue physics in EHN1, EHN2 and ECN3. Change intensities on 15.05. to 90 (T2) - 60 (T4) - 60 (T6) for the NA64 run until 28.06. User changes: • H6: ATLAS ITK continues and RD42 and CMS Pixel starts. • M2: AMBER antiproton physics run • P42/K12: NA62 physics run

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	Completed DPS commissioning. DAQ/Trigger test with plasma and all diagnostics. Cabling for next-generation plasma source (July) Cleaned cavern and RP visit in preparation for protons beam.			
Issues	Laser room vacuum pump. Solved.			
Plans	Begin 3 weeks of proton running			
Foreseen beam stop				
Yes / No	***Duration***		***date/time***	

LHC			
Machine Coordinator last week	M.Solfaroli		
Machine Coordinator this week	D.Nisbet		
Statistics			
Availability	59.8%	***Stable Beam Ratio***	24.4%
Facility Status			
Summary	On Monday completed the 3rd 75b fill, followed by RF full detuning setup at injection and dump aperture check. On Tuesday morning a 220V power loss made the 18 kV cell trip, with consequent stop of the cryo compressor in point 8. Long recovery due to pierced bayonette in S81, conditions back only 24 hours later. On Wednesday set-up of injections of 3x72b in B2, only 2x72b in B1. General beam quality with trains very good, using last year working point, only limitations arising from vacuum in and around MKI8. Vacuum thresholds of MKI8 tank and interconnects increased to help scrubbing. On Thursday filled B2 with 1896b during TL collimator alignment check on B1 (TCDIH.29206 to be re-aligned and re-validated). Filled B1 with 1020 bunches. It was decided to interrupt dedicated scrubbing sessions and continue scrubbing the machine while doing physics. First physics fill with 400b overnight. First fill dumped due to a BLM HV drop in point 7 with low lifetime just as the beams collided. Second fill made it to stable beams, but dumped after 5.4h due to trip of RQ10.L8 (DC water flow). Off-momentum losses are observed to dominate until 2 TeV, this may be related to longer bunches (0.1 ns) from the SPS. On Friday dry run of HB settings during SPS (the sextupoles in position 620 was shunted out of the circuit) and LINAC4 access; trip of RQ7.L1 during the desqueeze, the duration had to be extended. The two subsequent 400b fills were lost while colliding, with B1 lifetimes of 1 hour or less, seem insensitive to tune changes. At the 5th attempt UFO in 17L4 followed by a quench. On Saturday first 400b fill with the mixed 8b4e + 2x36b scheme. To help the dp losses in the ramp and check the impact on the lifetime in collision, the bunch length was reduced in the by 0.1 ns. It did not have a significant impact on the ramp losses, and had (as expected) no impact on lifetime in collisions. But the SPS beam became unstable, the reduction was therefore reverted. On Sunday, the QH target was increased by +0.001 in the last 15sec of the collision BP. As result B1 lifetime improved by about a factor 3 and no significant losses appeared when going into collisions. A further step by +0.001 was done for the following fill with higher bunch intensity (1.5e11 p/b) and the improvement was confirmed. Two fills dumped by problem of cooling on cables of RQ10.L2. MPP checklist ready to step up to 900bunches. **UFO dump count: 1, UFO quench count : 1**		
Issues	- Tuesday loss of IP8 compressor, following trip of 220 V -> 18 kV - TCDIH.29206 to be re-aligned and re-validated (next week) - Two dumps on BLM HV drops from a crate in point 7, once during a fill, once when going into collisions (first fill with 400b) -> card exchanged - First UFO (17L4) leading to quench - High losses in 83.3s RS of BLMQI.06R7.B1E10_MQTL ➔ Monitor Factor increased by 50% - Tune increased while going into collisions significantly improved B1 lifetime		

	- Hybrid scheme in operation since Saturday afternoon			
Plans	Intensity ramp-up (900 bunches and beyond) TCDIH.29206 re-alignment Fix issue with tilted COLL in B1H			
Intervention Request				
Yes / **No**	***Duration***		***Preferred date/time***	

CLEAR	
Facility Coordinator last week	Vilde Rieker
Facility Coordinator this week	Wilfrid Farabolini
Facility Status	
Summary	- Plasmid irradiations with the University of Manchester
Issues	- Charge logging/trigger issues due to crash in XenericSampler_DU in cfc-2010-cgpctf (reported by CCC) - Digital cameras failing, required power resets.
Plans	CHUV chemistry irradiations