15 May 2023

ACCELERATORS & EXPERIMENTAL FACILITIES STATUS

SUMMARY OF WEEK 19 - 2023

Technical infrastructure – *J. Nielsen*

Linac 4 – *E. Gousiou*

PS Booster – *J-F. Comblin*

ISOLDE – *E. Siesling*

PS – *B. Mikulec*

PS – East Area – *No report received*

PS – nTOF – *N. Patronis*

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 – E. Bravin

CLEAR - *No report received*

Technical Infrastructure (TI)					
Facility Coordinator last week	Jesper Nielsen				
Facility Coordinator this week	Jesper Nielsen				
Facility Status					
Summary	Fairly standard week with a few major events				
Issues	Mon 08/05/23 21:19: Ventilation unit in LHC point 8 sends a fire alarm and switches automatically to the standby ventilation unit. Short time after the kicker magnet sees also a fire alarm and an interlock is raised on the kicker. After investigations by the experts it is clear that the smoke came from the ventilation unit and the kicker saw the smoke via its new smoke detection equipment. Fri 12/05/23 06:22: After numerous stops/starts of the BA6 main magnet cooling circuit on request from SPS operations (to avoid clogging filters on magnet side of the cooling circuit) unfortunately the wrong circuit was stopped, which led to a trip of the SPS. The circuit was rapidly switched on again. Mon 15/05/23 03:00: Trip of electrical breaker EOD303/5E, causing a power cut of the BLM racks B$YL=SR5. TI on-site but the breaker tripped immediately again. BLM piquet contacted; most likely a power supply needs to be replaced.				
Plans					
Intervention Request					
Yes / No	**Duration**		**Preferred date/time**		
Reason					
Impact					

Linac 4

Machine Coordinator last week	E. Gousiou
Machine Coordinator this week	A. Lombardi

Statistics

Availability	100%

Facility Status

Summary	• As good as it gets!
	• All operational beams delivered as requested
	• Source: increased H gas on Wed am to stabilise the beam pulse shape during the high current MD; since then we have minimal stability fluctuation <1%.
	• High current MD
	  ○ 50mA out of the Source
	  ○ Good transmission through the RFQ
	  ○ 25mA through the linac after chopping
	  ○ Confirmed reliable RF operation of beams up to 25-30mA

Issues	• [2min] Watchdog trip (Low-E WD)
Plans	Regular operation.

Intervention Request

Yes	***Duration***	3.5 hours	***Preferred date/time***	24h warning

Reason	• Elevator repair.
	• In the shadow of the elevator repair, two non-urgent requests:
	  1. new FESA class deployment on cfv-400-allsrc, to enhance source logging (requires source stop).
	  2. power cycle of the DTL3 LLRF crate, due to some acquisition glitches (requires no beam)			

Impact	All proton beams stopped.			

<table>
<tr><th colspan="5">PS Booster</th></tr>
<tr><td colspan="2">Machine Coordinator last week</td><td colspan="3">JF Comblin</td></tr>
<tr><td colspan="2">Machine Coordinator this week</td><td colspan="3">S. Albright</td></tr>
<tr><td colspan="5">Beam Scheduled</td></tr>
<tr><td>ISOLDE</td><td colspan="2">Yes</td><td>PS</td><td>Yes</td></tr>
<tr><td colspan="5">Beam Availability by Destination (AFT)</td></tr>
<tr><td>ISOLDE</td><td colspan="2">97 %</td><td>PS</td><td>96.8%</td></tr>
<tr><td colspan="5">Facility Status</td></tr>
<tr><td>Summary</td><td colspan="4">• All operational and MD beams were delivered as requested.
• Inspection of BR.QFO11 (access on May 8th): no change on the water leak. MSC remeasured the leak rate and it is still consistent to last measurement.
• Linac4-PSB dedicated MD on high intensity tests:
○ Good energy matching at PSB injection with the high current configuration.
○ The energy spread was measured for both natural and large energy spread configurations. Everything was as expected.
○ When we started pushing the intensity in the PSB, we observed larger-than-nominal transverse emittance (which is normal).
○ Reference measurements were taken, to be compared to operational beams.
• The high-level interface for the PSB transverse feed-back has been activated. The high-level settings are propagated by a dedicated Makerule, that automatically scales the loop gain set by the operator with the evolution of the BEAM/GAMMA before sending the adjusted gain to the hardware.</td></tr>
<tr><td>Issues</td><td colspan="4">• Friday: SMH15 tripped probably due to a vacuum peak (20 min. downtime)
• Friday: BI1.BSW1L1.2 tripped twice. Specialist fine-tuned it, together with 2 others BSW from R4. He is still investigating to find the root cause (12 min. downtime).
• Saturday: POPS-B tripped for no obvious reason. To be followed-up (15 min. downtime).</td></tr>
<tr><td>Plans</td><td colspan="4">• Deliver beams to downstream machines.
• Fine-tune “AD 5 rings” beam.</td></tr>
<tr><td colspan="5">Intervention Request</td></tr>
<tr><td>Yes/No</td><td>Duration</td><td>1 hour</td><td>Preferred date/time</td><td>May 15th 7:30 AM
May 24th 7:30 AM</td></tr>
<tr><td>Reason</td><td colspan="4">Regular inspections of BR.QFO11 (already discussed at FOM).</td></tr>
<tr><td>Impact</td><td colspan="4">No beam for all downstream machines and experiments.</td></tr>
</table>

ISOLDE

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

Beam Scheduled

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

Beam Availability by Destination (AFT)

GPS	- %	***HRS***	96.7%	***HIE-ISO***	- %

Facility Status

Summary	GPS: - Previous physics run finished last Monday - Target change Thursday 11.05 to #759UC quartz line, neutron convertor - SY/EPC (J. Parra-Lopez) has changed two unstable power supply cards cards (red emergency buttons) for the target and line heating - Stable beam setting up ongoing. Preparing for beam to IDS for fast timing measurements of n-rich Cadmium isotopes: IS685 experiment. HRS: - MEDICIS target irradiation on target #802M from Monday to Tuesday morning 08/09.05. - HRS running target #816UC. Thallium beams for COLLAPS experiment IS718. Stable beam since Tuesday-evening 09.05, proton scan and yield measurements on Wednesday-morning 10.05 followed by physics at COLLAPS on Thallium isotopes. Run will stop Monday-morning 15.05 - Overall, a very good run REX/HIE-ISOLDE: - REX EBIS: Good news: The repair of the collector part by the main workshop has finished and the piece is back in the machine. Re-alignment of the various parts was done, and the machine closed. Bake-out ongoing. EBIS expected to be ready latest end of May for beam which is, considering the issue, remarkable. Many thanks to F. Wenander, main workshop and the team of technicians, BE/ABP. - REX: Giampaolo Piccinini continues working on improvements for the REX RF amplifiers and recommissioning at different repetition rates. - HIE ISOLDE: Reconditioning of the SRF by Daniel Valuch continuing.
Issues	-08.05 HRS target heating stopped – J. Parra-Lopez SY/EPC exchanged an unstable power supply controller card – OK -09.05 several scanners in error. This occurs from time to time. BI has been informed. E. Piselli is following up. -09.05 HRS separator power supply YHRS.MAG60 stopped working again – J. Parra-Lopez replaced the 400V AC phase balance measurement card – OK -10.05 The HRS ISCOOL (cooler buncher RFQ) front-end cfv-170-arfqcb is unstable. A reboot brings back up the RF but the FE remains red. E. Piselli is following this up with A. Butterworth SY/RF. -11.05 A vacuum leak occurred on the YHRS.BFC7480 faraday-cup – exchange was carried out by BI (W. Andreazza, M. Martin Nieto) and RP (N. Conan, A. Dorsival) – many thanks for your flexibility and the fast intervention Others: -Temperature issue in 197 power room: despite (vacuum) cleaning the blocked HVAC unit the temperature in the power convertor room is still too high – EN/CV is on it. -We observe that the base vacuum pressure in the HRS target Front-End (HRS10_VGP1) has been increasing constantly over the last year independently of target type or target settings – under investigation by TE/VSC, SY/STI.
Plans	GPS: until next week Monday 22.05: IS685 experiment at IDS (n-rich Cd isotopes) HRS: Thallium run ends Monday 15.05. Standby until week 21.

Intervention Request

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

PS							
Machine Coordinator last week	B. Mikulec						
Machine Coordinator this week	A. Huschauer						
Beam Scheduled							
East Area	Yes	***nTOF***	Yes	***AD***	FTA tests	***SPS***	Yes
Beam Availability by Destination (AFT)							
AD	n.A.	***EA N***	93.4%	***EA T8***	93.3%	***EA T9***	94%
nTOF	93.3%	***SPS***	93.2%				
Facility Status							
Summary	- TOF: continue preparations for double-injection TOF cycle - EAST_T9: successful T09 Target Asymmetry Online monitoring test (new OP UCAP device) with Dipanwita - AD cycle using 4 extraction bumpers refined and used by Yann to re-commission the AD transfer line over the weekend (~85-90% transmission)						
Issues	- Phase oscillations affecting LHC-type cycles solved on Tuesday (removed 10 dB attenuation in phase return signal and exchanged faulty cable + solved bad cavity controller re-synchronisation with C40-77) - Sudden beam losses due to issues with 2 RF frontends (CB feedback and Rpos) → being followed up by RF - Lost PSB-PS synchronisation on Saturday due to an issue with the barrier-bucket controls → being followed up by RF - SMH16 and KFA71 sometimes pulse with the CCV of the wrong cycle → informed EPC and ABT						
Plans							
Intervention Request							
No	***Duration***		***Preferred date/time***				
Reason							
Impact							

PS n_TOF				
Facility Coordinator last week	N. Patronis			
Facility Coordinator this week	N. Patronis			
Beam Requested				
Yes				
Facility Status				
Summary	• Progressing with physics programme according to planning			
Issues	• No issues			
Plans	• EAR1: ^{181}Ta(n,g) measurement (C6D6, sTED) • EAR2: Capture setup auxiliary measurements			
Foreseen Beam Stop				
Yes	***Duration***	2h	***Date/Time***	We 17/05/23 10h-12h

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	* AD target: - Final inspection of target and slit movement - Exchange of the old camera of BTV 6048 by a CCD one for better sensitivity - Deployment of new software for the horn to fix communication issue - Low intensity proton beam sent to target for FTA studies - Test of lower rate pulsing of DI lines power supplies * AD ring: - bake-out on-going in the injection kicker region, progressing as planned - Restart of main power supplies with the QFC54 circuit back in - test with e-cooler high voltage, filament OFF * ELENA: - optics studies of Hminus injection line - work on injection plateau with e-cooler on to optimize injected intensity - HW tests on scrapers MCP
Issues	- Ion switch power supply to be exchanged after being left in DC mode by mistake - vacuum spikes in ELENA ring following work on scraper MCP
Plans	* HW tests in AD ring during bake-out * beam on AD target on demand for FTA studies * validate DI lines pulsing stability with synchro PS (change of repetition cycle) => AD beam request with low intensity

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

SPS							
Machine Coordinator last week	Arthur Spierer						
Machine Coordinator this week	Carlo Zannini						
Beam Scheduled							
LHC	Yes	***NA***	Yes	***AWAKE***	Yes	***HiRadMat***	No
Beam Availability by Destination (AFT)							
LHC	97.1%	***NA***	93.3%	***AWAKE***	98.1%	***HiRadMat***	%
Facility Status							
Summary	Very good availability for the SPS this week, with beam provided to AWAKE, short and long parallel MDs, NA and LHC. The main downtimes being caused by the access system maintenance and the injectors. AWAKE: No major issues, beam time lost due to difficult fills of the LHC. The increased duty cycle in compensation for MDs took place on Sunday afternoon. MDs: Mon-Thu - Short parallel: Non-linear chromaticity measurements in Q20/Q22/Q26 optics; Test of new method for tune and chromaticity analysis/control - Long parallel: Crystal shadowing from LSS4; Laslett tune measurements versus bunch intensity for multi-batch beam - Profiting from the cycle, 2e11 proton per bunch were brought to flat-top to maintain scrubbing. LHC: The Mixed 8b4e+5x36b with 200ns spacing was setup and extracted for LHC physics. The fills were made difficult due to jittery PS extraction (solved), injectors downtime, SPS scrappers losing steps and intermittent beam instabilities. NA: No changes of the intensity/sharing (next change on the 15th). The 50/100 Hz compensation algorithm is now running on GPUs to increase iteration speed and QC threshold were updated. Others: HiRadMat did two long access in BA7/TT61 in the shadow of Linac4 MD/LHC access, to prepare for week 21.						
Issues	- Mains lost on Tue. For 2h due to manipulation during access system maintenance in BA1. - issue with the MKE4 with pilot extraction, was finally on LHC side MKI controls sending erroneous signal. - NA62 door issue, seemingly staying open if not intentionally closed, causing need for patrol. - Unplanned access in the PS 10MHz on Friday morning (8.30-12h) - 8b4e+5x36b for LHC is poorly transmitted to beam 1, requires scraping (5%-6% in H, 1% V) to limit losses at injection. Source not found yet in PS or SPS. - 800 MHz Cavity 2 power piquet intervention, reduced voltage for the weekend, to be followed-up on Monday. - Scrappers are still losing steps Follow-ups: - Request to inspect tunnel cracks once per month to measure movements (too early this week)						
Plans	This week: - AWAKE 3rd week (semi-dedicated) - Short parallel and dedicated MDs						
Intervention Request							
Yes / No	***Duration***		***Preferred date/time***				
Reason							

Impact	

SPS AWAKE

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

Facility Status

Summary

Second week of proton run: continued physics program, at slower pace. Beam delivered was ~60% of previous week, mainly due to 2 missing days (Wednesday MD and Saturday LHC).

	M	T	W	Th	F	S	S
SPS extractions	715	794			855		1362
Hours of beam to AWAKE	5.2	5.9			5.4		7
Hours with no beam	3.3	5.9			5.7		3.8

Daily summary:

- Monday: ion motion studies comparing proton self-modulation in Xenon vs Helium plasma
- Tuesday: hosing instability studies at low density with Argon and Helium plasma
- Wednesday and Thursday: no beam (MD and Parallel MD). Installed second configuration of Discharge Plasma Source: split 10m plasma into two sections, with 3.5m upstream and 6.5m downstream
- Friday: self-modulation studies in 6.5 m of Argon plasma, plasma light delay scans, ion motion dataset
- Saturday: no beam (PS and LHC)
- Sunday: several datasets (ion motion, plasma light, hosing, impact ionization) with Helium plasma

Issues	Monday: lost PC controlling fast cameras. Replaced in early-morning access Friday: disconnected filter on BTV screen. Re-connected in early-morning access.
Plans	More protons. Depending on beam availability Monday/Tuesday, consider changing plasma length during Wednesday MD.

Foreseen beam stop

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

LHC				
Machine Coordinator last week	Enrico Bravin			
Machine Coordinator this week	Elias Metral			
Statistics				
Availability	79.8%		***Stable Beam Ratio***	47.2%
Facility Status				
Summary	Week dedicated to luminosity production. The week started with no beam due to an access in the PSB followed by an urgent access request by ATLAS. ATLAS has suffered all week with a vacuum problem in the liquid argon cryostat, after the last access on Friday morning the situation seems to have stabilized by adding pumping capacity. On Wednesday afternoon we commissioned the abort gap keeper for the 236b-200ns-spacing trains and after validation of the injection process we started using these beams for physics. This allowed to make the last step in intensity ramp up from 1818b to 2374b on Thursday morning. At the moment the bunch intensity is around 1.45E11 and will be increased gradually over the next fills, losses permitting. On Friday morning we organized an access for all teams needing to intervene, the main driver for the access was ATLAS. The whole Saturday was lost due to recurrent, alternating, problems with the QPS of RQTF/D.A23.B1/2 and injectors unavailability. Also the BSRT calibration fill scheduled for Saturday night was cancelled due to the QPS problem. Sunday morning we had problems injecting the beams. Losses in IR7 triggered frequent dumps during filling. This is a recurrent problem, steering of the lines is not solving the problem, for now the only indication is that aggressive scraping in the SPS helps reducing these losses, to be studied further. Several ramp attempts have been lost due to losses at the start of the ramp. This is an indication of debunching, no RF issue has been found. In the latest fills aggressive abort gap cleaning before starting the ramp has helped reducing the losses. Massive blow-up of B1V was observed after switching to the 200ns beams. An instability related to the increased e-cloud is the cause. The problem has disappeared after a few fills thanks to conditioning. A bug was identified in the coupling correction procedure. The wrong time stamps were used to correlate measurements with indexes in the ramp functions leading to an amplification of the error instead of reducing it. Few fills have been lost also due to losses bringing the beams in collisions, although the losses are relatively rapid, of the order of seconds, the long running sum of 82s triggers the beam dump. The problem is not understood and is being studied. The logic of the long running sums may need revision.			
Issues	High losses at injection for B1 (dump), recurrent. High losses at start of ramp for B2 (debunching), probably solved. Blow up of B1V at 1.1TeV (wrong c- correction + e-cloud, both solved) High losses on B1 going into collision (dump), recurrent. ATLAS liquid Argon cryostat vacuum, under control. QPS RQTF.A23, solved. Injectors unavailability, mainly PS RF, recurrent.			
Plans	Physics production with 2400b. Progressive increase of bunch charge. BSRT calibration on Tuesday			
Intervention Request				
Yes / No	***Duration***		***Preferred date/time***	