

17 April 2023

ACCELERATORS & EXPERIMENTAL FACILITIES STATUS

SUMMARY OF WEEK 15 - 2023

Technical infrastructure – *R. Ledru*

Linac 4 – *A. Topaloudis*

PS Booster – *F.i Asvesta*

ISOLDE – *A. Rodriguez*

PS – *A. Huschauer*

PS – East Area – *D. Banerjee*

PS – nTOF – *M. Bacak*

AD – ELENA – *L. Ponce*

SPS – *M. Schenk*

SPS – North Area – ?

SPS – AWAKE – *G. Della Porta*

SPS – HiRadMat – *None*

Linac 3 – *None*

LEIR – *None*

LHC – *J. Wenninger*

CLEAR – *Pierre Korysko*

Technical Infrastructure (TI)					
Facility Coordinator last week		Jesper Nielsen			
Facility Coordinator this week		Ronan Ledru			
Statistics					
Alarms	3956				
Phone calls	526	Incoming	317	Outgoing	209
ODMs	102				
Facility Status					
Summary	Less calls but a lot of events				
Issues	<p>Mon 10/04/23 - 16:46 Stop of Isolde ventilation due to an issue on the SITOP (batterie of the PLC) This ventilation has interlocked the beam - see event</p> <p>Tue 11/04/23 - 12:26 Trip of the 18kV breaker EMH104/A2 (BA2) due to issue on the measurement cable Cable has been fixed and breaker switched on - see event</p> <p>Wed 12/04/23 - 22:35 Fire alarms in US15 (4 sensors), evacuation and DSS triggered. The faulty rack Y-09-05-S2 has been found - see event</p> <p>Wed 12/04/23 - 11:32 Hydrocarbons alarm on the WMS-102 (Meyrin), real alarm. Fire brigade sent on site to put a boom</p> <p>Wed 12/04/23 - 20:28 Glitch on the 400kV line between Genissiat and Vieil Moulin 2</p> <p>Thu 13/04/23 - 14:54 Fire alarm in TS54 (SPS) Fire brigade on site, nothing has been found- see event</p>				
	Plans				
	Intervention Request				
	Yes / No	Duration		Preferred date/time	
	Reason				
	Impact				

Linac 4			
Machine Coordinator last week		Topaloudis Athanasios	
Machine Coordinator this week		Bellodi Giulia	
Statistics			
Availability	99.5%		
Facility Status			
Summary	Excellent week		
Issues	Modulator DTL1 tripped on Monday 10 (overall down time: 5 min). Electrical glitch due to the thunderstorm on Wednesday 12 (overall down time: 14 min). Few chopper trips over the week that are being followed-up by the experts (overall down time: 24 min).		
Plans	Regular operation		
Intervention Request			
No	Duration		Preferred date/time
Reason			
Impact			

PS Booster			
Machine Coordinator last week		F. Asvesta	
Machine Coordinator this week		G.P. Di Giovanni	
Beam Scheduled			
ISOLDE	Yes	PS	Yes
Beam Availability by Destination (AFT)			
ISOLDE	98.4 %	PS	98.5 %
Facility Status			
Summary	<ul style="list-style-type: none"> All operational beams were delivered as requested. Transverse optimization of the 8b3e beam – increased brightness by reducing emittances (~20%), beam sent downstream and reduced emittances measured in the PS as well. Longitudinal optimization of the AWAKE beam – improved emittances in the PS. LHC_PILOT variant with higher intensity prepared – requested for LHC test. New LHC Standard variant with triple harmonic capture and updated working point evolution – reduced transverse profile tails while maintaining brightness. Beam tested in the PS (38 bunches variant) measuring similar emittances as the operational user. Optimizations still ongoing. 		
Issues	<ul style="list-style-type: none"> Electrical perturbations on Wednesday night affected operations as they resulted in faults of multiple magnets of the BTY line, the Transverse Feedback and the Finemet cavities in ring 3, blocking operations for almost an hour. The cavities required the intervention of the piquet and beam was produced in degraded mode (without ring 3) for another 30min. During the triple harmonic setup, the experts realized that the energy matching, done during commissioning, was not propagated to all operational users. This will be followed up next week to fully resolve but no observable impact on the operational users is expected. Otherwise, only short faults resolved with resets. 		
Plans	Deliver beams to downstream machines		
Intervention Request			
No	Duration		Preferred date/time
Reason			
Impact			

ISOLDE					
Machine Supervisor last week		Alberto Rodriguez			
Machine Supervisor this week		Simon Mataguez			
Beam Scheduled					
GPS	Yes	HRS	No	HIE-ISO	No
Beam Availability by Destination (AFT)					
GPS	%	HRS	%	HIE-ISO	%
Facility Status					
Summary	GPS: - Physics: Development of Lanthanide beams (LOI246, LOI235 and LOI226) until 14.04. - ²⁴ Na collection for calibration source (15.04) HRS: - ³⁹ K ⁺ beam to CRIS experimental station for commissioning (12.04). - New target (#743) installed, heating up and separator beam setup (14.04). - Cooler/buncher tests and time structure measurements (14.04). REX/HIE-ISOLDE: - Cryomodules cooldown on-going. SRF cavities at ~ 100 K as of 14.04.				
Issues	- Required calibration of the HRS target clamps (~30m). - Access to HT room to fix a problem with the HRS target heating (~30m). - Trip of HRS separator dipole magnets.				
Plans	GPS: - New target (#818) installation and heating up (17.04). - Separator and LEBT lines set up. Stable beam to TAS (18.04). - Proton scan, yield measurements and optimization (19.04). - Physics: Total absorption spectroscopy of neutron-rich indium isotopes (IS693) starting in the evening on 19.04 HRS: - ³⁹ K ⁺ beam to COLLAPS experimental station for commissioning (17.04). - MEDICIS irradiation of targets #767M and #723M (17-18.04)				
Intervention Request					
No	Duration		Preferred date/time		
Reason					
Impact					

PS							
Machine Coordinator last week		Alex Huschauer					
Machine Coordinator this week		Alex Lasheen					
Beam Scheduled							
East Area	Yes	nTOF	Yes	AD	Yes	SPS	Yes
Beam Availability by Destination (AFT)							
AD	98.1%	EA N	97.6%	EA T8	97.6%	EA T9	97.6%
nTOF	98.2%	SPS	98.1%				
Facility Status							
Summary	<ul style="list-style-type: none"> - AWAKE cycle for HiRadMat prepared at 3.5e11 ppb with transverse emittances of 2.7, 2.2 um at extraction - AD: FTA studies continue - EAST beams delivered and harmonisation of settings between the variants ongoing - Continued delivery of scrubbing (up to 2.4e11 ppb) and LHC single bunch beams - Delivered 8b4e and 36b standard beams for tests of the dedicated filling cycle - Delivering SFTPRO for NA commissioning (another iteration of energy matching done over the weekend, trajectories adjusted) - TOF delivered at 40 ns during the week (working point adjustments and investigations of beam loss ongoing on MD cycle) - Transverse emittance measurements at LIU intensity: <ul style="list-style-type: none"> - LIU brightness reached for the first time ever at 2.6e11 on 48b and 72b (~1.9 um average emittance) - 8b4e even brighter (~1.6 um average emittance) - MDs started 						
Issues	<ul style="list-style-type: none"> - Problems with recurrent KFA71 trips continue (mainly module 12 for which also the rise time is too long) → experts aware and working - SPS frequently reported extraction jitter, most likely linked to issues with 80 MHz cavities (ongoing trips of C80-89 – LLRF problem suspected by the piquet, power supply replaced for C80-88 on Friday) - SMH57 tripped with temperature fast abort, likely related to the settings adjustment done over the weekend. Discussion with expert on Monday, until then interlock threshold set higher. 						
Plans	<ul style="list-style-type: none"> - Continue improvements on TOF cycle and push intensity of parasitic bunches - Polishing of all beams 						
Intervention Request							
Yes	Duration	2h		Preferred date/time	-		
Reason	FINEMET cavity amplifier replacement						
Impact	Non-blocking, can be done in the shadow of other interventions						

PS East Area							
Facility Coordinator last week		D. Banerjee					
Facility Coordinator this week		D. Banerjee					
Beam Scheduled							
T8	Yes	T9	Yes	T10	No	T11	No
Beam Availability by Destination (AFT) – including injectors / excluding injectors							
Running T8	50.6/100%	T9	97.6/99%	T10	98.7/100%	T11	98.7/100%
Facility Status							
Summary	<ul style="list-style-type: none"> T08: Experiments in IRRAD until 13th then characterization of CHARM radiation field and beam measurements/alignment in IRRAD. EA2 evacuation sirens tested in the shadow of one of the access slots. T09: PAN users taking good data. T10: Beam ready for physics. ALICE ITS3 users had delays and started data taking from 14th April. T11: No user. CLOUD preparing for run. 						
Issues	<ul style="list-style-type: none"> T08: change of gain of XSEC070 in T8 affecting the counts logged on TIMBER (used to normalize beam and radiation field measurements in both IRRAD and CHARM, as well as to produce performance plots, etc.) To be understood: was change needed to avoid the XSEC signals to reach saturation. T09: T09.BVT037 had a MCB fault with a 1h 50 min downtime. T10: Low efficiency of XCET (beam particle ID). T11: April 14th evacuation alarm as CLOUD was testing new FLOTUS O3 generator with a leaky system. The area was cleared and the O3 generator switched OFF. Will check and make the system leak tight. 						
Plans	<ul style="list-style-type: none"> T08: continue preparation to start first active experiments in both areas during W16. Follow-up the BI XSEC gain issue. T09/T10: Continue operation. 						
Intervention Request							
Yes / No	Duration		Preferred date/time				
Reason							
Impact							

PS nTOF			
Facility Coordinator last week		M. Bacak	
Facility Coordinator this week		M. Bacak	
Beam Requested			
Yes			
Facility Status			
Summary		<p>Long stop on Wednesday took longer than expected due to novel measurement setup in experimental area 2 (EAR2) and last-minute modifications from our engineers – last piece was picked up from the external company on Tuesday afternoon and installed Wednesday during the day.</p> <p>All 3 experimental areas in data taking</p>	
Issues		On the contrary: amazing average beam intensity!	
Plans		EAR1: RF investigation & swap to (n,n') setup EAR2: Novel capture setup characterization EAR3 (NEAR): spectral/Maxwellian averaged cross-section setup	
Foreseen Beam Stop			
Yes	Duration	5h 4h	Date/Time We 19/04/23 9h-14h Fr 21/04/23 9h-13h

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	<ul style="list-style-type: none"> * Beam commissioning in FTA and DI line: <ul style="list-style-type: none"> - reference trajectory in FTA established with 1 nominal bunch * Hardware commissioning in AD: <ul style="list-style-type: none"> - restart of the e-cooler - restart of stochastic cooling but IST not fully completed - conditioning of the C10 cavity * Beam commissioning in ELENA: <ul style="list-style-type: none"> - analysis of scraper measurement 		
Issues	<ul style="list-style-type: none"> - problem with the FTA and DI BCT TRIC fixed on Monday - problem with the magnetic horn IPOC triggering fixed - problem with the longitudinal movement of the target fixed - QUAD-MAIN circuit regularly tripping 		
Plans	Continuing HW activities in AD ring and beam commissioning of FTA/DI line		
Intervention Request			
Yes / No	Duration		Preferred date/time
Reason			
Impact			

SPS							
Machine Coordinator last week		Michael Schenk					
Machine Coordinator this week		Arthur Spierer					
Beam Scheduled							
LHC	Yes	NA	Yes (BC)	AWAKE	No	HiRadMat	No
Beam Availability by Destination (AFT)							
LHC		NA	--	AWAKE	--	HiRadMat	--
Facility Status							
Summary	<p>Another busy week at the SPS with focus on target steering and BSI calibration for North Area (NA) beams, high-intensity scrubbing whenever possible, beam to AWAKE area, setting up HiRadMat bunch rotation, and a test of the operational hybrid beam up to 450 GeV (8b4e + standard 25 ns). Pilots and Indivs delivered to LHC whenever requested.</p>						
	<p>NA beam</p> <ul style="list-style-type: none"> - Beam steering to targets T2/T4/T6, achieved by Wednesday evening. - Adjustments of calibration factors by BI for intensity and multiplicity readings on SPS page 1. - Successful installation, irradiation, and removal of foil stacks on Friday with stable beam and equal sharing on targets T2/T4/T6 for BSI calibration. - Mini-scans for all targets as well as BSM scans in T2 and T4 (multiplicity and symmetry) were performed to obtain new references. - NA beam commissioning started on Friday evening and continued during the weekend with beam in all secondary lines, slightly ahead of schedule (planned start Monday, 17.04.) - Various tests were made with adaptive Bayesian optimization for spill noise corrections. Promising results on the 100 Hz noise line. To be continued. - Clean-up of rf settings to improve spill structure. 						
	<p>Hybrid beam</p> <ul style="list-style-type: none"> - Cycle with 6 injections was prepared and set up with Indiv and 1x12b. An extensive test was carried out on Thursday where 1 batch of 8b4e (56b), and up to 5 batches of standard 25 ns beam (36b per batch) were brought to flat top at 1.8E11 ppb, bunch length 1.6 ns, however yet with significant amount of uncaptured beam. Transverse emittances unknown. 						
	<p>Scrubbing & high-intensity beams</p> <ul style="list-style-type: none"> - Scrubbing continued, time, MKP temperature, and ZS spark rate permitting. Typically started in the evening and into the night, pushing intensity with single batch on long 400 GeV long flat-top cycle for different settings of longitudinal blow-up (up to 1x72b at 2.3E11 ppb). Eventually put on hold due to increased ZS tank 5 spark rates (see below). - A special scrubbing period was carried out on Wednesday with MKDH vacuum threshold at 1e-6 mbar and according voltage limits for energy limit 400 GeV (while LHC in access). No interlocking MKDH spikes during that phase (9 AM to 3 PM). One MKP spark required reset by expert. Up to 4x72b at 2.05E11 ppb at 400 GeV. Facing some transverse beam instabilities. - Test of automatic optimization of longitudinal blow-up. 						
	<p>AWAKE: bunch rotation was set up, beam permits signed on Wednesday and single bunches (1E11 p) were successfully extracted to the experimental area on Thursday with bunch rotation.</p>						
<p>HiRadMat: turn-by-turn diagnostics set up and bunch rotation was fine-tuned with extraction to TED.</p>							

Issues / follow-ups	<ul style="list-style-type: none"> - SFTPRO <ul style="list-style-type: none"> o Vacuum valves in TDC2 area were closed until Wednesday morning while beam had already been extracted to targets overnight. Went unnoticed as BIC (BA3 > "TT80 Vacuum") was accidentally still masked on OP side since 21.03. o Beam occasionally still unstable during the ramp, both in H and V. Checks and adjustments on transverse damper, chromaticity, and octupoles were made, improving situation, but beam not always stable yet. - Hybrid beam <ul style="list-style-type: none"> o Longitudinal quadrupolar coupled-bunch mode observed in PS; different energy matching settings found for 8b4e and standard beams, respectively, likely able to explain part of uncaptured beam. - Scrubbing & high-intensity beams <ul style="list-style-type: none"> o ZS tank 5 started sparking frequently during Friday night on scrubbing cycle. This started unexpectedly without change of ZS parameters. Persists even after ZS conditioning performed by expert on Sunday morning. To be investigated next week. Scrubbing "on hold". - Other <ul style="list-style-type: none"> o Cavity power limits measured: found Siemens to be limited to 800 kW rather than 1.05 MW. To be investigated. o False fire alarm in BA5 on Thursday afternoon required fire brigade intervention as fire doors BA4, 5, and 6 closed (~1 h). o All 4 wire-scanners found to be broken since last week – reason not fully clear yet. Further investigations and potential replacement(s) on Wednesday, 19.04. during access. o Mains and 400 V transformer trip on Tuesday (~2.5 h). o MBE2103 and bypass did not restart after mains / 400 V transformer trip (in BA2), required expert intervention (~3.5 h, for NA). o Electrical glitch on Wednesday evening causing mains to trip (~1.5 h). o Two alarms by MKE6 required access by Piquet for inspection. o MSE6 required conditioning. o Various investigations by experts to look into 800 MHz cavity trips. o SPS SIS lagging. Server was in CPU mode "energy saving". Now put to "max. performance" to see if that resolves issue. 			
	Plans	<ul style="list-style-type: none"> - NA beam commissioning continues. - SFTPRO: crystal alignment; investigate losses in BA80; timing tests with NA for dedicated LHC filling, potentially on Wednesday. - LHC: multi-bunch beams; BQM checks on all LHC-type beams. - MKP alignment. - Finalise feed-forward commissioning. - HiRadMat: check beam spot size on BTV in experimental area. - Wednesday, 19.04.: long access for tunnel inspection (to be done once per month); wire-scanner replacement(s): one spare to be installed in BA4, discussion between BI, SPS and LHC OP on Monday to take final decision on installing a spare in BA5 as well. - From last week: vacuum valve VVFA_610213 did not interlock extraction to LHC B1 as in undefined state (already clear: once valve state read properly, interlocks behave properly, too); PC RQID.660440 investigations. 		
Intervention Request				
Yes	Duration	12 h (+ pump-down)	Date/time	19.04.23, from 8 AM
Reason	Inspection of tunnel cracks; installation of spare wire-scanner(s).			
Impact				

SPS North Area							
Facility Coordinator last week		HWC					
Facility Coordinator this week		Beam Commissioning					
Beam Scheduled							
H2	Yes/No	H6	Yes/No	K12	Yes/No	P42	Yes/No
H4	Yes/No	H8	Yes/No	M2	Yes/No	TT20	Yes/No
Beam Availability by Destination (AFT)							
H2	%	H6	%	K12	%	P42	%
H4	%	H8	%	M2	%	TT20	%
Facility Status							
Summary	Hardware commissioning finished and started beam commissioning early thanks to quick readiness by OP-SPS. Successful foil activation calibration on TCC2 targets done on Friday, now being analysed. Started with EHN1/H2-8 and EHN2/M2 beam commissioning on Friday and continued over the weekend, already first useful beams in all lines. First hints that electron beam quality is much better after removal of VXSS vacuum chamber.						
Issues	Some trouble with T2 wobbling magnet interlock, ~3 hours downtime.						
Plans	Continue beam commissioning. Start with ECN3 today.						
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	Prepared and executed first proton beam test with Discharge Plasma Source: <ul style="list-style-type: none"> - Before p+: tested DPS and diagnostics using calibration trigger - Detected protons on all diagnostics (after synchronization) - Verified spatial alignment of DPS and new BTV with p+ beam Thanks to SPS, vacuum, EPC, firefighters, access system for making this possible		
Issues	Missing DPS trigger: tracked down to cabling and solved Vacuum system interlocks: solved with access to PLC		
Plans	Continue DPS commissioning, install additional diagnostics and BTV filters		
Foreseen beam stop			
Yes / No	Duration		date/time

LHC			
Machine Coordinator last week		J. Wenninger	
Machine Coordinator this week		S. Redaelli	
Statistics			
Availability	93%	Stable Beam Ratio	NA
Facility Status			
Summary	Important progress with the beam commissioning, helped by the excellent availability. <ul style="list-style-type: none"> • First collisions at 6.8 TeV on VDM and nominal pp cycles. • Full nominal cycle commissioned with beta* levelling to 30 cm. • All collimators aligned in all phases of the cycle, started validation of the protection settings. • Aperture measured at 30 cm, consistent with 2022. 		
Issues	No major issues		
Plans	Complete last commissioning steps (main point roman pots, injection and dump protection), test first train injections and start the physics run. Cryo system reconfiguration on Wednesday (~24h), in parallel to intervention in the SPS.		
Intervention Request			
Yes / No	Duration		Preferred date/time

CLEAR

Facility Coordinators last week Pierre Korysko

Facility Coordinator this week Pierre Korysko

Facility Status

Summary	Week 15 was dedicated to: - Bergoz Instrumentation Wall Current Transformer tests and measurements. - CLEAR Machine Development including development and optimisation of a new GUI for CLEAR Cavity BPMs.
Issues	No major issues.
Plans	Week 16 will be dedicated to CLEAR Machine Development.