

22 May 2023

ACCELERATORS & EXPERIMENTAL FACILITIES STATUS

SUMMARY OF WEEK 20 - 2023

Technical infrastructure – *J. Nielsen*

Linac 4 – *A. Lombardi*

PS Booster – *S. Albright*

ISOLDE – *E. Piselli*

PS – *A. Huschauer*

PS – East Area – *D. Banerjee*

PS – nTOF – *N. Patronis*

AD – ELENA – *L. Ponce*

SPS – *C. Zannini*

SPS – North Area – *D. Banerjee*

SPS – AWAKE – *G. Zevi Della Porta*

SPS – HiRadMat – *No report, started running today*

Linac 3 – *No report – Not running*

LEIR – *No report – Not running*

LHC – *No report*

CLEAR – *J. Bateman*

Technical Infrastructure (TI)				
Facility Coordinator last week		Jesper Nielsen		
Facility Coordinator this week		Ronan Ledru		
Statistics				
Alarms	3057			
Phone calls	551	Incoming	337	Outgoing 214
ODMs	88			
Facility Status				
Summary	<p>Mon 15/05/23: High pH alarm on WMS102, HSE-ENV sent onsite. The pH reached 11.1, so the reject was stopped.</p>			
	<p>Sun 21/05/23: Valve issue on the chilled water regulation for ALICE mixed water distribution (UW25). The valve has been manually adjusted until its replacement - 3H access is needed</p>			
	<p>Mon 22/05/23: 400kV Electrical glitch on RTE side, between Chaffard and Mions 1 All accelerators impacted but Linac 4</p>			
Issues				
Plans				
Intervention Request				
Yes	Duration	3H	Preferred date/time	
Reason	Valve replacement in UW25 – EN/CV			
Impact				

Linac 4			
Machine Coordinator last week		Alessandra Lombardi	
Machine Coordinator this week		Athanasios Topaloudis	
Statistics			
Availability	98.8%		
Facility Status			
Summary	A very good week Source : decrease gas by 2 μ s on Tuesday.		
Issues	2min 37 sec downtime to BIS 1hour 45 min due to a power converter for a quadrupole in the PIMS L4P.LQD11 PIPO came on site. Power unit was in bad state blocking the converter.		
Plans	Regular operation		
Intervention Request			
Yes / No	Duration		Preferred date/time
Reason			
Impact			

PS Booster			
<i>Machine Coordinator last week</i>	S. Albright		
<i>Machine Coordinator this week</i>	R. Murillo Garcia		
Beam Scheduled			
<i>ISOLDE</i>	Yes	<i>PS</i>	Yes
Beam Availability by Destination (AFT)			
<i>ISOLDE</i>	98.2%	<i>PS</i>	98.1%
Facility Status			
<i>Summary</i>	<ul style="list-style-type: none"> All operational beams delivered as requested. No significant change observed in water leak, direct inspections reduced to every two weeks. 		
<i>Issues</i>	<ul style="list-style-type: none"> A scattering of usual power converter trips and resets A couple of repeated trips on the BE.BSW required piquet intervention An intermittent drop of transmission at intensity (~1 in 30 cycles) appeared over the weekend, but the cause is still unclear. 		
<i>Plans</i>	<ul style="list-style-type: none"> Deliver beams to downstream facilities as needed Investigate intermittent transmission issue If possible, switch to an updated B-Train FESA class 		
Intervention Request			
No	<i>Duration</i>		<i>Preferred date/time</i>
<i>Reason</i>			
<i>Impact</i>			

ISOLDE					
<i>Machine Supervisor last week</i>		E.Piselli			
<i>Machine Supervisor this week</i>		E.Piselli			
Beam Scheduled					
<i>GPS</i>	Yes	<i>HRS</i>	No	<i>HIE-ISO</i>	No
Beam Availability by Destination (AFT)					
<i>GPS</i>	94.2%	<i>HRS</i>		<i>HIE-ISO</i>	%
Facility Status					
<i>Summary</i>	<p>HRS: On standby</p> <p>GPS: Target #759UC quartz line, neutron converter Stable beam already prepared on Monday 15.05. After proton scan, IDS (IS685) started on Tuesday night (protons on the converter) measuring between 130-132Cd. Since Cd yields slowly decreased (although lasers, target temp, quartz, and transfer line were optimized), on Friday, after a proton beam scan, we moved protons on target they have measured 133Cd. On Sunday afternoon we have switched back beam to converter to measure exotic cases and, in the evening back to converter. Quartz line seems t perform really well.</p>				
	<p>REX/HIE-ISOLDE: - REX (G.Piccinini) IHS: Repaired and operational. The preamplifier was found to be faulty (burnt driver module) and an exploded electrolytic capacitor exchanged. A loose connection was found in the power supply of grid 1 of the tube, which prevented its proper polarization. A faulty relay was also identified for replacement (spare parts ordered, awaiting delivery) as it is no longer reliable. However, it is currently functioning fine. Once the relay becomes available, it will only require a replacement. 7GAP1: The crowbar circuit has been redone, but it is still under investigation. Random trips are still occurring.</p>				
	<p>HIE ISOLDE: Reconditioning of the SRF by Daniel Valuch over the week.</p>				
<i>Issues</i>	<p>EBIS issue: Bakeout finished. We hope to have beam by today.</p> <p>GPS target and line failed few times.</p>				
<i>Plans</i>	<p>HRS: Target change foreseen on Wednesday. GPS: Hg beam to IDS until Thursday morning. Target change on Thursday, then Hg beam to TAS.</p>				
Intervention Request					
No	<i>Duration</i>		<i>Preferred date/time</i>		
<i>Reason</i>					
<i>Impact</i>					

PS							
Machine Coordinator last week		A. Huschauer					
Machine Coordinator this week		M. Fraser					
Beam Scheduled							
East Area	Yes	nTOF	Yes	AD	FTA comm.	SPS	Yes
Beam Availability by Destination (AFT)							
AD	97.6%	EA N	96.8%	EA T8	96.8%	EA T9	96.8%
nTOF	96.1%	SPS	96.1%				
Facility Status							
Summary	<ul style="list-style-type: none"> - LHC beams: extraction settings and TT2 trajectories homogenised between different variants - work on modified EAST cycle setup (using identical magnetic ramp as on dedicated TOF up to 20 GeV) continued; higher parasitic TOF intensities of ~550E10 p (operational today 350-400E10 p) and acceptable EAST spill quality achieved 						
Issues	<ul style="list-style-type: none"> - Over the weekend: cavity C10-81 not pulsing and C10-11 frequently tripping → piquet couldn't solve the problem, expert investigations needed - Synchronisation issues with KFA71 modules continue → ABT experts looking at it daily - KFA71 module 5 kept in standby over the weekend due to recurrent trips - EAST T9 stopped for several hours on Thursday due to power converter issue and other EAST users later for access - fault on power converter of extraction bumper BSW14 during night from Tuesday to Wednesday; intervention by piquet and expert necessary; caused ~2h downtime - SMH16 and KFA71 still occasionally pulsing with the CCV of the previous cycle, always leading to beam loss at extraction and radiation alarms → ABT experts investigating 						
Plans							
Intervention Request							
Maybe	Duration		Preferred date/time				
Reason	Might need an access for problematic 10 MHz cavities – to be discussed with expert Monday morning						
Impact							

PS East Area							
<i>Facility Coordinator last week</i>		D. Banerjee					
<i>Facility Coordinator this week</i>		J. Bernhard					
Beam Scheduled							
<i>T8</i>	Yes	<i>T9</i>	Yes	<i>T10</i>	No	<i>T11</i>	No
Beam Availability by Destination (AFT) - including / excluding injectors							
General: 94.4%							
<i>Running T8</i>	96.7%	<i>T9</i>	94.1%	<i>T10</i>	N/A	<i>T11</i>	N/A
Facility Status							
<i>Summary</i>	Mostly smooth running of T09.						
<i>Issues</i>	T09: T09.RQNEL012 fault on 18 th May for 4hr coming from the WIC.						
<i>Plans</i>	<ul style="list-style-type: none"> • T09: CALICE continues. • T10: No user. • T11: No user. 						
Intervention Request							
Yes / No	<i>Duration</i>		<i>Preferred date/time</i>				
<i>Reason</i>							
<i>Impact</i>							

PS n_TOF				
<i>Facility Coordinator last week</i>	N. Patronis			
<i>Facility Coordinator this week</i>	N. Patronis			
Beam Requested				
Yes				
Facility Status				
<i>Summary</i>	<ul style="list-style-type: none"> Progressing with physics programme according to planning 			
<i>Issues</i>	<ul style="list-style-type: none"> No issues 			
<i>Plans</i>	<ul style="list-style-type: none"> EAR1: $^{181}\text{Ta}(n,g)$ measurement (C6D6, sTED) EAR2: Capture setup auxiliary measurements NEAR: $^{89}\text{Y}(n,g)$ using 20mm B4C filters 			
Foreseen Beam Stop				
Yes	<i>Duration</i>	5h	<i>Date/Time</i>	We 24/05/23 9h-14h

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"> * Bake-out of the injection kickere and ejection septum completed on Wednesday, first leak detection OK, final leak test at on Monday * Proton beam sent on target (1 nominal bunch, target out) to perform optics studies in FTA and resteer F16 after change of PS cycle * Stability test of DI Pow1553 power converters with reduced number of pulses before injection timing * final HW tests of e-cooler and power converters in AD ring * continue studies to optimize intenisty on Hminus cycle in ELENA 		
Issues	- nothing to report		
Plans	<ul style="list-style-type: none"> * Leak detection and pressure in injection region * start injection kicker conditioning, ejection septum HW tests * inject nominal beam on target and start commissioning of DI line with beam. * e-cooler optimization in ELENA with Hminus 		
Intervention Request			
Yes / No	Duration		Preferred date/time
Reason			
Impact			

SPS								
<i>Machine Coordinator last week</i>		Carlo Zannini						
<i>Machine Coordinator this week</i>		Francesco Maria Velotti						
Beam Scheduled								
<i>LHC</i>	Yes	<i>NA</i>	Yes	<i>AWAKE</i>	Yes	<i>HiRadMat</i>	No	
Beam Availability by Destination (AFT)								
<i>LHC</i>	88.9%	<i>NA</i>	80.4%	<i>AWAKE</i>	97.0%	<i>HiRadMat</i>	%	
Facility Status								
<i>Summary</i>	<p>North area (SFTPRO beam):</p> <ul style="list-style-type: none"> Intensity adjustment/increase on SFTPRO to accommodate physics request now we have 105/47/60. Dedicated MDs on Wednesday on empty bucket channeling and TT20 optics with non-local crystal shadowing studies <p>AWAKE: Several hours of dedicated AWAKE on Thursday following the issue with MBE2103. AWAKE beam availability was limited due to the difficulties to fill LHC.</p> <p>LHC:</p> <ul style="list-style-type: none"> LHC fill with increased bunch intensity on the hybrid beam (1.5e11 ppb on Wednesday and 1.6e11 ppb the first time on Friday afternoon). Operational beam is not reproducible. To be further investigated with high priority next week. We can have periods with bad beam (extremely difficult to fill LHC) and periods with good beam with the same beam settings in the SPS. <p>MDs:</p> <ul style="list-style-type: none"> Short parallel MDs on Monday and Tuesday MD to push intensity on the LHC standard beam in parallel to SFTPRO dedicated MDs. Record flat top intensity for LHC type beams of 2.17e11 ppb with 288 bunches and 1.64 ns bunch length. 							
	<i>Issues</i>	<ul style="list-style-type: none"> Major fault on the MBE2103 power converter on Wednesday afternoon (~24h downtime for NA). Broken thyristors. The four bridge circuits had to be replaced. More details here Cavity 6 trips in the morning for the AWAKE cycle (fixed with changes in the voltage limits) ~1h downtime due to some issues with the ZS (sparking on Saturday and voltage on Sunday) Several cavity 1 trips Evident hysteresis issue: the orbit of the LHC type beam was significantly affected by the bump on the cycle in front (SFTship) RF synchronization to be fixed urgently (slowing down LHC fill) Hybrid operational beam not reproducible 						
	<i>Plans</i>	<p>NA physics, HiRadMat week</p> <p>Follow-up:</p> <ul style="list-style-type: none"> Hybrid operational beam is not reproducible. It can make LHC fill very difficult. To be further investigated with high priority. Investigate if scraping percentage in H can be reduced Scrapers' behaviour after Friday 07.05 intervention RF synchronization issue 						
Intervention Request								

No	<i>Duration</i>		<i>Preferred date/time</i>	
<i>Reason</i>				
<i>Impact</i>				

SPS North Area							
Facility Coordinator last week		D. Banerjee					
Facility Coordinator this week		J. Bernhard					
Beam Scheduled							
H2	Yes	H6	Yes	K12	Yes	P42	Yes
H4	Yes	H8	Yes	M2	Yes	TT20	Yes
Beam Availability by Destination (AFT)							
H2	80.8%	H6	80.8%	K12	80.8%	P42	80.8%
H4	80.8%	H8	80.0%	M2	80.8%	TT20	80.8%
Facility Status							
Summary	<p>H2/H4/H6/H8: Mostly smooth running. H4: NA64e detector commissioning. H6: High intensity tuned for EP Pixel, ALICE ITS and Malta. M2: CEDAR commissioning and fixing issues in regulation and pressure reading. P42/K12: NA62 running at lower intensity due to TDAQ issues.</p> <p>Sharing while NA62 has troubles: 100 (T2) - 50 (T4) - 60 (T6), then back to 90 (T2) - 60 (T4) - 60 (T6). NA64e will profit from any extra intensity on T2.</p>						
Issues	<p>H8: Quad 19 fault. M2: The pressure reading of CEDAR089 was unstable and due to regulation, He was lost. BI updated the software on 16.05. and replaced the pressure sensor on 17.05., stable since. P42/K12: No issues. Access door fixed on Wednesday morning.</p>						
Plans	<p>Continue physics in EHN1, EHN2 and ECN3.</p> <ul style="list-style-type: none"> • H2: ALICE FOCAL --> RADICAL. • H4: Continue NA64. • H6: EP Pixel, ALICE ITS, ATLAS MALTA --> ATLAS HGTD, ATLAS TOF. • H8: CMS MTD, STRAW TRACKER --> SND + CMS MTD (in parallel). • M2: Continue AMBER antiproton 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 Third week of proton run: completed physics program. Gained time from NA issues, lost time due to LHC issues.

Summary of this run (week 1 / week 2 / week 3):

- Extractions: 5966 / 3715 / 6321
- Hours with beam: 40.8 / 23.5 / 38.9
- Hours waiting for beam: 23.9 / 22.9 / 15.7
- Availability: 63% / 50% / 71%

Summary of the week:

	M	T	W	Th	F	S	S
SPS extractions	1144	595		2151	198	1460	773
Hours of beam to AWAKE	9.0	4.4		9.9	1.5	9.2	4.9
Hours with no beam	0.8	2.0		2.8	6.5	0.2	5.4

Daily activities:

- Monday: Plasma length = 6.5 m. Start with Xenon (narrow and wide bunch), then Argon (wide bunch)
- Tuesday: double access to explore 3.5 m and 3.5+6.5m plasma.
- Wednesday (MD): change setup to a single 10-m plasma
- Thursday: dedicated-AWAKE supercycle. Xenon plasma dataset (narrow, wide and asymmetric beam optics)
- Friday: LHC injection issues
- Saturday: Helium plasma scans. wide-bunch proton optics in Helium, then Argon plasma
- Sunday: LHC injection issues. Finished Argon plasma

Issues Tuesday: Access system failure caused patrol loss also in CNGS area

Plans Monday-Wednesday: Dismantle the Discharge Plasma Cell to prepare for installation of Density Step Rb Plasma Cell
Thursday/Friday: Access System maintenance

Foreseen beam stop

Yes / No

Duration

date/time



Week Summary Report

Supervisor: Joseph Bateman

Overall Summary

Week type:

- UVic VHEE UHDR Experiments – Biological Sample and Scintillator Dosimetry
- CHUV ZFE and Phantom dosimetry for VHEE UHDR

Date/Week Number : 15/05/23 to 19/05/23 (Week 20)

EDMS number : -
Beam time : 32 h
Fatal Failure time : 6 h
Installation time : 2.5 h
Number access : 12

#	Experiment Name	Responsible	Institute	Installation time (h)	Access number	Beam time (h)
1	UVic VHEE UHDR Experiments	A.Hart, C.Gigu��r��, M.Bazalova-Carter	University of Victoria	2	10	24
2	CHUV ZFE and Phantom Dosimetry	M.C.Vozenin, J.Olivier, H.Kacem, C.Bailat	CHUV	0.5	2	1
3	CLEAR MD	CLEAR Team	CERN	0	0	7

Weekly activity

This week was dedicated to medical research with the University of Victoria collaborators for both biological sample irradiations and real-time scintillator dosimetry for investigations into UHDR VHEE RT. During the week we also had half a day dedicated to ZFE irradiations for CHUV along with 6 other phantom dosimetry measurements. CLEAR MD ofr uniform beam generation, integration of quad scan software and preparation of beam conditions for next weeks experiments was carried out over the weekend.

A. Day by day report

Monday 15/05

- For most of the day maintainence was being carried out on the PAD so no beam until late afternoon.
- Installed 4 scintillator probes (in one holder) in the robot and films for practice runs.



- Beam On at 17.30
- Some issues with laser – shutter open but no signal on MTV125. Eventually turned out to be something blocking the laser line.
- Practise measurements for biological sample irradiations – 20 Gy, 30 Gy and 40 Gy and UHDR and CONV.
- Then initial tests on the fibre with 9.0 nC shots at 10 Hz.
- Beam off at 19:15

Access: 1 - beam time 1h 45m

Tuesday 16/05

- Access at 8:15 to collect films from practice run for analysis.
- Preparation of biological samples and films in the morning, installed for beam on at 11:00.
- Irradiation of first batch of 24 samples (+2 lead samples for alignment) of 20 Gy, 30 Gy and 40 Gy at UHDR and CONV.
- Access at 13:30 to collect samples.
- Second batch installed for beam on at 15:30.
- Another 24 (+2 for lead) samples irradiated with same conditions as first batch.
- Beam off at 17:00.
- Access at 17:30 to collect samples for second batch.

Access: 3 - beam time 6 h 45

Wednesday 17/05

- Another set of 24 (+2) samples installed by 9:30.
- Beam on at 9:40 for biological sample irradiations at 20 Gy, 30 Gy, 40 Gy at UHDR and CONV.
- Beam off at 12:00.
- Access at 12:15 to collect samples.
- 12 ZFE and 6 phantom dosimetry sample holders installed at 13:00.
- Beam on at 13:10.
- 12 ZFE irradiations at 8 Gy and 10 Gy UHDR and CONV (CONV at 20pC 10 Hz rather than 200pC 0.833 Hz for lower instantaneous dose rate).
- 6 phantom dosimetry measurements at 10 Gy – 3 UHDR and 3 CONV (usual CONV dose rate). Each UHDR and CONV holder had different film type i.e., 1 EBT3, 1 EBT-XD and 1 MD-V3.
- Beam off at 14:00.
- Access at 14:20 to collect samples.
- Beam on at 15:45 for scintillator dosimetry measurements.
- Response linearity measurements with 3 pulses per measurement (in single shot mode) at 2.0 nC, 5.5 nC, 10 nC, 20 nC, 30 nC, 40 nC, 45 nC, 50 nC, 55 nC, 60 nC, 65 nC, 70 nC.
- Beam off at 17:00
- Access at 17:30

Access: 3 - beam time 4h 25

Thursday 18/05

- Beam on at 10:30.
- Beam off 10:50.
- C-robot issue – robot arm got caught on fibre and dragged fibre holder out of slot.
- Emergency access to solve issue at 11:45.
- Beam back on at 14:15. Scintillator response linearity measurements for 60 nC, 50 nC, 40 nC, 30 nC, 20 nC, 10 nC, 2 nC.
- 5 kGy long irradiation at 9.0 nC per pulse at 3.33 Hz for 5605 nC.



- Repeat of linearity measurements up to 60 nC.
- 1 hr recovery time for fibre, then another repeat of linearity measurements up to 60 nC.
- Another 5 kGy long irradiation at 3.333 Hz up to 5605 nC.
- Final repeat of repones linearity measurements up to 60 nC.
- Beam off at 17:00.

Access: 1 - beam time 3 h

Friday 19/05

- Access at 8:45
- Samples installed for another run of biological sample irradiations.
- Beam on at 10:10 for another round of 24 (+2) irradiations at 20, 30 and 40 Gy at UHDR and CONV.
- Beam off at 14:00.
- Access at 14:30 to collect samples and install second batch for the day.
- Beam on at 15:30 for batch of 20 (+2) samples installed for another run at 20, 30 and 40 Gy UHDR and CONV.
- Beam off at 17:00.
- Access at 17:50 to collect samples and align for scintillator fibre.
- Beam on at 18:00 for scintillator.
- Repeat of response linearity measurements from 2 nC up to 50 nC (couldn't achieve 50 nC with beam conditions that day.)
- Observed between 2 nC and 20 nC that when adding bunches the beam had a significant vertical kick.
- Beam off at 19:00

Access: 3 - Beam time 8 h 35

Saturday 20/05

- Beam on at 16:40 for uniform beam tests
- Beam off at 19:00

Access: 0 - Beam time 2 h 20

Sunday 21/05

- Beam on at 14:30
- Klystron breakdowns in MKS11 overnight
- Issues with MKS11 tripping multiple times
- MKS11 conditioned starting at 33500 V up to 36000 V
- Preparations for VHEE pencil beam spatially fractionated measurements next week – 20Gy in air with 0.5x0.5 beam size.
- Cleaning RF guide
- Beam for quad scan software.
-

Access: 0 - Beam time 4 h (as of 18:30 on 21/05)

Other business

- None

Additional resources

- None



B. Main issues

- MKS11 tripping over the weekend.
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C. Action needed to be followed up

- None