

11 April 2023

ACCELERATORS & EXPERIMENTAL FACILITIES STATUS

SUMMARY OF WEEK 14- 2023

Technical infrastructure

Linac 4

PS Booster

ISOLDE

PS

PS – East Area

PS – nTOF

AD – ELENA

SPS

SPS – North Area

SPS – AWAKE

SPS – HiRadMat

Linac 3

LEIR

LHC

CLEAR

Linac 4

Machine Coordinator last week	Sanchez Alvarez Jose-Luis		
Machine Coordinator this week	Topaloudis Athanasios		
Statistics			
Availability	99.3%		
Facility Status			
Summary	Excellent week		
Issues	1. On Monday, Modulator CCDTL0304 tripped twice - 17 min 2. On Tuesday, Modulator PIMS 9-10 klystron vacuum interlock. Vacuum pump restarted – 29 min 3. On Wednesday: - Chopper tripped – 4min - RFQ Breakdown – 3min - L4L.RCH.111 tripped – 18 min		
Plans	Regular operation.		
Intervention Request			
No	Duration		Preferred date/time
Reason			
Impact			

PS Booster			
Machine Coordinator last week		C. Bracco	
Machine Coordinator this week		F. Asvesta	
Beam Scheduled			
ISOLDE	Yes	PS	Yes
Beam Availability by Destination (AFT)			
ISOLDE	98.6%	PS	98.5%
Facility Status			
Summary	<ul style="list-style-type: none"> All operational beams delivered as requested. AWAKE and VdM beams ready 		
Issues	<ul style="list-style-type: none"> Non-blocking problem with missing current acquisition in IPOC for ring 3 KSWs persists (probably a card has to be replaced) BTY.DVT212 current fluctuations: two accesses required. A card was initially replaced but this did not fix the problem, an adjustment of the internal timing eventually solved the situation BTY.DHZ323: different polarity requested for some cycles but not bipolar converter (electromechanical switch) ==> set 0.5 A to all users and 0.1 A to STAGISHRS and NORMHRS Alarm on BI2.BSW cooling: the alarm was not published in the FESA_Class but only on LASER running on CWO-CCC-B0LF. The alarm was acknowledged when opening another session on CWO-CCC-B0LC. The FEC of the cooling control system will be rebooted at the next occasion but the problem is probably on the LASER side (to be monitored) WD issues: BCT8L1 gains are no more automatically set by the cruise control but new default values, found by Jose, are set for the different users: <ul style="list-style-type: none"> LOW_GAIN 14db for AD, MTE, TOF, ISOGPS/HRS type beams, LOW_GAIN 0db for all LHC, STAGISO beams. BR3.DHZ12L4 power converter exchanged on 09/09 morning 		
Plans	Deliver beams to downstream facilities as needed		
Intervention Request			
No	Duration		Preferred date/time
Reason			
Impact			

ISOLDE					
Machine Supervisor last week		Emiliano Piselli			
Machine Supervisor this week		Jose Alberto Rodriguez			
Beam Scheduled					
GPS	Yes	HRS	No	HIE-ISO	No
Beam Availability by Destination (AFT)					
GPS	99.7%	HRS		HIE-ISO	
Facility Status					
Summary	<p>GPS: LOI246, LOI35, LOI226 New LIST target (#777) on GPS front end on Tuesday (4th of April). Tuning performed to the central beam line and to GLM from BE-OP. Remote intervention needed on Saturday evening to restart the target line.</p> <hr/> <p>Input from K. Chrysalidis on behalf of SY-STI:</p> <p>SY-STI have then started their run measuring yields of dysprosium on Thursday. They have then continued with this until Friday mid-day and then switched over to promethium, for which we measured yields on Sunday. Thulium yield measurement starting on Monday.</p> <p>HRS: Stable beam tuning done on Wednesday morning, very good transmission using reference files prepared during the commission period. CRIS users were supposed to take stable beam for their commissioning by Friday evening. Unfortunately, it was not possible due to a problem with the front end HT. Once called in, I have checked that we were not able to restart the HT because of an interlock. HT experts (on best effort) were called, but they could not intervene. Intervention foreseen on Tuesday.</p>				
Issues	<p>No issue to report from Isolde. Only few small problems at RILIS, solved by SY-STI:</p> <ul style="list-style-type: none"> - Local PC broke - Pump laser broke 				
Plans	GPS: LOI246, LOI25, LOI226 till Monday 17/04				
Intervention Request					
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	Yes	SPS	Yes
Beam Availability by Destination (AFT)							
AD	98.5%	EA N	92.7%	EA T8	92.7%	EA T9	92.7%
nTOF	92.9%	SPS	93.1%				
Facility Status							
Summary	<p>Busy week with the following main activities:</p> <ul style="list-style-type: none"> - EAST_T8: Extraction and transfer line setting-up (E. Johnson, M. Delrieux) using optimisers; irradiations started - TOF: Transfer line optics studies (Y. Dutheil) and start of physics run - AD: Setting-up of AD cycle and first beam to AD target on Thursday! FTA transfer line studies ongoing (Y. Dutheil) - Delivering beams for SPS scrubbing and LHC filling - Setting up beam for HiRadMat (high-intensity single bunch @35e10 ppb) 						
Issues	<ul style="list-style-type: none"> - POPS DC3 trip (communication issue) Tuesday after midnight (3h stop; piquet intervention) - Exchange of nTOF Semgrid patch panel required 1h beam stop for SPS/LHC Thursday lunchtime. This was the main issue of this week, as with the new patch panel installed during the YETS to decouple H/V planes did not provide correct H profiles. This blocked the transfer line optics commissioning and potentially operation to nTOF as well (used for interlocking to avoid destroying the target). - 2h15m piquet intervention for injection kicker PI.KFA45 Sunday early morning 						
Plans	<ul style="list-style-type: none"> - Increased losses in FTN with the reduced bunch length and without dummy septum need to be understood. - FTA line commissioning ongoing - Tweaking all beams, homogenising different EAST cycles - Start of MDs in PS 						
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	<ul style="list-style-type: none"> • Beam commissioning on the PS side • No issues with hardware downstream the target (umegas preamp problem solved) • First physics data taken with commissioning beam <ul style="list-style-type: none"> ○ Novel high efficiency TOF imaging detector EAR1 ○ Diamond flux at NEAR (1e12 n/cm2/s) • Setting up next experiments for physics beam 		
Issues	<ul style="list-style-type: none"> • Troubles with horizontal SEM grid upstream the target at >40% nominal intensity – problem solved by going back to the previous electronics chain (single patch box). Many thanks to OP and BI teams! • Some problems with beam losses for the 28ns pulse. No problem when 35 ns is adopted. Many thanks to PS teams for their efforts.! 		
Plans	<ul style="list-style-type: none"> • Capture setup characterization • Investigation of beam induced RF problem at small TOFs in EAR1 together with EMC expert 		
Foreseen Beam Stop			
Yes	Duration	6h	Date/Time
			We 11/04/23 8h-14h

SPS							
Machine Coordinator last week		Stephane Cettour Cave					
Machine Coordinator this week		Michael Schenk					
Beam Scheduled							
LHC	Yes	NA	No	AWAKE	No	HiRadMat	No
Beam Availability by Destination (AFT)							
LHC	-%	NA	-%	AWAKE	-%	HiRadMat	-%
Facility Status							
Summary	<p>An very intense week</p> <ul style="list-style-type: none"> • DSO test North Transfer, EHN1, EHN2, TCC8, ECN3 fully completed Beam permit signed North Transfer HIRADMAT • Beam extracted to HIRADMAT Pilot beam 1.2e10 ppb Indiv beam 1.1e11 ppb Indiv beam 2.7e11 ppb • We prepared 3 beam for HIRADMAT with tune setting in trim history Pilot beam 1e10 ppb Indiv beam 1e11 ppb Indiv beam 3e11 ppb We will need time to complete the synchronisation of extraction and the bunch rotation • MKP alignment did for 200ns of batch spacing, we will need more time for fine tuning • Completed setup feedforward loop but with some issues Gregoire need to discuss with Arthur to found a solution. The phase loop and the feedforward loop going in different direction • Danilo completed the calibration cavities voltage • 8b4e beam 2X56 bunches spaced by 250ns at 2e11 ppb took on LHCMD3 In opposite of last year we could control vacuum spike amplitude on 800 MHz • Awake cycle with an indiv beam at the intensity of 1e11 ppb ready for next Thursday but without bunch rotation on demand of Edda • We lauched different SC configurations and measure the impact of the hysteresis on tune at FB 						
	<p>Scrubbing run</p> <ul style="list-style-type: none"> • The scrubbing continued using trains of 72 bunches with the main focus on further conditioning the new MKP-L and on attempting to condition the MKD-H with high intensity. At the beginning of the week, MKDH pressure spikes exceeding the hardware interlock level were observed at flat top with 4x72 bunches and 1.54e11 p/b. Throughout the week (and sometimes in parallel to feed-forward commissioning), scrubbing was performed using the specially created 400 GeV cycle with a long flat top to achieve short bunches for extended durations. Scrubbing periods with single batches of high intensity (up to 2e11 p/b at flat top) were alternated with periods of using 4 batches and gradually reducing the bunch length at flat top, which turned out to be relatively effective even though the MKDH pressure spikes remained sometimes quite unpredictable. On Thursday night it was possible to reach 1.8e11 p/b at the 400 GeV plateau with 4 batches and 1.6 ns bunch length (i.e. what is needed for LHC injection) with quite good beam transmission (almost 95%). In some occasions, sparks were encountered on the MKP-L and the MKP-S requiring the intervention of the Piquet or the ABT kicker expert. To be mentioned also that increased temperature was observed on the MKP-S as expected due to beam induced heating in particular when running with high intensity multi-batch beams. This required some cool-down 						

	<p>periods especially during the weekend. If time allows, scrubbing for even higher intensity can be attempted in the coming days.</p> <ul style="list-style-type: none"> • A test with the 8b4e beam on Wednesday was also successful. Using the 400 GeV cycle the pressure spikes in the region of the 800 MHz cavity 1 (and LSS6 close to the start of TT60, which also reacted to this beam configuration with pressure spikes) could be conditioned with beam. At the end of the session, a maximum of $2e11$ p/b could be achieved with 1.6 ns bunch length at flat top with 2 batches spaced by 250 ns (last year the maximum intensity for this configuration was below $1.8e11$ p/b). This gives hope that also this part of the machine can be conditioned for the high intensity beams ($8e4$ in this case). <p>Thanks to Hannes for the summary</p>
<p><i>Issues</i></p>	<ul style="list-style-type: none"> • One MPS station SMD10 tripped and needed an intervention to change one fuse in protection relay in BE • Fire alarm in BA6, fire brigade need to do a patrol, back to a normal situation (CV investigating on ventilation) • Beam stop for 2h00, access in NToF target • Beam stop for 3h00, access in BA1 to analyse the tunnel cracks • In the WE no beam from PS for 2h00 • Problem with PC RQID.660400 connected to a dipole for fire ball experiment has been solved • Setup 800 MHz on HIRADMAT1 but we lose the communication with these FECs cfv-ba3-allfb800c1 cfv-ba3-allfb800c2 We tried to reboot them but after, we have lost the hardware setting. We needed to redrive several parameters. Anthony Rey, Gregoire Hagmann and Yvan Karpov tried to solve the problem (This problem will need to follow up) • Access system in faulty in ECA5, PLC communication error need an intervention of access expert, after replacement of several cards • Vacuum valve in TT60 VVFA_610213 was in error (state undefined) since 21h00 on Friday without interlocked the extraction After intervention the piquet did several tests with the gauge coupled to this valve and the interlock working fine but we could not close manually this valve Need to investigate more (maybe this valve is blocked open) Apparently the beam injected in the LHCB1 before the repairing of this valve had an emittance to high and after the intervention the emittance was fine Maybe we can conclude that this valve was closed and did not interlock the extraction so we have send the beam in LHCB1 across this valve To be checked • F. Dos Santos: request to inspect once per month the tunnel cracks to measure movements. Call P. Bestmann. • Access validated on April 19 for tunnel cracks inspections and works (duration all the day) • MKP and MKDH vacuum reset needs proposition - certain part of resets can be done by operators as long as we are scrubbing: <ul style="list-style-type: none"> ▪ Distinguish between vacuum spike and sparks! ▪ First line, operator can reset vacuum spike; second line is expert in case of sparks; third line is piquet for everything else than vacuum activity, i.e., conditioning; ▪ On the kicker application there is a clear YES/NO switch that teels if we are to classify this as spark or not; ▪ Definitively always put an entry in the logbook and tag the entry with the expert; ▪ At any beam stop - inform piquet and launch a conditioning for the MKP ▪ Procedure to follow: SPS-OP will continue calling the experts • MKDH threshold changes for dumps at loewr energies: <ul style="list-style-type: none"> ▪ Procedure to follow: SBDS kickers vacuum interlock thresholds management during scrubbing runs Document 2716721 (v.2.1)

Plans	<ul style="list-style-type: none"> • Scrubbing needs to continue for the moment as MKP-L not yet fully condition up the ramp; cool-down times required as well as MKP-S are now limiting • Check if we can interlock on BQM bunch length in the SIS • Problem on vacuum valve VVFA_610213 in error and did not interlock extraction to LHCB1 (maybe correlated with vacuum valve blocked open) • On cavities 800MHz when we reboot these FEC (cfv-ba3-allfb800c1 cfv-ba3-allfb800c2) we have lost the hardware settings • Hiradmat Pulsed list for week 21 from Nikos : <ul style="list-style-type: none"> ▪ User HIRADMAT1 ▪ Bunch rotation set ▪ 50 pilots (1E10) ; ▪ 150 single bunches 1E11 (“INDIV”) ▪ 150 single bunches with 3E11. (“AWAKE type”) Pulse list : <table border="1" style="margin: 10px auto; border-collapse: collapse; text-align: center;"> <thead> <tr style="background-color: #800000; color: white;"> <th colspan="8">Beam Pulse List</th> </tr> <tr> <th rowspan="2">No</th> <th colspan="3">Intensity</th> <th colspan="2">Beam spot [mm]</th> <th rowspan="2">Bunch spacing [ns]</th> <th rowspan="2">Bunch length [ns]</th> </tr> <tr> <th># bunches</th> <th>p/bunch</th> <th>Total</th> <th>Sigma_x</th> <th>Sigma_y</th> </tr> </thead> <tbody> <tr> <td>1-50</td> <td>1</td> <td>PILOT</td> <td>1.00E+10</td> <td>1</td> <td>1</td> <td>--</td> <td>1</td> </tr> <tr> <td>51-200</td> <td>1</td> <td>1.00E+11</td> <td>1.00E+11</td> <td>1</td> <td>1</td> <td>--</td> <td>1</td> </tr> <tr> <td>201-350</td> <td>1</td> <td>3.00E+11</td> <td>3.00E+11</td> <td>1</td> <td>1</td> <td>--</td> <td>1</td> </tr> </tbody> </table> <ul style="list-style-type: none"> ▪ Need bunch rotation like AWAKE 			Beam Pulse List								No	Intensity			Beam spot [mm]		Bunch spacing [ns]	Bunch length [ns]	# bunches	p/bunch	Total	Sigma_x	Sigma_y	1-50	1	PILOT	1.00E+10	1	1	--	1	51-200	1	1.00E+11	1.00E+11	1	1	--	1	201-350	1	3.00E+11	3.00E+11	1	1	--	1
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Intervention Request																																																
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LHC			
Machine Coordinator last week		E. Bravin	
Machine Coordinator this week		J. Wenninger	
Statistics			
Availability	71%	Stable Beam Ratio	14% (commissioning)
Facility Status			
Summary	<p>The recovery from the aftermaths of the loss of electricity in Pt. 4 lasted until the late afternoon of Tuesday. The RF direct cooldown, after the replacement of the rupture disks, worked well and no negative effect has been noticed, neither on RF nor on cryogenics.</p> <p>When the machine was restarted the orbit at injection had to be readjusted due to the movement of the triplet in L5 caused by temperature excursion.</p> <p>Several cycles with nominals and pilot bunches were made during the week to optimize the orbit in the ramp and adjust coupling, tune and chroma all along the cycle. We also had many shifts of the OMC team for optics corrections of the nominal and VdM cycles and for studies at injection.</p> <p>On Wednesday morning the collimation system was setup at injection, including TCTs for collisions at 900GeV. This included the first collisions of the year. All the required loss maps have been carried out and validated as well as a global aperture measurement. The aperture measurement is perfectly in line with expectations: above 12 sigma everywhere and bottlenecks in IR6.</p> <p>The setup of the Van der Meer cycle is also well advanced with several cycles with pilots during the week, ready now to start operating with nominals.</p> <p>On Thursday we had the first stable beam of the year with 3b at 450GeV. A shift of one bucket of B1 was needed to centre the collisions in the experiments. SB at injection was completed with fills on Friday and Sunday with 12b.</p> <p>The ABT team has started the setup of the injection and injection protection, the work will continue next week.</p> <p>The RF cavities have been phased, only one cavity could not be completed and remains to be done.</p> <p>On Sunday evening the new ion cycle was tested for the first time, at the 3rd ramp the beam made it to the end.</p>		
Issues	<p>Several stops due to injector problems, one of the most recurring issues is related to the SPS MKP.</p> <p>Problem with vacuum valve in TT60, we probably sent beam to LHC with the valve closed, no warning or interlock triggered, only noticed unusually large emittance of injected B1 during Friday night.</p>		
Plans	Continue beam commissioning. Set up collimation at FT, setup injection protection, nominal cycle with nominals, finalize VdM cycle.		
Intervention Request			
Yes / No	Duration		Preferred date/time

CLEAR

Facility Coordinators last week	Joseph Bateman & Pierre Korysko
Facility Coordinator this week	Pierre Korysko
Facility Status	
Summary	Week 14 was dedicated to 3 experiments: <ul style="list-style-type: none">- Obtaining a flat profile beam with scatterers.- Real-time dosimetry measurements with optical fibres.- Uniform Beam Generation using the photo-cathode and solenoids.
Issues	No major issues.
Plans	Week 15 will be dedicated to 2 experiments: <ul style="list-style-type: none">- Testing a new Bergoz Instrumentation Beam Current Transformer.- Passive dosimetry studies with radiochromic films.