



BE-ABP-CEI
Coherent Effects and
Impedance

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Coherent Effects and Impedances section (CEI) – general information

Giovanni Rumolo

CEI Section Meeting, 15/08/2024

Scientific secretary: Lorenzo Giacomel

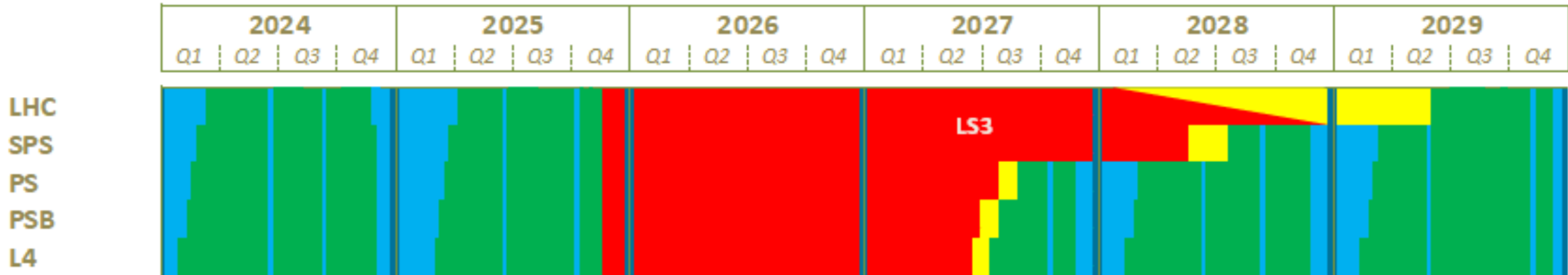
<https://indico.cern.ch/event/1439355/>



Arising matters

- LS3 extension?
 - At the moment, LS3 is planned to start in November 2025 for the whole CERN accelerator complex and last till mid-2027 for PS complex, mid-2028 for SPS and mid-2029 for LHC

Long Term Schedule for CERN Accelerator complex





Arising matters

- LS3 extension?
 - Two new important ingredients from HL-LHC
 - Extension of the allocated time for the core drilling (vertical cores to be excavated in LS3 between the new HL-LHC galleries) from 2 month to 6 months
 - The most recent schedule analysis for LS3 activities concluded that the LS3 length needs to be extended by approximately 11 weeks to accommodate previously unscheduled activities (i.e. CV piping replacement) or activities that require more time to be carried out (Minor Civil Engineering Works, DSL modification ,...)
 - All in all, the project is preparing a Schedule Change Request that asks for an overall extension of the LS3 length by 6 months (already discussed with the LS3 coordination team and presented to the ATS management)
 - The Schedule Change Request should get into circulation by next week
- Adding in the picture the possible delay of LS3 start (mid-2026?) – final decision expected in September 2024 – this might mean that HL-LHC beam commissioning will be pushed well into 2030!



1st CERN School of Computing on IT Services

- The 1st CERN School of Computing on IT Services will take place on November 4-8, 2024 in Ferney Voltaire, France. The school will be held at the Appart City hotel and is nonresidential
- It aims to empower CERN members of personnel to get the most out of the computing services delivered by the CERN IT Department to the physics community
- Recommended for any person that is using the CERN IT services either to deliver information, analyse data, automate tasks or work in engineering projects
- CEI list of potential candidates to attend? Needs to be sent out soon



4 – 8 November 2024
Ferney-Voltaire, France



Learn about IT Services at CERN

Programme:

- > Software development and hosting
- > Reproducible data analysis
- > Using the Data Center infrastructure for ML
- > Information and data management

Registration is open until 18 September!

<https://indico.cern.ch/e/tCSC-IT-services-2024>

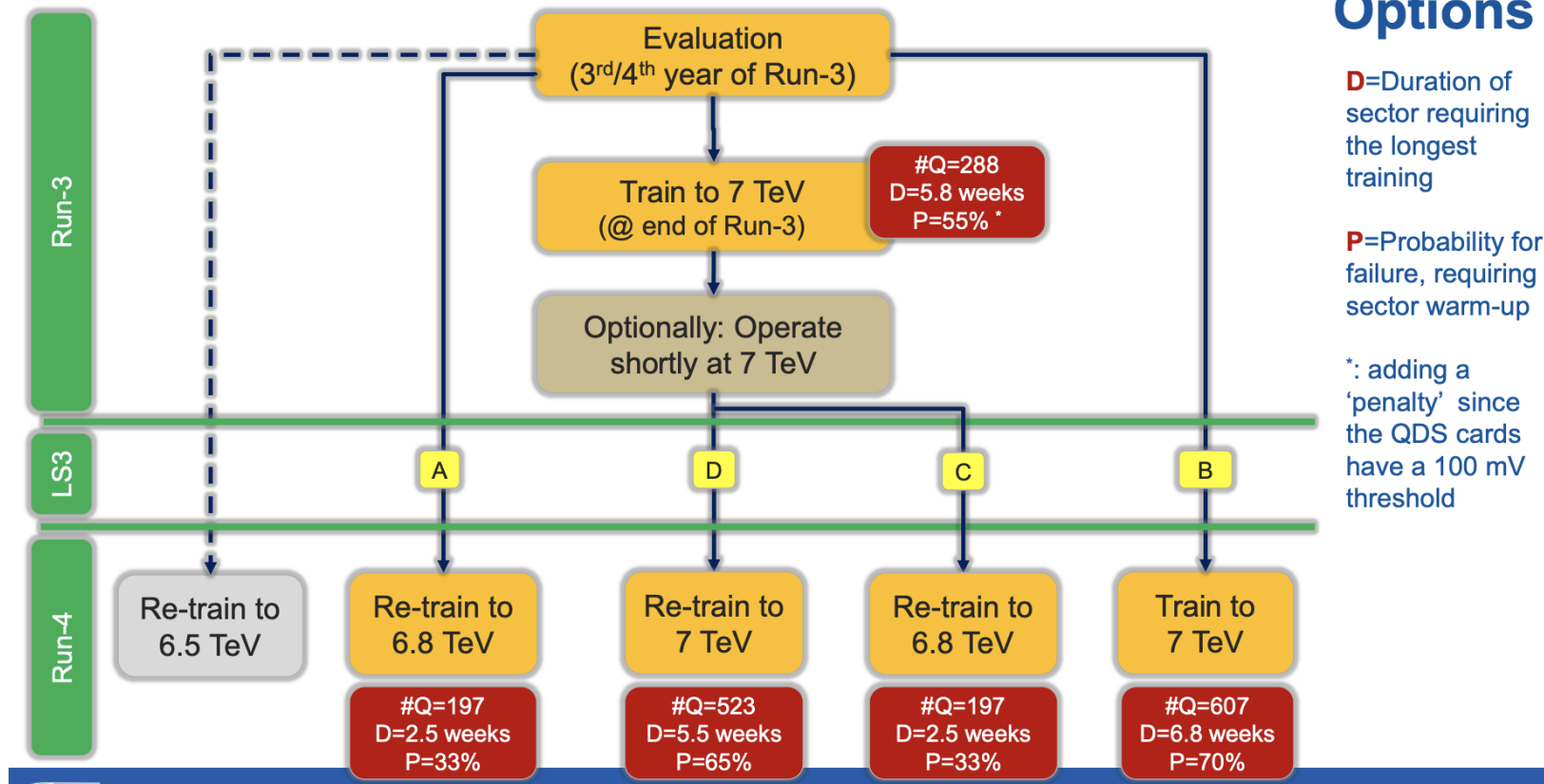


<https://csc.web.cern.ch/>



News from LMC

- LHC@7 TeV for Run 4, or even earlier?



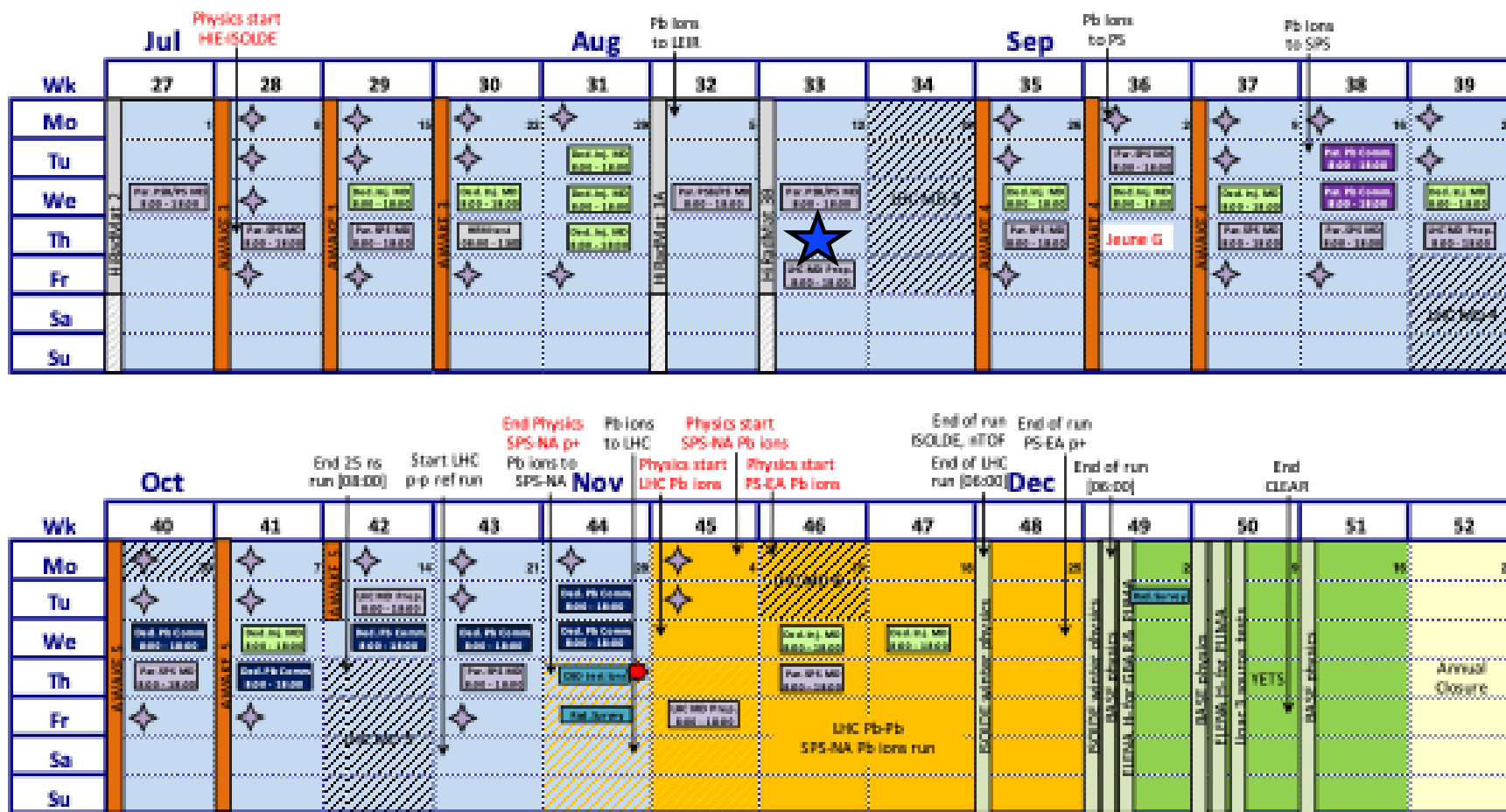


News from LMC

- LHC@7 TeV for Run 4, or even earlier?
- No decision taken, but:
 - Training before LS3 unlikely to happen
 - No sure benefit for post-LS3 retraining
 - Additional damage risk in case of quench from non-conforming by-pass diodes – to be repaired in LS3 and mostly not synergetic with BST
 - Running 7 TeV after LS3?
 - 100s quenches/>2 months training needed with high risk of breakage and +3.5 months delay
 - Uncertainty on other magnet circuits beyond dipoles
 - Probably reduced machine availability
 - HL assumes 6.8 TeV



2024 injectors schedule v2.1



- No dedicated nor long parallel SPS MDs for three weeks due to HiRadMat run and then LHC MDs
- LHC MD prep started already last Friday
 - 2x 48b with $2.3e11$ p/b and extractable to LHC produced, but with 10% larger emittance than LIU
 - Heavily scraped BCMS ready but only up to $1.9e11$ p/b



2024 LHC schedule v2.0

	Jul				Aug				Sep				Oct
Wk	27	28	29	30	31	32	33	34	35	36	37	38	39
Mo	1	8	15	22	29	5	12	19	26	2	9	16	23
Tu													
We								MD 3					
Th							★			Jeune G.			
Fr													
Sa													MD 4
Su													

- Physics production with very good availability
- Next week MDs with some involvement from CEI

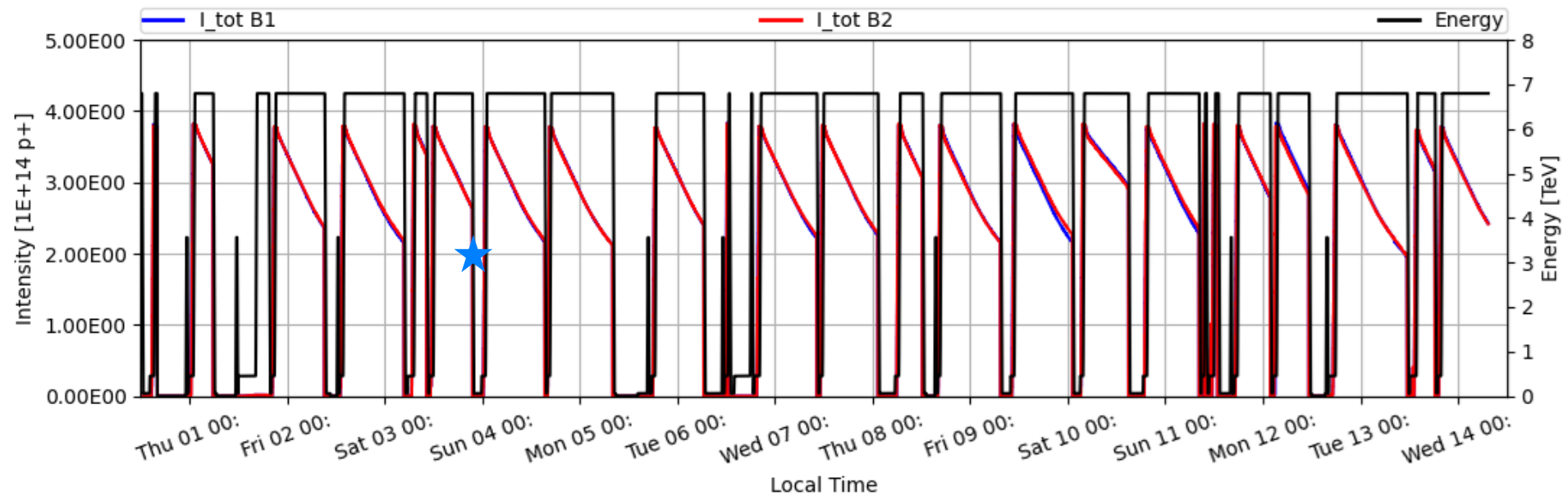
	Nov							Dec					
Wk	40	41	42	43	44	45	46	47	48	49	50	51	52
Mo	30	7	14	21	28	4	11	18	25	2	9	16	23
Tu				TS2	p-p ref run		MD 6						
We													Xmas
Th				p-p ref setup	★		Pb-Pb Ion run			YETS			Annual Closure
Fr			MD 5		Cryo reconfig.								
Sa					Pb Ion setting up								
Su													



LHC Lumi

- Very good production period in last two weeks with high availability and large fraction in stable beams
 - High injector availability
 - Only one UFO dump ★

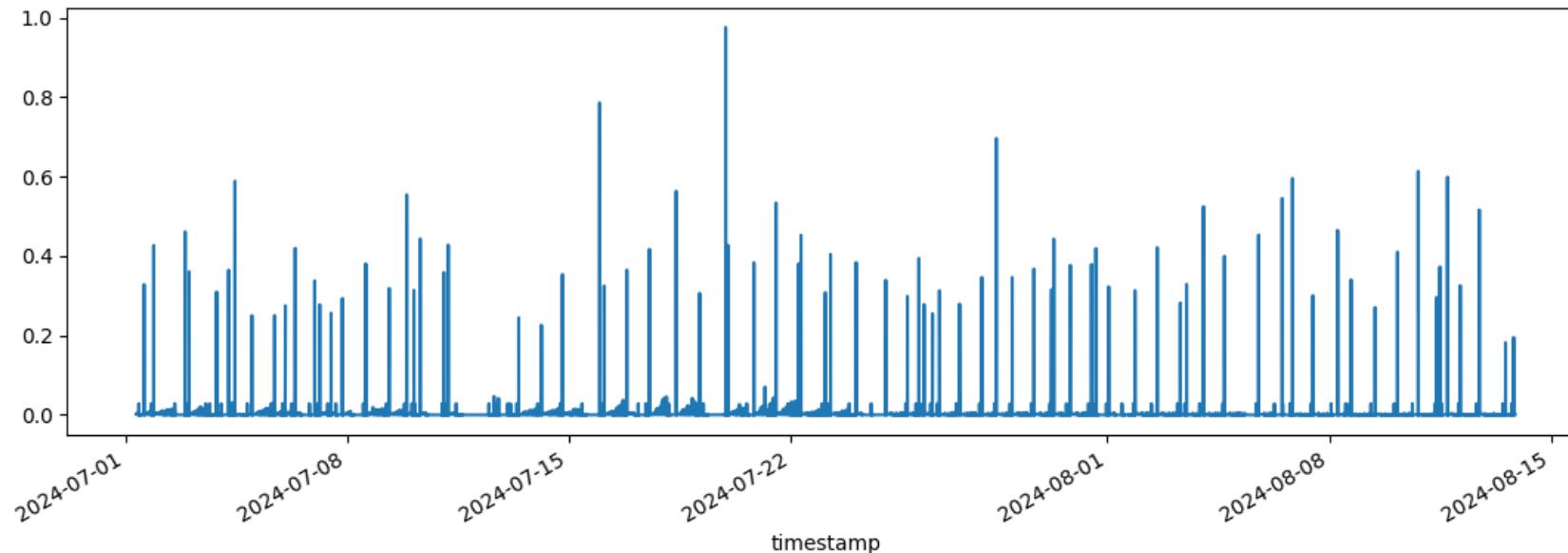
Availability	Stable beams (SB)
79.2%	63.3%





LHC Lumi

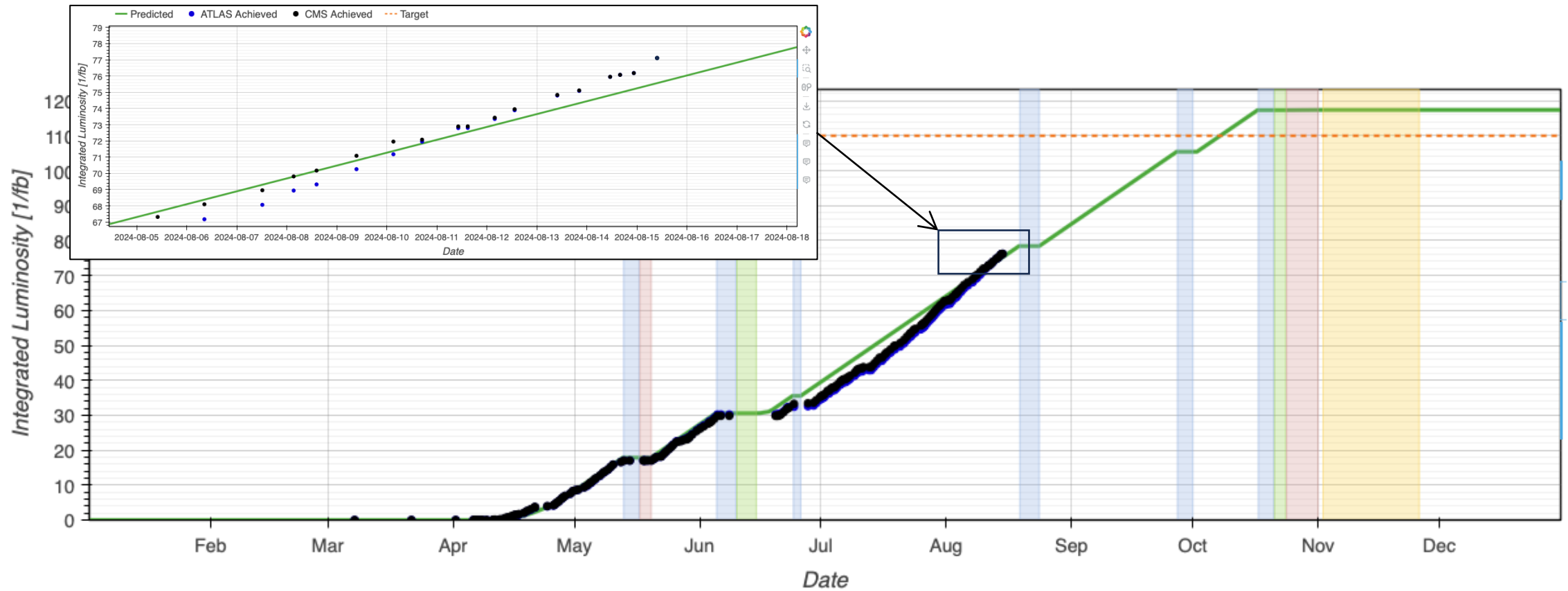
- Very good production period in last two weeks with high availability and large fraction in stable beams
 - High injector availability
 - Only one UFO dump ★
 - Still important losses at the beginning of ramp, not clearly correlated with time @450 GeV





LHC Lumi

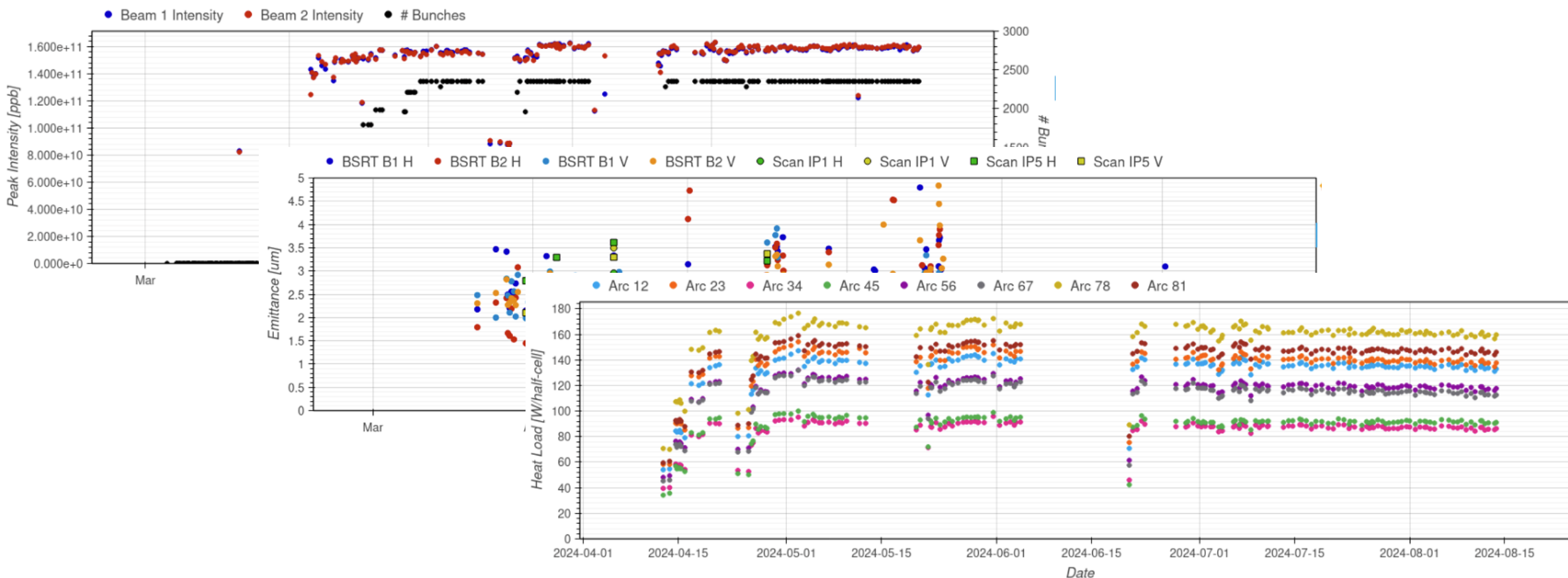
- LHC integrated lumi ahead of schedule, which provides good margin





LHC beam parameters

- No important change on beam parameters and heat load





LHC MDs

- Latest program available on ASM

	Mon 8/19	Tue 8/20	Wed 8/21	Thu 8/22	Fri 8/23
00		00:00 - MD12743 RF power limitations for high-intensity batches	Lumi: No BCM: No	00:00 - MD12723 HL-LHC optics cycle (part II)	Lumi: No BCM: Yes
01		01:00 - Recovery	MD12803 Reduced tails in the LHC and emittance growth studies	01:00 - Recovery	MD6943 60deg arc FODO cell phase advance LHC optics
02		Lumi: No BCM: No		Lumi: No BCM: No	
03		MD6925 Electron cloud coupled-bunch tune shifts at injection	03:00 - Recovery	MD12805 Impact of longitudinal impedance and betatron coupling on the Schottky spectrum	
04			Lumi: No BCM: No		05:00 - Recovery
05			MD11786 Threshold of longitudinal loss of Landau damping	07:00 - Recovery	Lumi: Yes BCM: No
06					MD9325 Beam Halo Population Measurements using Collimator Scans at the End of Squeeze
07	Lumi: No BCM: No		08:00 - Recovery	07:00 - Recovery	
08	MD12783 Octupole sweet spot width		09:00 - 12:00	Lumi: Yes BCM: No	
09		Lumi: No BCM: No	MD12663 loss maps	MD12663 Wire compensation during the beta*-leveling	
10		MD12804 Negative octupole polarity and electron clouds at injection energy	12:00 - Recovery		
11					
12		14:00 - Recovery	Lumi: No BCM: Yes	16:00 - Recovery	
13		Lumi: Yes BCM: No	MD12723 HL-LHC optics cycle (part II)		
14		MD12844 Faser background mitigations			
15	15:00 - Recovery				
16		21:00 - Recovery			
17	Lumi: No BCM: No				
18	MD12743 RF power limitations for high-intensity batches	23:00 - MD12803 Reduced tails in the LHC and emittance growth studies		Lumi: No BCM: Yes	
19				MD6943 60deg arc FODO cell phase advance LHC optics	
20					
21					
22					
23					

MD number	MD title	Required beams
6925	Electron cloud coupled-bunch tune shifts at injection	Bunch trains of 2x48 bunches with intensity 1.2e11 p/b, 1.6e11 p/b, 2.0e11 p/b, 2.3e11. Operational 12b train needed as well.
12783	Octupole sweet spot width	INDIV bunches with 1.6e11 p/b, 4x1b per injection change the transverse emittance by changing the time on the foil. Xavier Buffat knows how perform this manipulation and will be present at the MD.
12804	Negative octupole polarity and electron clouds at injection energy	Bunch trains of 2x48 bunches with intensity, 1.6e11 p/b. (same as MD6925) Operational 12b train needed as well.
12805	Impact of longitudinal impedance and betatron coupling on the Schottky spectrum	Single bunches of varied intensity and longitudinal emittance in the range of 0.1-0.3 eVs, 5e9-2.4e11 p/b (taken already in past MD blocks, contacts S. Albright, A. Lasheen)