



# Status of the accelerator complex

Mike Lamont

Resources Review Board, 26.04.2021

# Overview

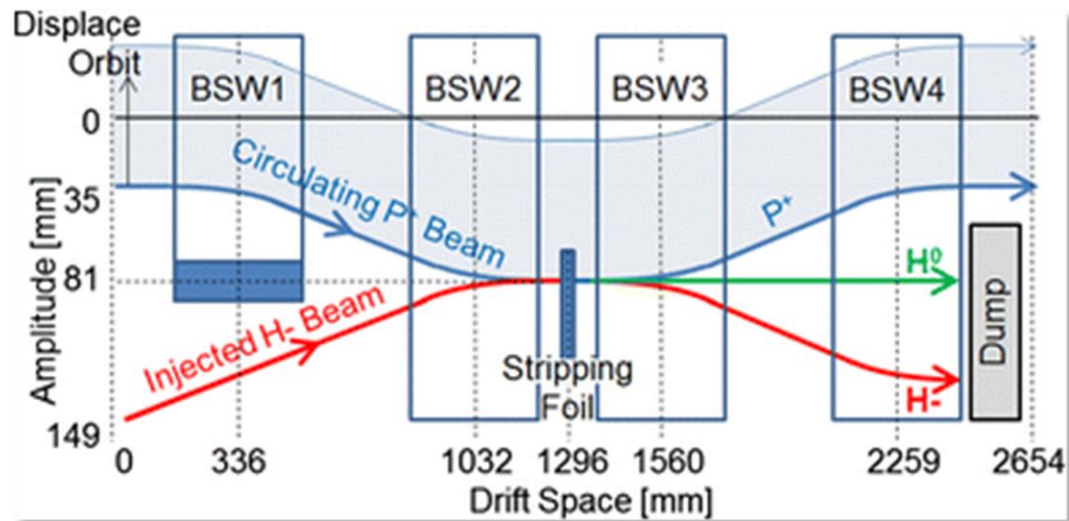
- **LS2**
  - Completed in injectors – back in the hands of Operations by end 2020
  - Completed in LHC - back in the hands of Operations 15<sup>th</sup> March 2021
  - Tremendous, professional, and safe effort under difficult circumstances
- **LHC Injectors Upgrade (LIU)**
  - Successful deployment in LS2 and, so far, excellent operational progress with beam
  - Goal for 2021: pre-LS2 beam parameters for protons and HL ones for ions
  - Ramping up to full LIU specs during Run 3



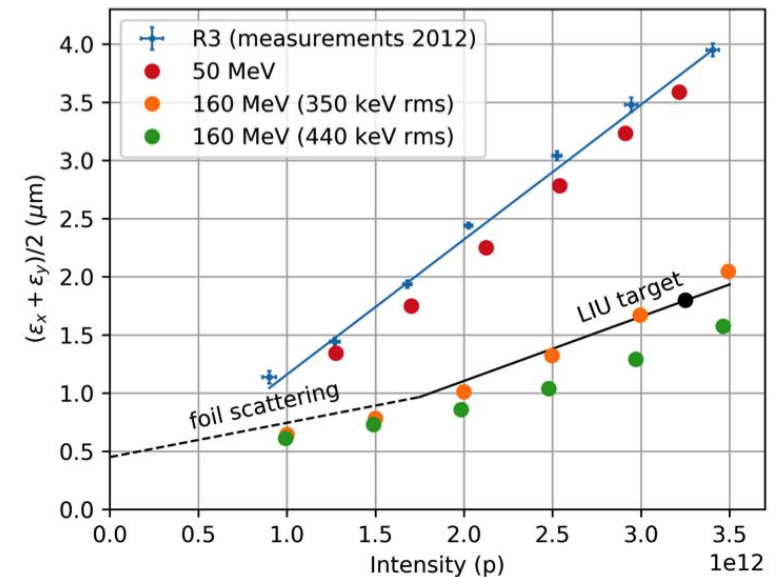
# Booster

- Connection of Linac4: H<sup>-</sup> at 160 MeV
- H<sup>-</sup> charge exchange injection
- Increase of extraction energy to PS to 2 GeV

The key LIU measures



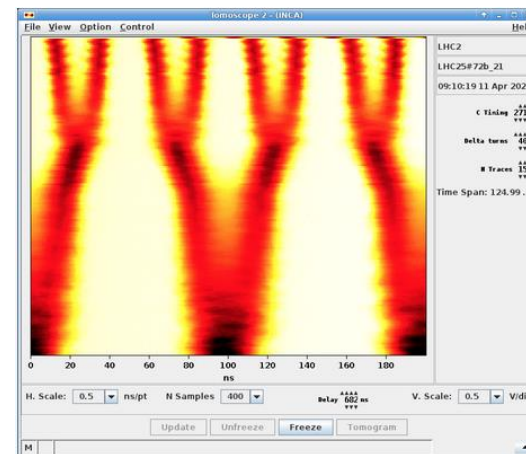
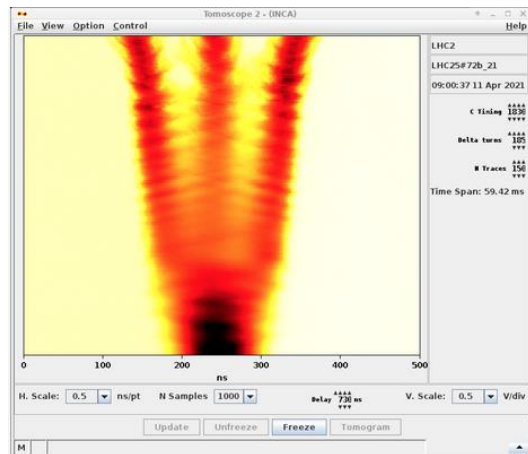
“Beam Size”



Protons per bunch

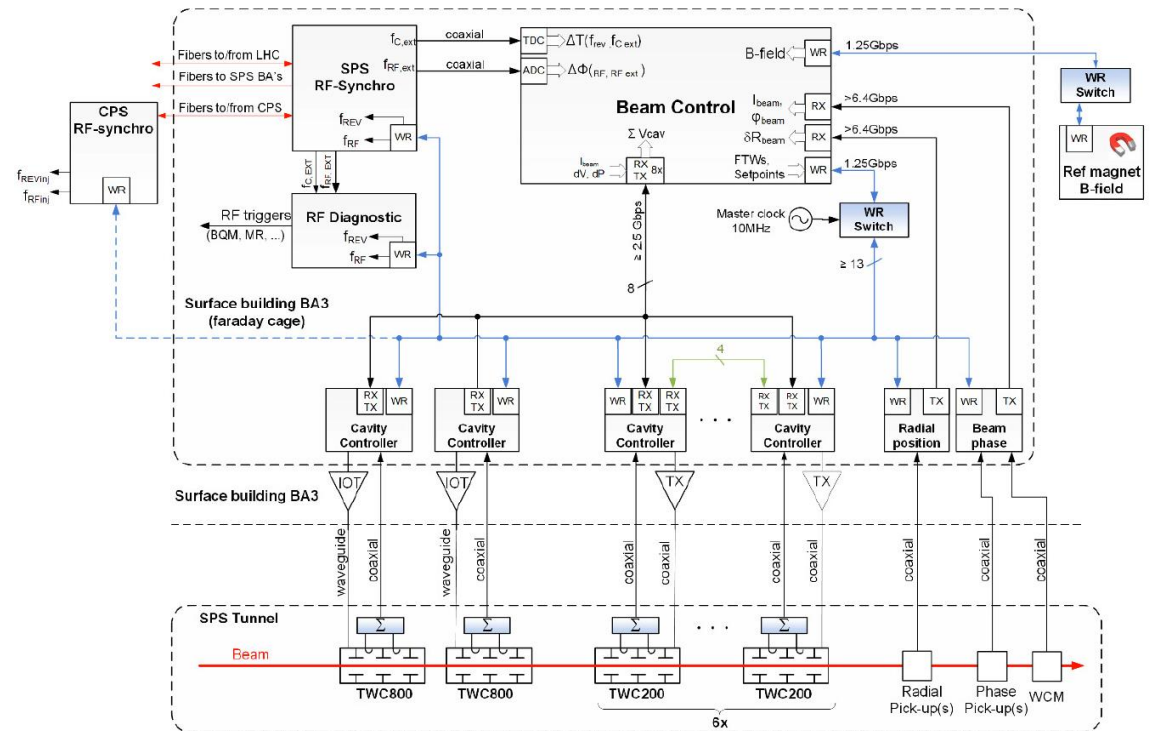
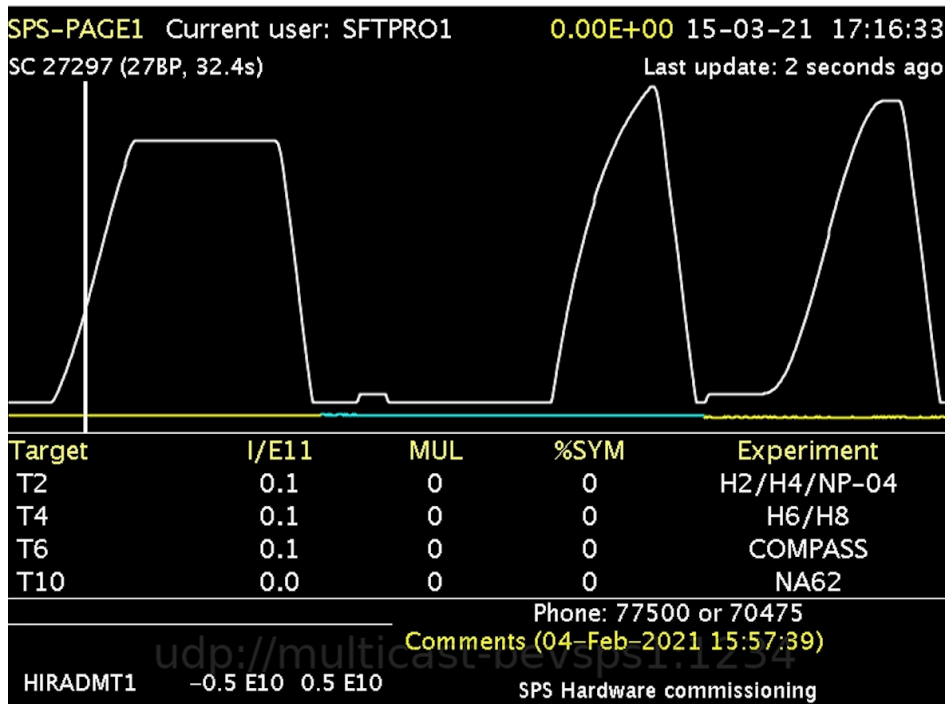
# Beam commissioning PSB & PS

- PSB beam commissioning
  - Excellent progress with LHC 25 ns beam, **brightness promisingly close to the LIU target**
  - Great progress also with **high intensity SPS North Area beams**
- PS beam commissioning – good initial progress
  - For example, setting-up the LHC 25 ns beam...

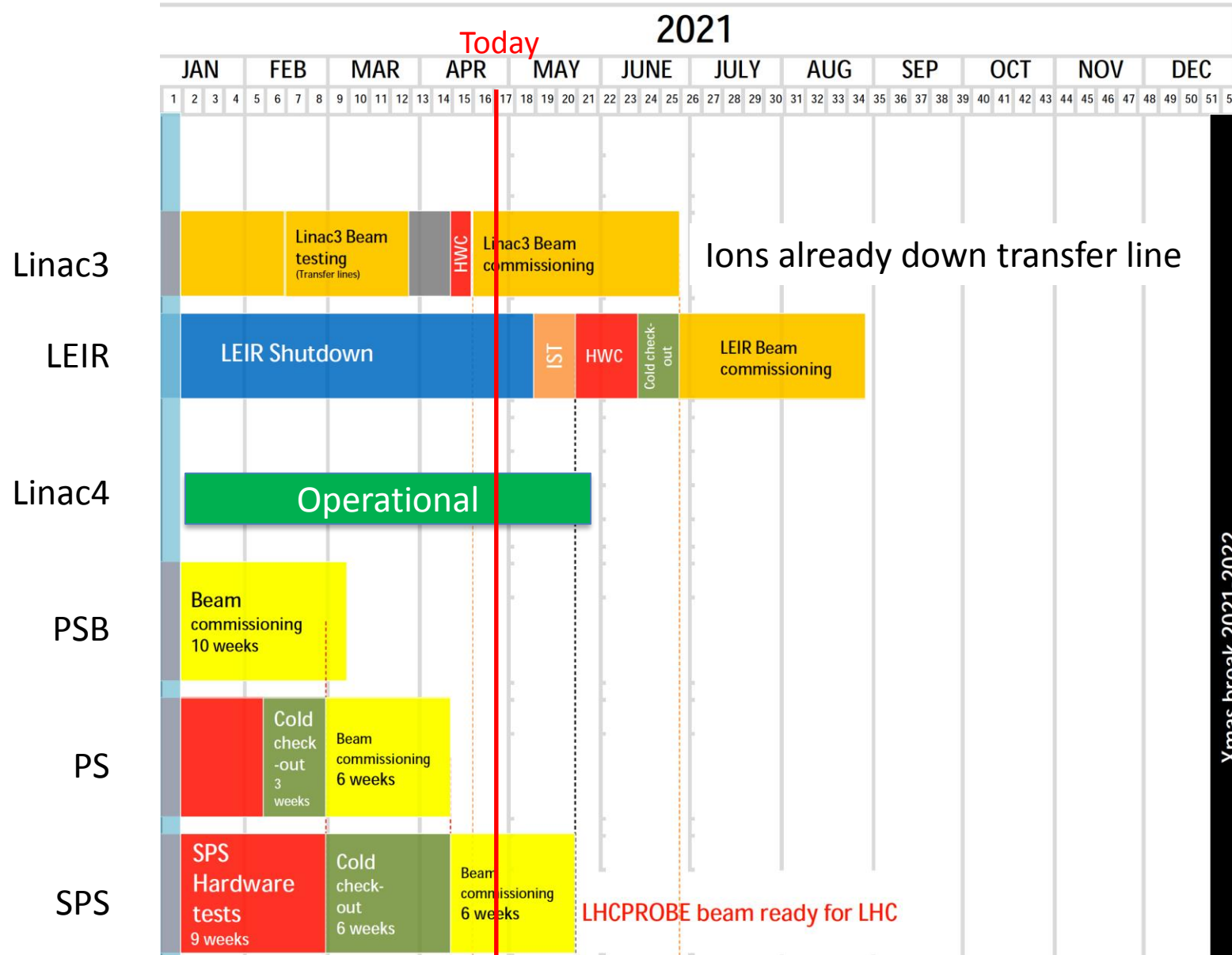


# SPS – starting-up with beam

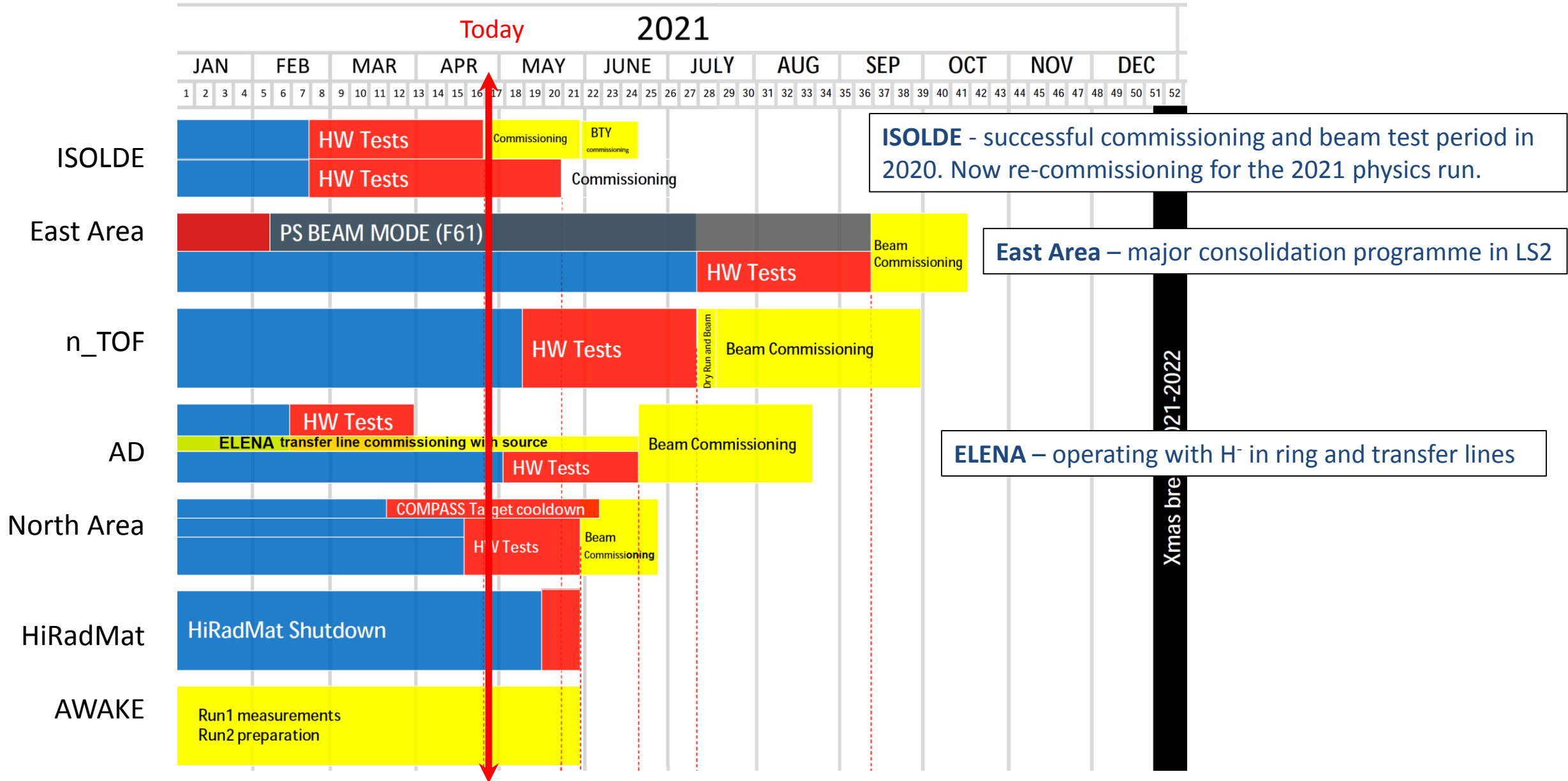
- A lot of work done in LS2...
- Commissioning with beam has started
- RF recommissioning after major upgrades during LS2



# Accelerator schedule - overview



# Facilities schedule - overview



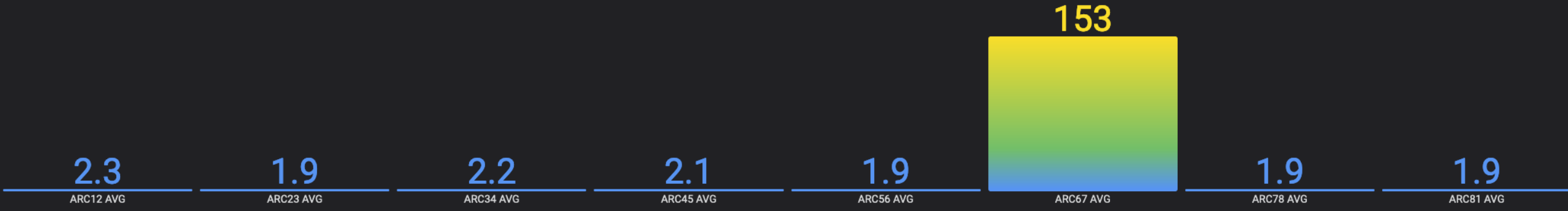


# 2021 Injectors Schedule

- Beam physics start dates:
  - 21 June: **ISOLDE**
  - 12 July: **SPS North Area** fixed target physics with protons
  - 23 August: antiproton physics from **AD-ELENA**
  - 27 September: **n\_TOF**
  - 18 October: **PS East Area** fixed target physics with protons
- All beams will be stopped 15 November for the Year-End-Technical-Stop to allow restart of the complex early in 2022 for LHC commissioning with beam.

# Overall LHC Status

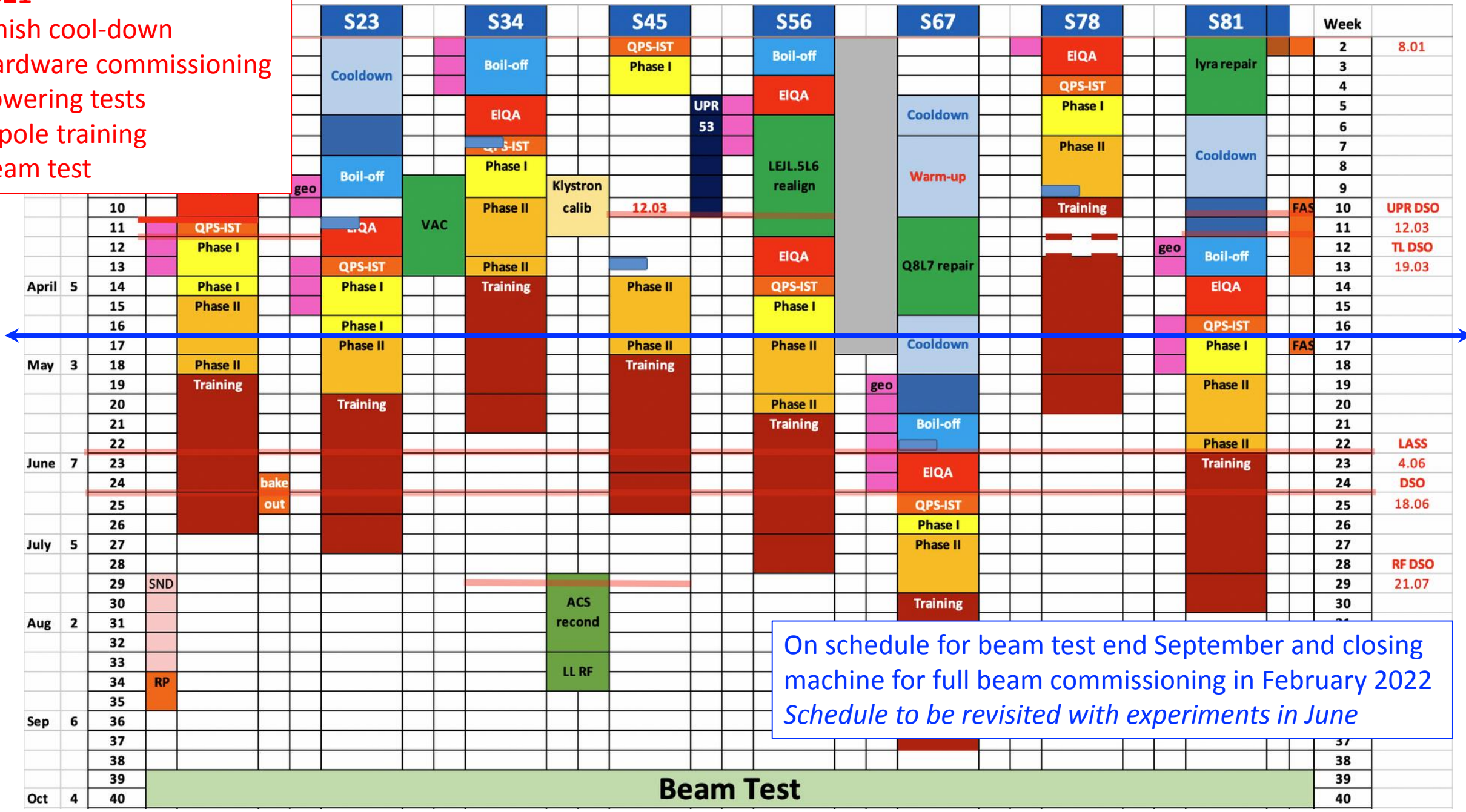
ARC AVERAGE TEMPERATURES



- **Seven sectors are at nominal cryogenic conditions**
- **4 sectors - magnet training campaign**
- **3 sectors - powering tests**
- **S67 – cooling down after quadrupole circuit earth fault repair**

**2021**

- Finish cool-down
- Hardware commissioning
- Powering tests
- Dipole training
- Beam test

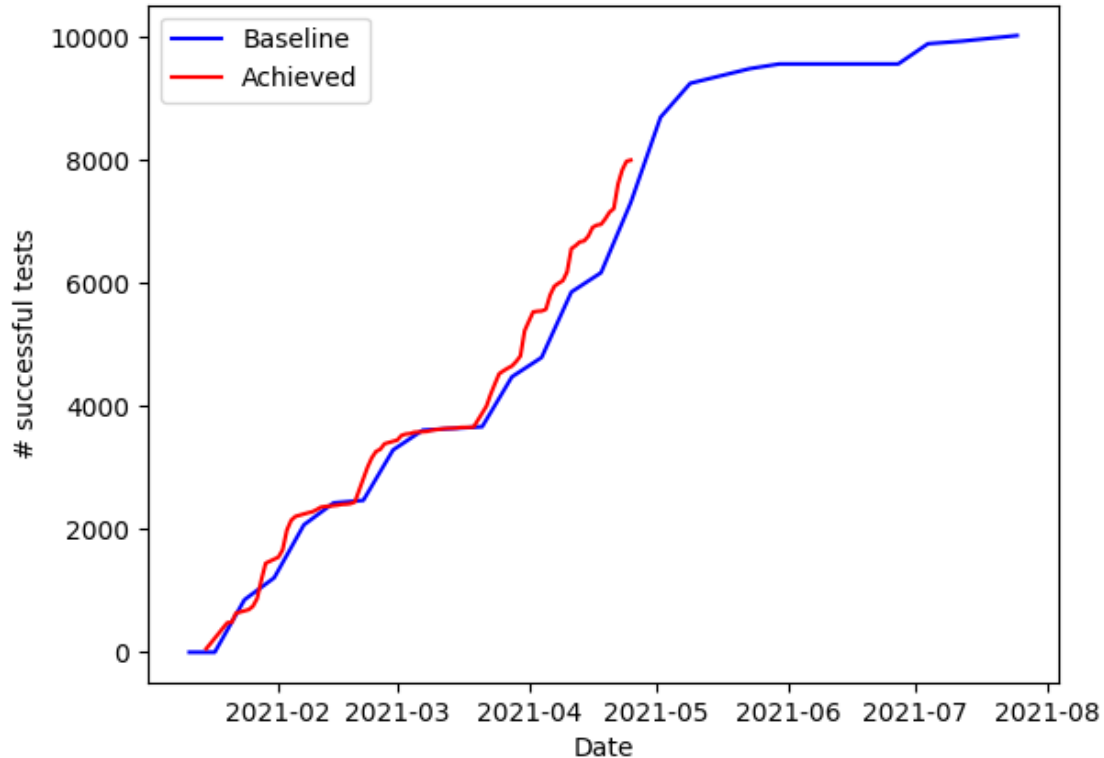


On schedule for beam test end September and closing machine for full beam commissioning in February 2022  
 Schedule to be revisited with experiments in June

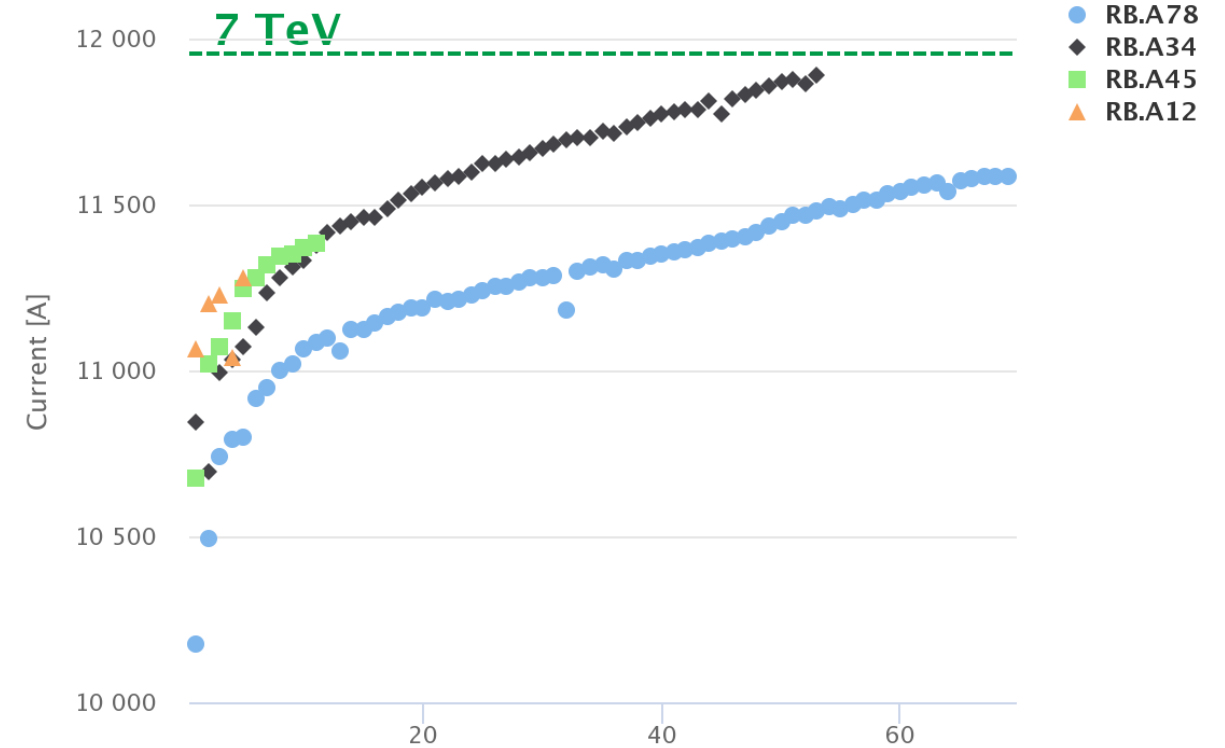
# Powering tests progress & magnet training

## LHC Powering Tests - Progress dashboard

Last update on 2021-04-25



## RB training quenches



**10031 tests on  
1572 superconducting circuits**

**Target 7 TeV  
~600 dipole magnet  
quenches expected**

# Summary

- LS2 is over – tremendous effort under difficult circumstances
- Successful deployment of LIU
- Beam back in:
  - **Linac3, Linac4, Booster, PS, SPS, ELENA (H<sup>-</sup>)**
  - Good progress, staged restart of facilities incoming
- **LHC**
  - Mostly cold, powering tests and dipole training underway
  - On schedule for beam test end September and closing machine for full beam commissioning in February 2022
  - Schedule to be revisited with experiments in June