

LS2 Report: Linac4 knocking at the door of the PS Booster

October 30 2019



The linear accelerator 4 (Linac4) will be the new source of proton beams for the Large Hadron Collider (LHC) after the second long shutdown of CERN's accelerator complex (LS2). Credit: CERN

Busy activity has returned to the CERN Control Centre (CCC), where

the Operation group coordinates the current Linac4 test run, supported by the Accelerators and Beam Physics (ABP) group and all the involved equipment groups. As we write, the nominal 160 MeV beam has already reached the Linac4 dump.

After the ongoing second long shutdown of CERN's accelerator complex (LS2), Linac4 will replace the retired Linac2 to provide protons to the LHC and all the CERN experiments that are served by CERN's proton-accelerator chain. "For this purpose, Linac4 has by now been connected to the LHC injectors chain through its new transfer line to the PS tunnel and the existing transfer lines to the PS Booster (PSB)," says Bettina Mikulec, who coordinates the test run.

In order to prepare Linac4 for the challenge of delivering reliably high-quality beam to the PSB from its first day of post-LS2 operation in 2020, a special beam run started on 30 September to measure its beam parameters in the completely renovated 15-m-long emittance-measurement line (LBE), only 50 m away from the PSB injection point. "In this line, we can of course measure the emittance of the beam—the transverse dimensions of the beam and its energy spread—but also its longitudinal parameters in the transfer line," adds Bettina Mikulec. "The LBE line is also very close to the PSB entrance, so everything we measure there should not be far off from the final characteristics at the PSB injection point."



The new LBE line. At the end of this line, we can see the LBE dump (green shielding blocks) located just at the wall of the PSB. Credit: CERN

Until 6 December, negative hydrogen ions will cover the 86 m of the Linac4 to be sent along the new and renovated transfer lines (160 m in total) into the new LBE line, before terminating their flight in a dump located just at the wall of the PSB.

"During this run, hardware and software changes deployed since the last Linac4 reliability run, which took place in 2018, will be commissioned, with the aim of solving some remaining issues and enhance the beam quality," says Alessandra Lombardi, Linac4 project leader in the ABP group.

In addition, the required operational beam configurations for the 2020 start-up will be prepared as much as possible in advance to allow a rapid

Linac4 start in April 2020, when various beams will be set up for the PSB, so that the PSB can restart with [beam](#) under optimum conditions in September 2020.

Provided by CERN

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