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## Experimental confirmation of the impedance reduction campaign in the CERN SPS

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Measurements of the very long single bunch spectrum with RF off, were started in the SPS in 2012 to identify the main impedance sources responsible for both single and multi-bunch beam instabilities observed during operation. The impedance of the vacuum flanges with a strong peak at 1.4 GHz was identified and proven from simulations to limit the beam intensities required for the High-Luminosity LHC (HL-LHC). A shielding campaign was then initiated and applied during the long shutdown period in 2019-2020 to reduce their impedance. The same measurement technique was used recently to verify and evaluate the impedance reduction, as well as to identify other impedance sources. In this paper, the results of the new measurements are presented and compared with those found in 2012. The comparison shows that the strong impedance peak at 1.4 GHz has been fully suppressed and that the instability threshold largely increased in both optics used in measurements. Furthermore, the beam spectra evolution during the de-bunching is driven by the main 200 MHz cavity impedance, and no other dominant peak for the measured intensity range was observed.

### Funding Agency

### Footnotes

### I have read and accept the Privacy Policy Statement

Yes

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