

# **Vacuum operation and future upgrade of the LHC accelerator complex**

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The LHC accelerator complex returned in operation in April 2015, after almost 2 years of long shutdown (LS1) for various upgrades and consolidation programs. During Run2 of operation (2015-2018), the entire accelerator complex has shown remarkable reliability and in particular, the LHC operated for more than 3600 fills reaching a total integrated luminosity of more than 150 fb<sup>-1</sup>.

In 2019, the entire LHC accelerator complex will stop again for 2 years (Long Shutdown 2 - LS2). This period will be dedicated to the LHC Injector Upgrade (LIU) and will prepare the CERN injector complex for the final upgrade of the LHC to High-Luminosity (HL-LHC) foreseen during the LS3 (2024-2025).

This paper summarizes the vacuum related major issues happened during last 3 years of operation in the entire LHC accelerator complex and a summary of the most important vacuum observations along the LHC during the physics runs are presented. In addition, an overview of the planned activities during the LS2 will be presented and an outlook on the technical challenges for the HL-LHC upgrade is given.