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LHC Beam Vacuum Evolution during Run 2 Machine Operation

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The LHC successfully returned to operation in April 2015 after almost 2 years of Long Shutdown 1 (LS1) for various upgrade and consolidation programs. During the machine operation, in Run 2 (2015 - 2017), the LHC operated for more than 3000 fills and reached a total integrated luminosity of 125 fb⁻¹ since the start of the LHC (up to end 2017).

This paper summarizes the dynamic vacuum observations in different locations along the LHC during the dedicated fills as well as during the physics runs with different beam parameters. The beam-induced dynamic pressure rises in presence of synchrotron radiation and electron cloud, have been investigated, benchmarked with simulations and are presented here. A clear beam conditioning effect has been observed in Run 2.

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