Longitudinal parameters and beam induced heating

J. F. Esteban Müller, B. Salvant, E. Shaposhnikova

Abstract

The longitudinal beam parameters are proposed for the LHC re-commissioning and operation in 2015, based on the experience obtained from operation and MD results during LHC run 1. Controlled longitudinal emittance blow-up is necessary during the whole ramp to 6.5 TeV. The value of the longitudinal emittance is defined by beam stability and IBS, and bunch length and RF voltage by particle losses, beam induced heating and experiments requirements. The impact of the longitudinal parameters on luminosity will be also discussed here.

Beam induced heating limitations during LHC run 1 are reviewed and an update on the mitigation measures taken during LS1 is presented. The situation in 2015 is expected to be more favourable due to all improvements made and potential issues would be mainly caused by unexpected nonconformities. In addition, more devices are equipped with temperature sensors that will allow us to monitor beam induced heating and prevent damage to the equipment. Since further increase of bunch length leads to beam lifetime degradation, a special controlled emittance blow-up that flattens the bunch profile is also considered for beam induced heating mitigation.