

## **Review of the instabilities observed during the 2012 run and actions taken**

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### **Abstract**

Despite the excellent performance of the LHC in 2012, with a record peak luminosity at 4 TeV corresponding to 77% of the 7 TeV design luminosity of  $1034 \text{ cm}^{-2}\text{s}^{-1}$ , the intensity ramp-up was perturbed by several types of instabilities. All the observations (during both physics cycles and dedicated MDs) are critically reviewed, comparing them to past predictions and new findings. The lessons learned and actions taken are then discussed in detail.