

# The LHCb Upgrade Programme for Run 3 and Run 4

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The LHCb experiment at the LHC is designed to capture decays of b- and c-hadrons for the study of CP violation and rare decays. It has already had a transformative impact in the field of flavour physics as well as making many general purpose physics measurements in the forward region. At the end of Run-II, many of the LHCb measurements will remain statistically dominated. For this reason the experiment is being upgraded in a first step - Upgrade I - to run at higher luminosity of  $2 \times 10^{33} \text{cm}^{-2} \text{s}^{-1}$  after 2020. The trigger scheme, which currently has a 1 MHz lowest level hardware rate, will be transformed to a strategy whereby the entire experiment is read out at 40 MHz to a flexible software trigger. The increased luminosity and trigger efficiency anticipated at the upgrade will allow a huge increase in precision, in many cases to the theoretical limit, and the ability to perform studies beyond the reach of the current detector. In addition the flexible trigger and unique acceptance opens up opportunities in topics apart from flavour, reinforcing the role of LHCb as a general purpose detector in the forward region. In order to allow the triggerless readout the front end electronics of all subdetectors will be changed, and many subdetectors will be upgraded to cope with the increased occupancy and radiation levels. During the long shutdown between Run 3 and Run 4 the most irradiated parts of the detector will be replaced and other detector consolidation and improvement steps will be carried out.

## I read the instructions

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