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Plans for the Upgrade of the CMS Barrel Electromagnetic Calorimeter

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The electromagnetic calorimeter (ECAL) of the Compact Muon Solenoid Experiment (CMS) is operating at the Large Hadron Collider (LHC) with proton-proton collisions at 13 TeV center-of-mass energy and at a bunch spacing of 25 ns. Challenging running conditions for CMS are expected after the high-luminosity upgrade of the LHC (HL-LHC). Particular challenges at the HL-LHC are the harsh radiation environment, an increase in data rate (by a factor of 2 to 5) and the extreme level of pile-up events, with up to 200 simultaneous proton-proton collisions. We review the options for the upgrade of the barrel ECAL, including evaluations of the predicted longevity up to an integrated luminosity of 3000/fb. We also discuss the anticipated improvements to the electronics, which must be upgraded due to the increased trigger and latency requirements at the HL-LHC.

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