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The LHCb Upgrade

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LHCb probes physics beyond the Standard Model by measuring CP violating and rare b and c decays. It also searches for the production of exotic objects at large rapidities and relatively small transverse momenta. Sensitivities can be greatly enhanced by having an order of magnitude larger data sample than originally planned and a more flexible trigger. We can reconfigure the LHCb experiment to collect data at ten times the rate of its current design. We also can improve the efficiency of triggering on purely hadronic final states by about a factor of two. We will describe the physics objectives of such an upgrade, and discuss the necessary changes in the detector. Our plans include being able to examine each of the 40 MHz of beam crossings in order to decide which events to keep, by reading out the entire detector into a farm of computers and making the selections purely in software. Such a flexible "trigger"design allows for easy and highly efficient changes when different processes or decay modes are indicated to be important to analyze. We also will outline progress for a new pixel based vertex detector and improvements in other systems.

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