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The LHCb turbo stream

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The LHCb experiment will record an unprecedented dataset of beauty and charm hadron decays during Run II of the LHC, set to take place between 2015 and 2018. A key computing challenge is to store and process this data, which limits the maximum output rate of the LHCb trigger. So far, LHCb has written out a few kHz of events containing the full raw sub-detector data, which are passed through a full offline event reconstruction before being considered for physics analysis. Charm physics in particular is limited by trigger output rate constraints. A new streaming strategy includes the possibility to perform the physics analysis with candidates reconstructed in the trigger, thus bypassing the offline reconstruction. In the “turbo stream” the trigger will write out a compact summary of “physics” objects containing all information necessary for analyses, and this will allow an increased output rate and thus higher average efficiencies and smaller selection biases. This idea will be commissioned and developed during 2015 with a selection of physics analyses. It is anticipated that the turbo stream will be adopted by an increasing number of analyses during the remainder of LHC Run-II (2015-2018) and ultimately in Run-III (starting in 2020) with the upgraded LHCb detector.

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