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Event building for the LHCb Upgrade

Wednesday, 27 May 2015 16:15 (30 minutes)

During the LHC Run 1 the LHCb experiment has successfully performed a large number of world-class pre-
cision measurements in heavy flavour physics by having collected over 3 fb-1 at centre-of-mass energies of 7
TeV and 8TeV. However, even after an additional expected integrated luminosity of 5-6 fb-1 in Run 2, many of
the LHCb measurements will remain limited by statistics. The current 1 MHz readout system is the main bot-
tle neck to run LHCb at higher luminosity and with higher trigger efficiencies. LHCb will therefore undergo
a major upgrade in the Long Shutdown 2 of LHC (2018- 2019) aimed at collecting an order of magnitude more
data by 2028. The upgrade consists of a new full readout at the LHC bunch crossing rate (40 MHz) with the
ultimate flexibility of only a software trigger. In order to increase the instantaneous luminosity five times, up
to 2×10^{33} cm-2s-1, several sub-detector upgrades are also underway, such to cope with the expected higher
occupancies and radiation dose. The talk will focus on the PCIe based readout and the Event Builder we are
developing in collaboration of INFN Bologna, INFN-CNAF and the LHCb Online CERN group.

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