

New simulation of particle fluence for the LHCb VELO Upgrade

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The LHCb experiment is dedicated to studying CP violation in heavy flavour quark sector, rare decays of mesons containing beauty and charm quarks and searching for New Physics. This challenging physics programme requires excellent tracking system capable of providing high spatial resolution for single hit detection, best possible impact parameter and primary and secondary vertices reconstruction resolution and time resolution of tens of femto-seconds. The central part of the LHCb tracking system constitute Vertex Locator (VELO), built using silicon micro-strip technology. During Run I and Run II data taking periods (2010 –2012 and 2015 –2018 respectively) the detector was operating as close as 8 mm from the LHC beams and registered a particle fluence that ranged up to 10^{15} 1MeV neq/cm² with very non uniform radiation field. New VELO pixel sensors, planned for RUN III, will be situated at the distance of approximately 5 mm from the proton beams and will have to withstand almost ten times higher particle fluences. A new simulation of particle fluence with the FLUKA package for the LHCb VELO Upgrade is described in this presentation. Comparison of the Run II simulation with the measurements is discussed as well.

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