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LHCb full-detector real-time alignment and calibration: latest developments and perspectives

Tuesday 12 June 2018 15:55 (15 minutes)

A key ingredient of the data taking strategy used by the LHCb experiment at CERN in Run-II is the novel real-time detector alignment and calibration. Data collected at the start of the fill are processed within minutes and used to update the alignment, while the calibration constants are evaluated hourly. This is one of the key elements which allow the reconstruction quality of the software trigger in Run-II to be as good as the offline quality of Run-I. The most recent developments of the real-time alignment and calibration paradigm enable the fully automated updates of the RICH detectors' mirror alignment and a novel calibration of the calorimeter systems. Both evolutions improve the particle identification performance stability resulting in higher purity selections. The latter leads also to an improvement in the energy measurement of neutral particles, resulting in a 15% better mass resolution of radiative b-hadron decays. A large variety of improvements has been explored for the last year of Run-II data taking and is under development for the LHCb detector upgrade foreseen in 2021.These range from the optimisation of the data samples selection and strategy to the study of a more accurate magnetic field description. Technical and operational aspects as well as performance achievements are presented, focusing on the new developments for both the current and upgraded detector.

Minioral

Yes

Description

Trigger

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