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Design and development of the ALICE Common Readout Unit user-logic firmware for the Muon Identifier readout chain

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A Large Ion Collider Experiment (ALICE) at the Large Hadron Collider (LHC) at CERN is undergoing a major upgrade during which some of its sub-detectors are replaced with new ones, while others are equipped with new electronics to handle the expected higher collision rates in the next running period (Run 3), which is foreseen to start in 2022. As part of the upgrade, certain sub-detectors such as the Muon Trigger (MTR), renamed to Muon Identifier (MID), can now operate in a continuous, trigger-less readout mode, in addition to the previous triggered readout mode. The previous MTR readout chain could only operate in triggered mode and needed to be replaced. Due to the increased quantity of data, typical methodologies are impossible to employ without massive efforts to expand the processing capacity. Since the new ALICE computing system cannot keep up with the increased data flow of the MID, a new processing algorithm has to be established. This research provides a new approach to processing the MID readout data based on a customized user-logic firmware.

Apply to be considered for a student ; award (Yes / No)?

Yes

Level for award;(Hons, MSc, PhD, N/A)?

Master of Engineering (Meng)

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