Realistic Trigger Simulation for COMET Phase-II

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The COMET experiment aims to search for a muon-to-electron (μ-e) conversion with single event sensitivities of 3×10^{-15} and 3×10^{-17} in its Phase-I and Phase-II, respectively. This process is strictly forbidden in the Standard Model (SM) while many physics models beyond the SM predict the detectable μ-e conversion rate. Hence it would be a clear evidence of new physics if the μ-e conversion is observed. To achieve our final sensitivity goal, more than 10^{20} of muons are required and such a high intensity muon beam potentially leads to the extremely high hit rate in our detector system. Thus, it is mandatory to highly suppress the trigger rate due to backgrounds that can also induce the severe dead-time of the data acquisition (DAQ) while maintaining the high trigger efficiency for signal electrons. In addition, there is a possibility to further improve the Phase-II target sensitivity by optimising the design of the pion production target, transportation magnets and detectors, that may also increase the rate of incoming particles inside the detector. Therefore the design of the trigger and readout electronics is crucial for the COMET Phase-II experiment to keep the DAQ efficiency high enough so to maximise the physics sensitivity. In this poster, I will present the preliminary results of the first realistic trigger simulation for Phase-II.