Poster session 3 – Wednesday 6 July

P3.090 **Searching for muon-to-electron conversion at COMET phase-II**

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Conservation of Lepton Flavour in the Standard Model (SM) requires that muon decay is accompanied by the emission of two neutrinos. But this conservation is difficult to motivate theoretically and indeed, given neutrino oscillations, is now known to be violated in the SM albeit at a very small level. The COMET experiment is one of a handful of projects hoping to demonstrate Charged Lepton Flavour Violation, searching for COherent Muon to Electron Transitions, where a muon converts to an electron in the presence of an atomic nucleus, without neutrino emission. This process is particularly attractive from an experimental perspective since the signal of a single 105 MeV electron is robust against accidental backgrounds and the Standard-Model background is so vanishingly small.

Given that the current limit on this process is already very tight, the COMET experiment needs to have both a very intense, low-energy muon beam, and very high signal acceptance. Achieving these while keeping all possible background events to a minimum is the key challenge of COMET. Here, I present an overview of the simulated optimisations and predictions for how Phase-II of COMET can simultaneously achieve such high signal sensitivity and strong background suppression. Phase-I is currently under construction with first data-taking due in JFY 2018.