

StrECAL system for COMET Phase-I and Phase-II

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The COMET Experiment at J-PARC aims to search for the lepton flavour violating process of muon to electron conversion in a muonic atom, $\mu\text{-N}\rightarrow\text{e-N}$, with a 90% confidence level branching-ratio sensitivity of 6×10^{-17} , in order to explore the parameter region predicted by most well-motivated theoretical models beyond the Standard Model. The need for this sensitivity places several stringent requirements on both the muon beam and the detector system. In order to realize the experiment effectively and timely, a staged approach to deployment is employed. At the Phase-I experiment, a precise muon-beam measurement will be conducted, and a search for $\mu\text{-N}\rightarrow\text{e-N}$ will also be carried out with an intermediate sensitivity of 7×10^{-15} .

The beam measurement in Phase-I experiment and the search for $\mu\text{-N}\rightarrow\text{e-N}$ with the final sensitivity in Phase-II experiment will be performed by a combined detector system with Straw tracker and ECAL, called StrECAL system. To enable the required momentum resolution (<200 keV/c) for low energy electron signal ($=105$ MeV), a material budget of tracking detector is essential, i.e. thin-wall straw tracker operational in vacuum is employed. In addition, to enable good enough energy/spacial resolutions for the required trigger ($\sigma E/E = 5\%$ and $\sigma x = 1\text{cm}$ for a 105 MeV electron), highly segmented LYSO crystal viewed with APD is employed as an electromagnetic calorimeter.

In this contribution, current status on the R&D and the construction of StrECAL system for COMET Phase-I and Phase-II both will be given.

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