

# Development of the StrECal System for COMET phase-I

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The COMET experiment at J-PARC[1] aims to search for the charged lepton flavor violating process of neutrinoless  $\mu$ -e conversion, which indicates the new physics beyond the standard model. The goal sensitivities of its Phase-I and Phase-II experiments are respectively to be improved by a factor of 100 and 10000 to the current limit given by SINDRUM-II at PSI[2]. When the  $\mu$ -e conversion occurs, almost all the energy of the muon mass is carried out by the electron which is expected to have the monochromatic energy of about 105 MeV. The experiment requires to detect such electron with an excellent momentum resolution, better than 200 keV/c, in order to achieve the goal sensitivity. High rate capability is also necessary for accumulation of enough statistics with high power proton driver at J-PARC. In addition, the detector system needs the ability of particle identification (PID) with those conditions described above. On the basis of these requirements, we plan to construct a StrECal system which consists of a straw tube tracker and an electron calorimeter (ECal) as shown in Fig.1. The system is put in the detector solenoid with a field strength of 1 T. The straw tube tracker detects the particle momentum with the operation in the vacuum. The tracker is constructed by the extremely light material, which can achieve the high momentum resolution and handle the high intensity beam. The ECal consists of segmented scintillating crystals, which is placed downstream of the straw tube tracker. The ECal measures the energy of electron with good resolution to add redundancy to the momentum measurement, which can provide the ratio  $E/p$  for PID combining the measured momentum in the straw tracker. The ECal also provides the trigger signals, carrying the timing with respect to which the events are referenced. Development of the StrECal system is now ongoing and its construction has begun for the COMET phase-I experiment. In this presentation, we report the progresses of the development and construction of the StrECal system including its readout electronics and the trigger system. The prospect of final detector system is also described.

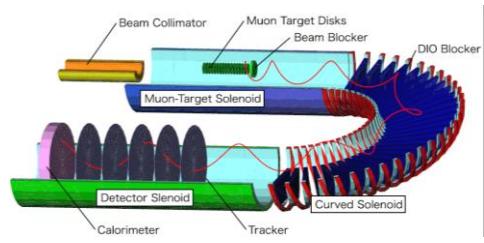


Fig. 1 Schematic view of StrECal system (Straw tube tracker and electron calorimeter).

## References

- [1] Y. Kuno for the COMET collaboration, *Prog. Theor. Exp. Phys.* 2013 022C01
- [2] W. Bertl, et al.: *Eur. Phys. J. C* 47 (2006) 337