Construction Status of the COMET Experimental Facility

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The COMET experiment searches for the process of the muon-to-electron conversion [1]. The process violates the lepton flavor conservation and is the phenomenon of the Beyond-Standard Model of the particle physics.

The 8 GeV proton beam is required for the experiment and is provided from the J-PARC Main Ring via the existing Hadron Hall. Due to lower beam energy compared to the nominal beam of 30 GeV, the beam emittance is larger than the nominal and the beam optics needs to be optimized. The new beamline for COMET is being constructed in the Hadron Hall and will be completed in 2015.

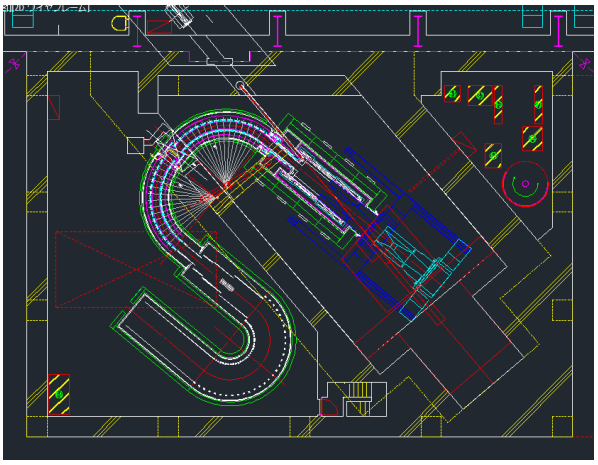

Figure 1
Layout of the COMET experimental area

The proton beam is delivered to the newly-constructed experimental hall for the COMET experiment. A major concern on designing the experimental hall is the radiation safety. The COMET experiment requires 56kW of beam energy at the final stage (3kW required at the first stage) and the significant energy is converted to radiation. To satisfy regulation for the radiation safety, the experimental area will be constructed in underground. Figure 1 displays the layout of the experimental area. The area is divided into two regions; a beam room (center in Figure 1) where the primary proton beam interacts with the target to generate a lot of muons, and an experimental room (left in Figure 1) where the generated muons are delivered to search for the muon-to-electron conversion process.

We report the design of the experimental facility and its construction status.

References

[1] Y. Kuno for the collaboration, “A search for muon-to-electron conversion at J-PARC : The COMET experiment”, Prog. Theor. Exp. Phys. **2013**, 022C01