

# Accelerator Physics and Technology Seminar

## Progress of the COMET Experiment and Muon Program in Japan

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**Date:** Tuesday, February 20

**When:** 4:00 pm CST

**Where:** One West (WH1W) and Zoom

**Abstract:** The COMET experiment searches for a phenomena of the conversion from a muon to an electron. Such a process violates the conservation law of the charged lepton flavor and is prohibited in the Standard Model of Particle Physics. The discovery of muon-to-electron conversion serves as evidence of physics beyond the Standard Model. The experiment is currently under construction at J-PARC. In February 2023, we delivered the primary proton beam for the first time to the COMET experimental hall for beam commissioning. Although the experimental setup for physics measurements was not yet ready, we demonstrated the transport of the proton beam from the J-PARC Main Ring to the COMET target and measured a secondary muon beam using the COMET Transport Solenoid Magnet.

The most important goal of modern particle physics would be to collect signs of new physics phenomena. One approach is the direct detection of new particles in high-energy collider experiments. Another direction is a precision measurement of symmetry or conservation laws based on the uncertainty principle of quantum physics. In the latter direction, muons are often utilized due to their ease of handling. In fact, various muon projects, including COMET, are underway at institutes worldwide such as FNAL, PSI and J-PARC. I would like to present the recent progress of the COMET experiment and briefly introduce the physics activity towards BSM in Japan.