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Quest for New physics of Charged Lepton Flavor Violation ; The COMET experiment at J-PARC

Charged Lepton Flavor Violation (CLFV) is as one of prime arena for probing new physics beyond the Standard Model (BSM), given its rate being highly suppressed in the SM, yet substantial predictions on the rate in new physics models. Notably, muon to electron conversion in a muonic atom serves as a promising process in this exploration. The upcoming COMET experiment in Japan, characterized by innovative muon sources, is to push the ultimate sensitivity limit by four orders of magnitude or more. This report will present the physics motivation behind the experiment and provides an outlook, while also highlighting concurrent CLFV experiments worldwide.

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