Abstract of poster for CLFV2019

Exploration of New Physics – Muon to Positron Transition at COMET experiment

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COherent Muon to Electron Transition (COMET) is an experiment at J-PARC, Tokai in Japan, which is to search for a Charged Lepton Flavor Violation (CLFV) process by capturing muons in Aluminum (Al) targets. The target channel for COMET is to search for a muon in nucleus of Al is then converted into a mono-energetic electron (μ−e conversion). This CLFV process is highly suppressed in the Standard Model (SM) of particle physics. Considering neutrino mass, the branching ratio will be strictly constrained at the order of $O(10^{-54})$. Another channel that can be probe in COMET is the muon to positron conversion (μ^-—e^+ conversion). This process violates total lepton quantum numbers by 2 units ($\Delta L = 2$), which can be mediated by Majorana neutrinos through type-I seesaw mechanism or massive particle with energy more than the order of TeV. According to recent researches [1-3], the μ^-—e^+ conversion process is more likely to occur in flavor off-diagonal sectors. Several theories beyond SM, such as the Majorana neutrino, doubly charged singlet scalar model and the left-right symmetric model suggested this process. This poster includes the content of possibility of searching μ^-—e^+ conversion process in COMET experiment.

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[3] T. Geib and A. Merle, Phys. Rev.D 95, 055009 (2017)