

Progress of Muonium to Antimuonium Conversion Experiment (MACE) at EMuS

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The spontaneous muonium-to-antimuonium conversion is one of the interesting charged lepton flavor violation processes. MACE is the next generation experiment to probe such a phenomenon. In models with a triplet Higgs to generate neutrino masses, such as Type-II seesaw and its variant, this process can be induced by the doubly-charged Higgs contained in these models. We study the prospect of MACE to probe these models via the muonium-to-antimuonium transitions. After considering the limits from $\mu^+ \rightarrow e^+ \gamma$ and $\mu^+ \rightarrow e^+ e^- e^+$, we find that MACE could probe a parameter space for the doubly-charged Higgs which is beyond the reach of LHC and other flavor experiments. Meanwhile, some progress in experimental study will be presented, including the plan of Chinese accelerator muon source called EMuS based on CSNS, our thoughts to increase muonium production efficiency, a development of toy MC simulation tool, optimization of magnetic spectrometer design.

Primary author: TANG, Jian (Sun Yat-Sen University)

Presenter: TANG, Jian (Sun Yat-Sen University)

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