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A New Idea of the Experiment Searching for μ -e Conversion

A new experiment searching for muon-electron conversion by fully utilizing the high-power pulsed proton beam available at J-PARC MLF will be discussed. Both a Monte Carlo simulation and a test measurement indicated that the muonic carbon atom formation rate in a muon target of MLF J-PARC is approximately 10^{10} /sec for 1 MW operation of the RCS. The muonic atom formation rate in an Aluminium muon stopper located close to the muon target will be more than 10^9 /sec. With this high formation rate of the muonic atoms, it is possible to perform a competitive search for muon-electron conversion from the muon stopper placed nearby the production target at the level of 10^{-14} , nearly two orders of magnitude below current limits. A new secondary beam line at the High-Momentum Decay Muon port will be dedicated to extract 105-MeV/c electrons from the muon stopper. A high performance kicker system will be used in the secondary beam line to eliminate the prompt beam burst.

Primary author: Dr AOKI, Masaharu (Osaka U., DeeMe working group)

Presenter: Dr AOKI, Masaharu (Osaka U., DeeMe working group)

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