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$\mu^- e^- \to e^- e^-$ in muonic atoms

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The charged lepton flavor violating (CLFV) processes of $\mu^- e^- \to e^- e^-$ decay by four Fermi contact interactions in a muonic atom for various atoms are investigated. The wave functions of bound and scattering state leptons are properly treated by solving Dirac equations with Coulomb interaction of the finite nuclear charge distributions. This new effect contributes significantly in particular for heavier atoms, where the obtained decay rate is about one order of magnitude larger than the previous estimation for ^{208}Pb. We find that, as the atomic number Z increases, the $\mu^- e^- \to e^- e^-$ decay rates increase more rapidly than the result of the previous work of Z^3, suggesting this decay as one of the promising processes to search for CLFV interaction.

Summary

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Primary author: Mr UESAKA, Yuichi (Osaka University)

Co-authors: Prof. SATO, Joe (Saitama University); Dr YAMANAKA, Masato (Nagoya University); Prof. SATO, Toru (Osaka University); Prof. KUNO, Yoshitaka (Osaka University)

Presenter: Mr UESAKA, Yuichi (Osaka University)

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