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Discovery potential of fermionic dark matter by using the Xe Charged Current tagging in KamLAND-Zen.

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The existence of dark matter is strongly supported by astronomical and cosmological observations. There are various experiments searching for dark matter with masses of 10-1000 GeV. However, it has not yet been detected.
Recently, low-mass dark matter has attracted attention as an alternative candidate. In particular, fermionic dark matter (FDM) has been proposed. FDM is absorbed by xenon nuclei and recoil electrons are emitted in the interaction. Then the FDM-absorbing Xe is excited to 136Cs. *We can observe recoil electrons and de-excited gamma rays from 136Cs.*
Recently, low-lying isomeric states with lifetimes on the order of 100 ns have been observed in 136Cs. This study suggests that delayed coincidence measurements are possible by detecting multiple time-correlated γ-rays emitted from 136Cs*.
The KamLAND-Zen experiment, situated in α deep underground laboratory, houses the largest amount of 136Xe.
We will report on the discovery potential of FDM with KamLAND-Zen.

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