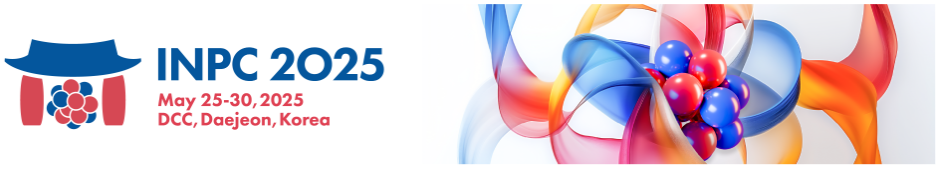

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A study of neutrinoless double electron capture of ^{40}Ca with AMoRE-I experiment

The AMoRE collaboration aims to investigate for rare processes, including neutrinoless double electron capture ($0\nu2$EC), an intriguing alternative to neutrinoless double-beta decay for exploring the fundamental nature of neutrinos. In this study, we present a comprehensive analysis of the $0\nu2$EC process in ^{40}Ca, utilizing the high-purity, enriched calcium molybdate ($^{48dep}Ca^{100}MoO_4$) detectors from the AMoRE-I experiment.

Utilizing advantage of the low-background environment and high energy resolution of AMoRE-I setup, we performed a thorough search for $0\nu2$EC signature at the Q-value (193.51 keV) of the decay. In this presentation, we report studies on the half-life of $0\nu2$EC in ^{40}Ca and highlight the sensitivity of low-temperature calorimeters in probing rare decay processes.

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