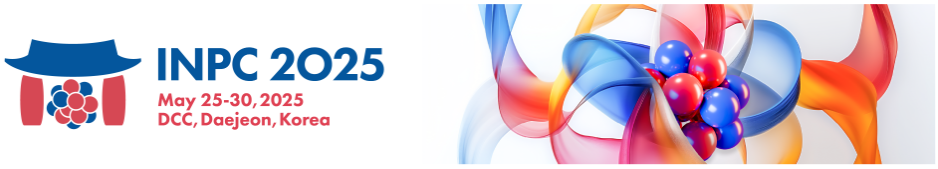

Contribution ID: **324** Type: **Contributed Oral Presentation**

Study of double beta decay of ^{48} Ca with CANDLES

Tuesday, 27 May 2025 08:45 (15 minutes)

The mass origin of neutrinos still remains unknown. One of the possible scenarios is that neutrinos have Majorana masses, which leads to neutrino less double-beta decay ($0\nu\beta\beta$).
CANDLES is a project to search for the $0\nu\beta\beta$ events of ^{48}Ca, which has the highest $Q_{\beta\beta}$-value of 4.27\,MeV among the double beta decay isotopes. We developed a CANDLES-III detector system with 96 CaF_2 scintillation crystals with natural Ca isotope, which corresponds to 350\,g of ^{48}Ca, and took data with almost 3 years of observation, at the Kamioka underground laboratory. We are analyzing data with the various methods to reduce background events to increase a sensitivity to the signal.
In this talk, the analysis of background reduction and the latest status of the search for the $0\nu\beta\beta$ will be reported. We have been developing the key technologies for the next generation detector system, such as isotope enrichment of ^{48}Ca and high energy resolution detector. The current status of these development will be also presented.

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Session Classification: Parallel Session

Track Classification: Neutrinos and Nuclei