Contribution ID: **4** Type: **Oral presentation**

A new possibility for experimental tests of nuclear matrix elements in double beta decay

Tuesday, June 24, 2025 11:45 AM (30 minutes)

Nuclear matrix elements in double beta decay are crucial for probing the nature of neutrinos. These quantities can, in principle, be inferred from experimental observables through various nuclear reactions. Examples include double charge exchange reactions connecting an initial and a final state, as well as single charge exchange and two-nucleon transfer reactions, which involve multiple intermediate spectator states. Despite extensive experimental efforts, however, no data with sufficient precision are currently available.

In this work, we present a new approach by introducing two complete sets of (A-1)-nucleon states and a complete set of A-nucleon states. This method enables the extraction of matrix elements from one-nucleon transfer amplitudes, which are generally easier to measure than those from other reactions. We demonstrate that, although many virtual states are involved and most are not experimentally accessible, only a few low-energy states make significant contributions. Furthermore, while limited, the available experimental data provide meaningful validation of the shell-model valence spaces. This approach offers a promising avenue for improving theoretical descriptions of double beta decay and guiding future experiments.

Primary author: Dr XAYAVONG, Latsamy (Yonsei University)

Co-author: Prof. LIM, Yeunhwan (Yonsei University)

Presenter: Dr XAYAVONG, Latsamy (Yonsei University)

Session Classification: Theory

Track Classification: Theory