



Contribution ID: 699

Type: **Invited Talk for Parallel Sessions (Invitation Only)**

Neutrino-nucleus interactions for oscillation experiments

Thursday, 29 May 2025 11:25 (25 minutes)

Neutrino interactions with nuclei have recently attracted significant attention due to various experimental efforts aimed at probing new physics. Notably, long-baseline neutrino oscillation experiments, such as Hyper-Kamiokande (Japan) and DUNE (USA), will soon enter the Precision Era. To maximize their impact, these experimental advancements must be complemented by accurate theoretical calculations to reduce systematic uncertainties and enhance the experimental sensitivity to fundamental constants.

In this talk, I will discuss the opportunities and challenges that nuclear theory faces in the context of neutrino oscillation experiments. Particular emphasis will be placed on *ab initio* methods and the significant progress made over the last few years, with a focus on results relevant to long-baseline experiments.

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Session Classification: Parallel Session

Track Classification: Neutrinos and Nuclei