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Probing New Physics from Neutrino Interactions at MeV and GeV

Monday 19 May 2025 17:30 (15 minutes)

As neutrino experiments become more precise and explore a wide range of energies, studying how neutrinos interact with matter has become an important way to test the Standard Model and search for new physics. In this talk, I will present our work on neutrino interactions at both low (MeV) and high (GeV) energy scales. At low energies, we consider coherent elastic neutrino–nucleus scattering (CEνNS) at current and upcoming neutrino facilities. CEνNS allows to extract key Standard Model parameters like the weak mixing angle and to explore possible new physics effects such as non-standard neutrino interactions (NSI), neutrino magnetic moment, and charge radius. At energies relevant for DUNE, neutrinos interacting with nuclei or electrons can have enhanced couplings to photons if light scalar mediators are present, resulting in a potentially measurable neutrino polarizability. We identify two possible experimental signatures of such coupling—one or two separated electromagnetic showers with no associated hadronic activity—and show the projected sensitivity for the DUNE Near Detector.

Mini Symposia (Invited Talks Only)

Plenary (Invited talks only)

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