Contribution ID: **34** Type: **Regular talk (15'+5')**

Tensions between theory and experiment on final states interaction with neutrinos

Wednesday 6 December 2023 11:00 (20 minutes)

Accurate modeling of neutrino final state interactions with target nuclei using neutrino detectors is an open field of research. Experiments such as MINERvA, T2K, and NOvA had shown discrepancies between their simulations and their data, which implies that the leading theoretical models embedded in the simulations are not encoding the full physics of the interactions. In particular, long-baseline neutrino oscillation experiments are currently developing various analysis techniques to bridge the gap between the theoretical models and the experimental results through the tuning of the models to better represent the data. The tuning emphasizes shifts in parameters with influence in the regions of energies to which the experiments are sensitive. In this talk we discuss the latest techniques deployed during the tuning processes done over neutrino cross-section simulators used by some long-baseline neutrino oscillation experiments.

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