Contribution ID: **1** Type: **not specified**

Energy-Dependent Neutrino Mixing Parameters at Oscillation Experiments

Thursday, May 26, 2022 4:59 PM (23 minutes)

One of the most important achievements in the field of particle physics was the discovery of neutrino oscillations.
Despite already awarded Nobel Prize, neutrino oscillation experiments still have a lot to offer, primarily the discovery
of CP violation in the lepton sector is anticipated. The expression for neutrino oscillation probabilities is composed
of neutrino mixing parameters and mass squared differences. In this seminar, we argue that mixing parameters at the scale of
neutrino production and detection do not necessarily need to coincide since such parameters are subject to renormalization group evolution and the two processes occur at different energies.
We discuss this in the frame of a particular UV compete realization and demonstrate that quantum effects can yield relevant observable effects at various neutrino experiments. As an example, we consider high-energy astrophysical neutrinos at IceCube and show that neutron decay production mechanism, that is considered to be
strongly disfavored by present data, becomes viable if significant renormalization group effects are present.
We also scrutinize terrestrial experiments and show that the mismatch between neutrino parameters at production and
detection can induce large effects at T2K and NOvA.

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Session Classification: Neutrino