Particle Physics on the Plains 2023



Contribution ID: 5

Type: not specified

Novel event generator for the automated simulation of neutrino scattering

Saturday 14 October 2023 10:35 (18 minutes)

With the onset of next-generation neutrino experiments, neutrino physics is entering an era of high-precision measurements requiring a fast and efficient process for testing Beyond the Standard Model (BSM) hypotheses against experimental data. Current BSM calculations are addressed on a case-by-case basis with multiple event generators and constantly evolving nuclear models that render this process infeasible and impractical for a wealth of ideas and data. In this work, we present a novel simulation framework that allows for the generation of particle-level events in arbitrary new physics models, while at the same time appropriately including nuclear effects. The core idea behind our generator is the factorization of differential cross sections into hadronic and leptonic tensors and currents, allowing us to focus on BSM leptonic effects while rendering implementations and updates of nuclear models straightforward. We validate our results against electron-and neutrino-carbon scatterings and present the first fully differential neutrino trident production results in the quasielastic region.

Author: LOPEZ GUTIERREZ, Diego (Washington University in St. Louis)
Presenter: LOPEZ GUTIERREZ, Diego (Washington University in St. Louis)
Session Classification: Intensity Frontier