Contribution ID: **581** Type: **Poster**

Tweaking Neutrino flux of NuMI using NA61 Data

Thursday 15 December 2022 14:00 (1 hour)

The NuMI Off-Axis e Appearance (NOvA) is a long-baseline accelerator based neutrino oscillation experiment designed to study the oscillation of muon neutrinos to electron neutrinos (→ e) using a muon neutrino beam. Neutrino spectrum before oscillation is observed at the 290-ton Near Detector (ND) located 100 m underground, 1 km from the source, and after oscillation the spectra is observed at the 14 kton Far Detector (FD) operating on the surface, 810 km away from the neutrino parent production source. The long-baseline neutrino oscillation experiments are entering an unprecedented level of precision measurements.
Flux is an important input for neutrino oscillation as well as cross-section measurements. Therefore, precise flux prediction is essential to achieve the physics goals of the current and future long-baseline neutrino-oscillation experiments. Hadron scattering and production uncertainties are limiting systematic in predicting the accelerator neutrino flux. The models employed to simulate hadron production from the nuclear target lead to intrinsic uncertainties of flux prediction. The typical neutrino flux uncertainty in the current generation of accelerator-based neutrino experiments is between 5% and 15%. To improve the prediction of the neutrino flux, we plan to make corrections based on constraints from the external hadron production experiments NA61 and EMPHATIC. We will use the Package to Predict Flux (PPFX) to achieve the aforementioned target.
In this presentation, we will talk about the GEANT4-based simulation using two different models, FTFP_BERT and QGSP_BERT. We use a tool G4HP to extract cross sections from thin target simulation. We plan to show the data/MC comparison study of G4HP simulation with the NA61 hadron production data. Further, we will show the FTFP_BERT and QGSP_BERT cross section for the NuMI using G4HP.

Session

Neutrino Physics

Authors: MEHTA, Bhumika (Panjab University); SHARMA, Prachi (Panjab University); BHATNAGAR, Vipin (Panjab University (IN))

Presenter: MEHTA, Bhumika (Panjab University)

Session Classification: Poster - 3