Contribution ID: **179** Type: **Poster**

Beam Simulations for the Long-Baseline Neutrino Experiment

The design of accelerator-based neutrino experiments relies heavily on neutrino beam simulations. The Long Baseline Neutrino Experiment (LBNE) uses a GEANT4-based simulation of the LBNE beamline. We present the current status of this simulation as well as efforts to characterize the LBNE beam. In particular, we discuss a recent study aimed at understanding the size and impact of flux uncertainties arising from the alignment of beamline elements.

The LBNE beam simulation has also been used to identify beam designs that maximize the potential for a discovery of CP violation. The optimization strategy involves maximizing the low energy flux in order to improve the L/E range and better resolve the second appearance peak while also reducing the high energy flux that can contribute to the neutral current and charged current tau neutrino background. A quantitative method to compare the discovery potential of various beam designs has been developed. We have used this method to study effects of changes such as the inclusion of a beam plug and varied horn current, proton energy, decay pipe length, and off axis angle. Changes to the beam configuration to support 1.2 Megawatt operation, including horn and target redesigns, have also been considered. We present preliminary results from these studies.

Primary author: BASHYAL, Amit (University of Texas at Arlingon)

Co-authors: Prof. YU, Jaehoon (University of Texas at Arlington); LOSECCO, John (Notre Dame); Dr FIELDS, Laura (Northwestern University); Dr LEBRUN, Paul L. G. (Fermilab); Dr PARK, Seongtae (University of Texas, Arlington)

Presenter: BASHYAL, Amit (University of Texas at Arlingon)

Track Classification: Neutrino Beam Flux