Contribution ID: **400** Type: **Poster**

Development of T2K Beam Simulation with GEANT4

Wednesday 30 August 2023 15:37 (1 minute)

The long baseline neutrino experiment T2K has successfully used Monte Carlo simulations for the neutrino flux predictions in both near and far detectors, which are essential inputs for different neutrino oscillation and cross section analyses. However, the current simulation software is based on FLUKA and the no-longer maintained simulation package GEANT3, which is becoming difficult to support. A replacement beam simulation using the GEANT4 software package is in development, aiming to describe the physical processes from the primary proton interactions in the T2K target to the decay of hadrons and muons, producing neutrinos for the flux predictions at both near and far detectors. The T2K flux simulation is generally tuned using measurements from the NA61/SHINE spectrometer of $\pi^{\pm}$, $K^{\pm}$, and proton differential yields emitted from a T2K replica target, and those measurements can also be used to validate the new simulation software. We present the recent simulation results for the validation with NA61/SHINE data, the neutrino flux predictions, and comparisons to the current FLUKA/GEANT3 simulations.

Submitted on behalf of a Collaboration?

Yes

Primary author: Dr NASCIMENTO MACHADO, Lucas (University of Glasgow)

Presenter: Dr NASCIMENTO MACHADO, Lucas (University of Glasgow)

Session Classification: Poster session

Track Classification: Neutrino physics and astrophysics