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T2K GEANT4 Beam Simulation

T2K has successfully developed a beam Monte Carlo simulation called Jnubeam for the neutrino flux prediction in both near and far detectors, which are essential for neutrino oscillation and cross section analyses. Jnubeam is based on the no longer maintained GEANT3 package, which is difficult to support. The current simulation also uses the software FLUKA to simulate the hadronic production from the interactions of the proton beam in the target. We are developing a replacement beam simulation based on GEANT4, which will describe the physics from proton interactions in the T2K target through to muons and hadrons decaying, producing neutrinos for the flux predictions. Simulation results for validation against NA61/SHINE data, neutrino flux predictions using GEANT4, and comparisons with FLUKA/GEANT3 simulations are presented.

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