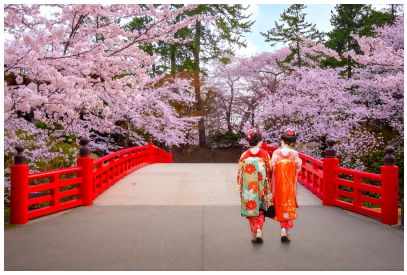

ID de Contribution: **43** Type: **Non spécifié**

Comparison of cross section models for neutrino-induced single pion production

It is important to measure neutrinos in the energy range from a few hundreds of MeV to several GeV for the study of neutrino oscillation by atmospheric neutrino observation and long baseline experiments. It is also important for proton decay search as the major background is atmospheric neutrinos in the energy region. In this intermediate energy region charged-current quasi-elastic scattering (CCQE), single pion production, and deep inelastic scattering (DIS) coexist with comparable contributions. The T2K experiment selects CCQE events from single ring samples to measure neutrino oscillations, while single pion production events become the background in case a pion is not identified. However, T2K aims to update their analysis to use multi-ring samples which include single pion production events in order to increase statistics. Single pion production is crucial in the NOvA experiment and the DUNE experiment in the future as they measure the neutrino oscillation at higher energy than T2K with the longer baseline. Similarly, single pion production can be a background in proton decay searches at Super-Kamiokande and future experiments, including Hyper-Kamiokande. Therefore, it is important to understand the cross section and kinematics of single pion production to improve the precision of the neutrino oscillation measurement and proton decay searches. For this purpose, we evaluated a new model for single pion production, called the dynamical coupled-channels model (DCC, S.X. Nakamura, H. Kamano, and T. Sato). We compared it with the Berger-Sehgal model, which is currently used in the NEUT neutrino interaction generator. The results and future perspectives will be presented.

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Classification de Session: Poster session