

T2K flux prediction file release description

Flux predictions for the T2K ND280 (near) and SK (far) detectors are provided. The original description of the flux predictions is published in Phys. Rev. D 87, 012001 (2013). Since the publication, the flux prediction has been updated with new thin target data from the NA61/SHINE experiment, and flux predictions for antineutrino enhanced beam operation have been produced. The NA61/SHINE thin target measurements of π^\pm , K^\pm , K_S^0 , Λ and p production are published in Eur. Phys. J. C (2016) 76: 84. The updated flux prediction is described in Phys. Rev. D 91, 072010 (2015). The provided flux predictions include no neutrino oscillations.

The ND280 flux is calculated as the average flux at a $150 \times 150 \text{ cm}^2$ plane that is centered in the ND280 near detector volume. The plane is at a distance of 284.9 m from the center of the production target. The direction from the center of the production target to the plane is offset from the beam direction by 2.042° .

The SK flux is calculated for an infinitesimal angular range in a direction that is offset by 2.506° from the beam direction. The SK flux is calculated at a distance of 295.3 km from the center of the production target. Fluxes are provided for both +250 kA (neutrino enhanced beam) and -250 kA (antineutrino enhanced beam) operation of the T2K magnetic horns. The flux is given in 50 MeV wide bins of neutrino energy from 0 to 10 GeV neutrino energy. Above 10 GeV, the bins are 1 GeV wide, and are normalized to show the flux per 50 MeV. All flux predictions are normalized to 1×10^{21} protons delivered to the T2K production target. The error bars shown in the histograms are Monte Carlo statistical errors.

ROOT and text files are provided:

- t2kflux_2016_plus250kA.root

ROOT histograms of the ND280 and SK flux for +250 kA horn operation

- t2kflux_2016_minus250kA.root
ROOT histograms of the ND280 and SK flux for -250 kA horn operation
- t2kflux_2016_nd280_plus250kA.txt
Text table of ND280 flux for +250 kA horn operation
- t2kflux_2016_nd280_minus250kA.txt
Text table of ND280 flux for -250 kA horn operation
- t2kflux_2016_sk_plus250kA.txt
Text table of SK flux for +250 kA horn operation
- t2kflux_2016_sk_minus250kA.txt
Text table of SK flux for -250 kA horn operation

The histograms in the ROOT files are:

- enu_sk_numu:
The SK ν_μ flux prediction in bins of neutrino energy
- enu_sk_numub:
The SK $\bar{\nu}_\mu$ flux prediction in bins of neutrino energy
- enu_sk_nue:
The SK ν_e flux prediction in bins of neutrino energy
- enu_sk_nueb:
The SK $\bar{\nu}_e$ flux prediction in bins of neutrino energy
- enu_nd280_numu:
The ND280 ν_μ flux prediction in bins of neutrino energy
- enu_nd280_numub:
The ND280 $\bar{\nu}_\mu$ flux prediction in bins of neutrino energy
- enu_nd280_nue:
The ND280 ν_e flux prediction in bins of neutrino energy
- enu_nd280_nueb:
The ND280 $\bar{\nu}_e$ flux prediction in bins of neutrino energy