Abstract

Many modern long baseline neutrino oscillation experiments use the $\nu_\mu/\bar{\nu}_\mu$-nucleus charged-current (CC) interactions to infer oscillation parameters. The NOvA experiment uses the off-axis NuMI beam with a neutrino energy spectrum peaking at about 2 GeV. In this energy range, the quasielastic, the resonant production, and the deep inelastic scattering processes come into play in the total cross section. Measurements of the individual channels are complicated by the final-state interactions (FSIs). The inclusive measurement, which only requires an outgoing muon, on the other hand, is much less sensitive to the FSIs. A