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CC nu_mu 1 pi+ production in the MINERvA tracker.

Long-baseline neutrino experiments such as NOvA, T2K, DUNE, and Hyper-Kamiokande measure neutrino oscillations using charged current (CC) neutrino interactions. CC interactions in long-baseline experiments consist of three types of interactions, whose relative fraction depends on the neutrino energy quasielastic (QE), resonant (RES) or Deep Inelastic Scattering (DIS). Precise measurements of neutrino oscillations require precise models of these three types of interactions. Although there have been many recent measurements of charged-current quasi-elastic scattering to improve quasielastic models, there is much less data available for resonant pion production, The RES events are characterized by the production of neutral and charged pions on the final state. A large quantity of the resonant interactions are produced between 1 GeV < invariant mass (W) < 1.7 GeV, this region is between the QE and DIS regions. So the selection of RES events contains a lot of noise from the other types of interactions, for which we have to develop different techniques to identify the RES events. The MINERvA experiment has measured the cross section for single pion production. The measurements of single and double differential cross sections of 1-pion events in the scintillator tracker region of the MINERvA detector, including results from both the LE ($<E_nu>= 3 GeV$)$er a and the ME era (< E_nu >= 6 GeV)$ are described in this talk.

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