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P4.024 Probing kaon-originated neutrinos with the muons produced outside of the T2K near detector

J Lagoda

National Centre for Nuclear Research, Poland

on behalf of T2K Collaboration

One of the main backgrounds to the $\nu_\mu \rightarrow \nu_e$ oscillations is the intrinsic electron neutrinos. They are produced in decays of muons and kaons, resulting in low and high energy components, respectively. The kaon-originated part of the spectrum can be measured using the Deep Inelastic Scattering of neutrinos inside of ND280, the T2K off-axis Near Detector, or by looking at muons coming to ND280 from the interactions in the surrounding soil. It will be demonstrated that such a sample of muons of both signs, entering through the upstream wall and penetrating the detector to the depth of at least 2.5 m, is mostly produced by the neutrinos coming from kaon decays. The additional advantage of the usage of muons originating from the neutrino interactions in the surrounding soil is an ability to work with a sample of much higher statistics than available from the ND280 interactions corresponding to the high energy part of the spectrum.