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Probing the neutrino reactor anomaly with the T2K near detector

Several anomalies in neutrino experiments could be explained assuming the existence of new sterile neutrinos. These hypothetical right-handed neutrinos, with a mass at the eV scale, don't interact but participate in mixing with the three SM active flavor neutrinos. We present a study of the nu_e component in the T2K beam using the data of the near detector ND280, located at 280m from the target. Nu_e interactions in ND280 are selected using the good particle identification performances of the TPC and the electromagnetic calorimeter. We describe the analysis we developed to investigate the effect of a 3+1 model with non-zero mixing angle theta_e4, leading to nu_e disappearance at the ND280. The sensitivity of this analysis in the delta_m^2-sin^2(2 theta_e4) plane, where delta_m^2 is the squared mass splitting between the new state and the SM neutrinos, is presented as well as the future prospects to investigate sterile neutrino models in the T2K Near Detector.

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