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NSI sensitivity for MINOS/MINOS+

With the increasing precision of neutrino oscillation measurements, Non Standard Interactions (NSI) have received growing interest and attention in the community as an additional alternative explanation of neutrino/antineutrino disappearance. The parameters governing non-standard interactions have been thus far difficult to measure in neutrino oscillation experiments due to short baselines limiting the amount of matter traversed by neutrinos, or by limited detector performance. These limitations, however, are mitigated due to the recent discovery of a large theta_{13} angle in one hand, and to future long-baseline neutrino oscillation experiments with improved neutrino detectors on the other hand. Long-baseline neutrino experiments may be able to probe the presence of NSI, in particular in the e-tau sector by measuring the nu_mu -> nu_e conversion probability, and in the e-mu sector by measuring muon neutrino/antineutrino disappearance. The Main Injector Neutrino Oscillation (MINOS) experiment, with a baseline of 735 km, can be used to search for the epsilon_{e-tau} and epsilon_{mu-tau} NSI parameters, by looking for deviations from the three-flavor oscillation scenario. We present the MINOS sensitivity to epsilon_{e-tau} using the complete MINOS beam neutrino data set taken between 2005 and 2012, and show prospects for searches of epsilon_{mu-tau} with MINOS+ using a higher-energy, doubled-intensity neutrino beam.

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