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Search for heavy neutrinos with the T2K experiment

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In the Standard Model of particle physics, neutrinos are massless. But, from neutrino oscillations experiments, we know that they are massive. The question is: how do they acquire these non-zero masses ?

One of the possible explanations introduces new heavy neutrinos states, with a mass of few keV to GUT scale, that would mix with light neutrinos. Not only would they explain neutrino masses but they could also give answers to other enigmas, such as the dark matter composition and the matter-antimatter asymmetry in the Universe. Using T2K experiment, a neutrino oscillation experiment located in Japan, it is possible to search for such particles (at 100 MeV-scale) that would be produced along the standard neutrino beam and then decay in the T2K near detector.

After introducing the theoretical framework, the presentation will focus on the studies of expected signal and background in the near detector in various decay modes, used to put constraints on heavy neutrinos mixing with standard neutrinos.

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