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Searching for a Sterile Neutrino at J-PARC MLF: JSNS² experiment

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The JSNS² experiment aims to search for the existence of neutrino oscillations with Δm^2 near 1eV^2 at the J-PARC Materials and Life Science Experimental Facility (MLF). With the 1 MW of 3 GeV proton beam created by Rapid Cycling Synchrotron (RCS) and spallation neutron target, an intense neutrino beam from muon decay at rest is available. Neutrinos come predominantly from μ^+ decay : $\mu^+ \rightarrow e^+ + \bar{\nu}_\mu + \nu_e$. The oscillation to be searched for is $\bar{\nu}_\mu \rightarrow \bar{\nu}_e$ which is detected by the inverse beta decay interaction $\bar{\nu}_e + p \rightarrow e^+ + n$, followed by gammas from neutron capture of Gd. The two detectors with a fiducial volume of 50 tons are located 24 meters away from the mercury target.

Additional physics programs include the cross section measurements with neutrinos with a few 10 MeV from muon decay at rest and with monochromatic 236MeV from kaon decay at rest..

Experimental Collaboration

JSNS² (J-PARC E56) experiment

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