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Searching for a Sterile Neutrino at J-PARC MLF: JSNS² experiment (15' + 5')

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

Additional physics programs include cross section measurements with neutrinos from muon decay at rest (10s of MeV) and with monochromatic 236 MeV muon neutrinos from kaon decay at rest.

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