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Searching for Sterile Neutrinos and CP Violation: The IsoDAR and Daedalus Experiments

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The IsoDAR experiment uses a novel isotope decay-at-rest (DAR) source of electron antineutrinos using protons from a 60 MeV cyclotron. Paired with KamLAND, the experiment can observe over 800 thousand inverse beta-decay events in five years and do a decisive test of the current hints for sterile neutrino. Daedalus is a phased program leading to a high-sensitivity search for CP violation. The experiment uses a set of high-intensity 800 MeV cyclotrons to produce pion DAR neutrino sources at several locations (1.5km, 8km, and 20km) going to a single ultra-large, underground detector with free protons. The Daedalus experiment will provide a high-statistics antineutrino data set with no matter effects that can be combined with long-baseline data sets to provide enhanced sensitivity to CP violation and matter effects.

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