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KamLAND

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KamLAND is a one-kiloton liquid-scintillator detector sensitive to antineutrinos through inverse beta decay. The experiment, located underground in the mountains of central Japan, was designed to look for the disappearance of antineutrinos produced in nuclear power reactors at a typical baseline of 180 km. The KamLAND collaboration made the first observation of the disappearance of reactor antineutrinos, and subsequently observed distortions of the antineutrino energy spectrum consistent with neutrino oscillation. We have made precise measurements of the neutrino oscillation parameters based on the rate and energy spectrum of observed antineutrinos. KamLAND has also studied other physics topics, most notably geologically-produced antineutrinos. The collaboration is planning a detector upgrade to dramatically reduce low-energy backgrounds through purification of the liquid scintillator. This upgrade will allow sensitivity to solar neutrinos through elastic scattering interactions down to energy deposits below 300 MeV, in particular ^{7}Be neutrinos. These measurements will test the MSW (Mikheev-Smirnov-Wolfenstein) explanation of solar neutrino flavor change, and they will both test and constrain the solar standard model. I will summarize KamLAND physics results to date and discuss the prospects for future measurements.