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Muon Tracking for Optimized Background Rejection at KamLAND THOMAS O'DONNELL, UC Berkeley/LBNL, KAMLAND COLLABORATION — KamLAND has demonstrated convincingly that neutrinos oscillate. The experiment has determined the neutrino oscillation parameter Δm^2_{21} to unprecedented precision, has helped constrain the neutrino mixing angle θ_{12} and has explored the potential application of neutrinos as a geophysical probe. The heart of the detector is 1 kton of hydrocarbon based scintillator located underground in Japan. A purification upgrade is currently underway which will enable KamLAND to execute a low energy solar neutrino program in parallel with the anti-neutrino program. Like many underground experiments, fast neutrons and other spallation products from cosmic ray muons present challenging backgrounds. In many cases these backgrounds can be reduced by rejecting events with the correct spatial and temporal correlation to muons. High muon tracking resolution is desirable to achieve efficient background rejection while maintaining maximal detector exposure. A new auxiliary muon tracking system is being commissioned to optimize the main detector muon reconstruction algorithm and further characterize post muon events at KamLAND. This system and the impact for CNO/pep solar neutrino observation will be described.

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