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Low Energy Anti-Neutrino Detection with Super-Kamiokande

Detection of low energy anti-neutrinos in large water Cherenkov detectors via inverse beta decay reactions opens the door to the observation of the diffuse supernova neutrino background and allows high statistics measurements of the anti-neutrino flux and spectrum of distant reactors. At present, these signals are buried by backgrounds which would be greatly reduced by the observation of the produced neutrons in delayed coincidence. At present, a 200t test facility is being constructed underground near Super-Kamiokande to study the impact of the proposed addition of Gadolinium ions to the water of Super-Kamiokande in order to reliably tag neutron captures by the 8 MeV gamma cascade emitted by the excited Gadolinium nucleus.

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