Abstract Submitted
for the APR10 Meeting of
The American Physical Society

Background Studies for Double Chooz: Identifying ^{9}Li Decay CLAIRE THOMAS, Boston University / Massachusetts Institute of Technology, DOUBLE CHOOZ COLLABORATION — Double Chooz is a reactor neutrino experiment that aims to measure the mixing parameter θ_{13}. The experiment detects electron antineutrinos via inverse beta decay. Neutrons and light nuclei produced in muon spallation are a major background to the experiment. The delayed neutron emitter ^{9}Li is especially problematic because it mimics the inverse beta decay signal. Since Double Chooz is not sensitive to the sign of the electric charge, an electron from ^{9}Li decay is not easily distinguished from an inverse beta decay positron. However, the emitted neutron energies differ substantially between ^{9}Li decay and inverse beta decay. The neutron from ^{9}Li decay has energy on the order of an MeV, whereas the inverse beta decay neutron has a negligible kinetic energy. Furthermore, in three of the five neutron-emitting ^{9}Li decay branches, an alpha particle is also emitted. To test whether Double Chooz can detect these differences, I developed general software to simulate radioactive decays in the detector. In this talk, I compare pulse timing information of each ^{9}Li neutron-emitting decay branch to that of inverse beta decay.

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Date submitted: 22 Oct 2009 Electronic form version 1.4