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Limits on Ag-108m Decay Rate Variations due to Reactor Antineutrinos JONATHAN NISTOR, JORDAN HEIM, TechSource, Inc., DAVID KOLTICK, SHIH-CHIEH LIU, Purdue University — An experiment is currently being conducted at the High Flux Isotope Reactor (HFIR) located at Oak Ridge National Laboratory (ORNL), designed to address whether a flux of reactor-generated antineutrinos, $\overline{\nu}_e$, can alter weak interaction nuclear decay life-times. The samples are exposed to approximately equal and alternating 28-day reactor-on periods, with an antineutrino flux of $\sim 3 \times 10^{12}$ cm^{-2} s^{-1}, and reactor-off refueling periods. Accurately measuring the radioactive decay constant in a counting experiment requires that both the detector and environment be well understood and stable over the experimental duration. A High Purity Germanium spectrometer has been constructed 6 meters from the HFIR core with the sensitivity to detect deviations in the decay rate at the level of 1 part in 10^5. In the ^{108m}Ag study, both the electron capture decay to ^{108}Pd and the internal conversion to ^{108}Ag are measured. The internal transition is an electromagnetic process that should remain unaffected by the antineutrino flux, and thus it presents a useful tool to further reduce systematic uncertainties. Analysis of the branching fraction of the decay modes should increase the spectrometer's sensitivity to the level of 10^{-6}.

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