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Title: Neutrino-Induced Nuclear Fissions

Abstract

The study of neutrinos is a burgeoning field with remarkable promise for examining the standard model and peering into what may lie beyond. Equally, neutrino physics continues to show value for national security and nuclear non-proliferation pursuits. Additionally, there's immense potential for greater understanding of neutrino transport to immeasurably aid the field of astronomy in neutrino-rich environments like core-collapse supernovae and neutron star mergers. This work sits at the nexus of all three of these crusades by searching for a process called neutrino-induced nuclear fission or "nuFission." Neutrino-Induced Nuclear Fission is simply nuclear fission of a heavy nuclei directly catalyzed by a neutrino-nucleus interaction. As of this writing, neutrino-induced nuclear fission has never been experimentally observed despite enduring predictions from over 50 years ago. This experiment would be the first. Extensive detector and signal simulation work for this effort is presented here.