

Abstract Submitted
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Modeling of ultracold neutron motion within the UCN τ magneto-gravitational trap DOUGLAS WONG, Yale University — The UCN τ experiment at the Los Alamos Neutron Science Center (LANSCE) measures the lifetime of free ultra cold neutrons (UCN). The neutrons are trapped within an asymmetric compound toroidal bowl made of a Halbach array of permanent magnets. The storage time τ_{store} of the trap is then measured by storing UCNs for various times before counting the remaining neutrons. The asymmetry of the trap is designed such that a population of UCNs should fill phase space with chaotic orbits, allowing the detector to count surviving neutrons with efficiency independent of storage time. This project seeks to verify that the simplest possible model of orbits in a compound toroid indeed produces chaotic orbits. We will also investigate if the chaotic nature of the phase space evolution is dependent on whether a neutron's interaction with the walls of the trap is modeled as a magnetic interaction or as simple specular reflection from a hard surface. The presented talk will include a status report.

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