Abstract Submitted
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Systematics of the UCNA Experiment A.T. HOLLEY, for the UCNA Collaboration — The goal of the UCNA experiment is to determine the angular correlation between the electron momentum and the neutron spin (the beta asymmetry) in free neutron decay using polarized ultracold neutrons (UCN). The experimental strategy is to transport UCN into a decay volume through a 7T static magnetic field, allowing the magnetic potential to polarize the UCN. The energy and transverse position of the electrons produced by beta decay are then measured by detectors on either side of the decay volume, with a 1T longitudinal field ensuring $2 \times 2\pi$ collection of the electrons. UCN polarization can be reversed via an rf adiabatic spin flipper, thereby providing first-order cancellation of systematic asymmetries between the beta detectors via the usual super ratio. The spin flipper also allows an *in situ* measurement of the depolarized contamination which develops during a constant-polarization measurement cycle. UCN-based angular correlation experiments have the innate advantages of essentially 100% initial neutron polarization and small neutron-generated backgrounds, both of which allow for good control over two of the major systematics in free neutron angular correlation measurements. These systematics, along with the systematic effects associated with our detector response and backscattering, will be discussed in relation to the UCNA experiment and our ultimate goal to extract a 1% or better measurement of the beta asymmetry from the data taken during our 2008 run cycle.

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