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Measuring Systematic Effects in the UCNτ Experiment[1] FRANCISCO GONZALEZ, Indiana University Bloomington, UCNτ COLLABORATION — The UCNτ experiment at Los Alamos National Laboratory measures the neutron lifetime by storing ultracold neutrons (UCN) in a magnetogravitational trap for variable holding times. Loss mechanisms besides β-decay add systematic uncertainties by potentially removing UCN before detection. Magnetic field anomalies can enhance UCN depolarization rates. Field mapping and in-situ detection help place limits on this effect. Before storage, UCN with energies above the trapping potential are removed, but over-threshold UCN could escape due to heating or insufficient cleaning. In-situ detection at various heights and an improved cleaner detector monitor high-energy UCN, constraining these losses. Detection and spectral cleaning efficiency couple to UCN phase-space distribution. Comparing UCN arrival times quantifies phase-space evolution. A buffer volume installed between the UCN source and trap has improved characterization of the UCN spectrum and reduced the effect of the beam structure on normalization. Alongside these improvements, Monte Carlo simulations of UCN trajectories give insight needed to understand and minimize loss mechanisms. We will present work done to constrain these systematic effects as part of an effort to reduce UCNτ's total uncertainty to about 0.25s.

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Francisco Gonzalez
Indiana University Bloomington

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