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Comparing Simulated and Experimental Data from UCNτ DEZRICK HOWARD, ADAM HOLLEY, Tennessee Technological University — The UCNτ experiment is designed to measure the average lifetime of a free neutron (τ_n) by trapping ultracold neutrons (UCN) in a magneto-gravitational trap and allowing them to β-decay, with the ultimate goal of minimizing the uncertainty to approximately 0.01% (0.1 s). Understanding the systematics of the experiment at the level necessary to reach this high precision may help to better understand the disparity between measurements from cold neutron beam and UCN bottle experiments (τ_n ~888 s and τ_n ~878 s, respectively). To assist in evaluating systemics that might conceivably contribute at this level, a neutron spin-tracking Monte Carlo simulation, which models a UCN population's behavior throughout a run, is currently under development. The simulation will utilize an empirical map of the magnetic field in the trap (see poster by K. Hoffman) by interpolating the field between measured points (see poster by J. Felkins) in order to model the depolarization mechanism with high fidelity. As a preliminary step, I have checked that the Monte Carlo model can reasonably reproduce the observed behavior of the experiment. In particular, I will present a comparison between simulated data and data acquired from the 2016-2017 UCNτ run cycle.

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