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Effect of Detector Coincidence Criteria on a High Precision Measurement of the Neutron Lifetime CALEB DAVIS, ADAM HOLLEY, Tennessee Tech Univ, UCNTAU COLLABORATION — The UCNτcollaboration is working to measure the mean lifetime of a free neutron to 0.1s using very low energy "ultracold" neutrons (UCN). Achieving such high precision is important in a variety of low-energy tests for new physics. A density of UCN is produced in the Los Alamos solid-Dsuper-thermalsource and is then polarized and guided to a magneto-gravitational trap. The UCN that have high enough energy to escape the trapping potential are cleaned out, and the remaining neutrons are left to decay for two time intervals, a short and long holding time. The difference in the two holding times, along with the normalized number of neutrons left in the trap at the end of the holding periods, are used to calculate the average lifetime of the neutrons in the trap. The neutrons are detected using a newly-developed *in situ* activedetector that observes light from a B-coated ZnS scintillation screen via a pair of photomultiplier tubes . An important consideration for this detector is optimizing the signal to background via adjustments of coincidence criteria defining the "fingerprint" of a neutron in the detector. A study will be presented showing the effects of adjusting coincidence parameters on the extracted mean lifetime of a neutron in the trap.

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