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A real-time in-situ detector for the UCNτ experiment[1] C. CUDE-WOODS, NCSU, UCNTAU COLLABORATION — Currently, the most precise cold-neutron beam and ultra-could neutron bottle measurements of the neutron life time disagree by more than4σ. The leading systematic uncertainties in previous bottle measurements are due to wall losses, quasi-bound neutron leakage, as well as phase-space and spectrum evolution during storage. The magneto-gravitational trap used for UCNτ minimizes losses by eliminating material interactions during storage. In order to address the remaining leading systematics we have developed a multilayer surface detector technology for UCN using ^{10}B evaporated onto ZnS:Ag and have applied this technology in a new double sided, large area, high efficiency detector for UCNτ (the "active dagger"), that allows spectrum and phase-space evolution and quasi-bound UCN leakage to be quantified and minimized in our lifetime measurement. We installed and used the active dagger to take data during the 2015-2016 run at Los Alamos Neutron Science Center. In addition to vastly improving the signal to noise ratio over previous counting techniques and eliminating several possible systematics, the active dagger allows us to record neutron capture in situ and in real time and directly study phase space evolution in the trap for the first time.

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