

Abstract Submitted
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UCN τ +: an upgrade to the UCN τ experiment¹ ALEXANDER SAUNDERS, Los Alamos Natl Lab, UCNTAU COLLABORATION — The UCN τ experiment measures the free neutron lifetime by counting the surviving polarized ultracold neutrons (UCNs) after storing them in an asymmetric magneto-gravitational storage volume built from a Halbach array of permanent magnets. The current apparatus will achieve a statistical uncertainty of about 0.3 s and has established a systematic uncertainty of 0.28 s; it is expected to ultimately reach a total uncertainty of about 0.2 s, limited primarily by the efficiency with which UCN τ utilizes the neutrons supplied by the Los Alamos UCN facility. In this talk, we will describe the "UCN τ +" upgrade, which will improve the statistical reach by increasing the efficiency of loading UCNs into the storage volume ten-fold. The current loading technique, using a removable section of the magnet array, induces depolarization which reduces the number of trappable UCNs. Here we describe a dedicated, insertable transfer volume that avoids significant sources of depolarization. This technique can potentially reduce the total uncertainty on the neutron lifetime to below 0.1 s.

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