Abstract Submitted
for the DNP20 Meeting of
The American Physical Society

Monte Carlo optimization of a low enrichment uranium neutron multiplier for the Los Alamos ultracold neutron source ROBERT PATTIE, East Tennessee State University, LANL UCN SOURCE COLLABORATION — The recent upgrade of the Los Alamos spallation driven ultracold neutron source drove the improved the statistical sensitivity of a precision measurement of the neutron lifetime and provided a path toward a new electrical dipole moment search at the 3.0×10^{-27} e·cm level. The output of the source can be further improve by borrowing a concept from reactor design, the fission foil neutron multiplier. The neutron flux through the cryogenic insert can be increased by replacing some of the passive room-temperature moderator components with low enrichment uranium. Simulations using MCNP6 demonstrate that the source's performance is increased by a factor of > 100, however the heat load on the source and uranium itself will be the limiting factor. We will present the results of a simulation study to optimize a fission foil geometry that will lead to an increase of a factor of $4 - 10$ in the ultracold neutron production under manageable heat loads.

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Date submitted: 01 Jul 2020 Electronic form version 1.4