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Modeling the New UCN source at Los Alamos National Laboratory for the UCNtau Experiment THOMAS BAILEY, ALBERT YOUNG, North Carolina State Univ, STEVEN CLAYTON, MARK MAKELA, ANDY SAUNDERS, Los Alamos National Laboratory — The Los Alamos Neutron Science Center uses a linear proton accelerator to make an ultracold neutron (UCN) source for use in experiments including the UCNtau and the nEDM experiments. The proton beam strikes a tungsten target, producing free neutrons through spallation. The target is embedded in beryllium and graphite moderators, coupling produced neutrons to a bucket-shaped cold moderator of polyethylene beads at 45K that surrounds a solid deuterium converter, where they are down-scattered to ultracold energies. The UCN source was upgraded over the summer of 2016 and Data taken from the 2016-2017 run cycle shows that continuous running decreases the neutron output caused by layers of deuterium frost building up on the surface of the crystal or in the low temperature part of the UCN guide, and/or other possible changes to the shape, temperature profile or energy content of the deuterium. We have simulated the source deterioration with a simple model for surface roughness and deuterium snow, to understand the expected correlations between the UCN flux and spectrum exiting from the source as snow accumulates. We plan to use the output of our simulation to compare a set of monitor detectors used to establish the output of the flux and to monitor spectral changes important for UCNtau.

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