

Abstract Submitted  
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**Development of an Ultracold Neutron Source at the NC State PULSTAR Reactor** GRANT R. PALMQUIST, ROBERT GOLUB, AYMAN I. HAWARI, ADAM T. HOLLEY, PAUL R. HUFFMAN, EKATERINA KOROBKINA, BERNARD W. WEHRING, YANPING XU, ALBERT R. YOUNG, North Carolina State University — Development of an ultracold neutron (UCN) source is underway at the North Carolina State University 1 MW PULSTAR reactor facility. Fast neutrons from the reactor core are moderated first by heavy water at room temperature and then by solid methane at a temperature of approximately 25 K. The cold neutrons emerging from the methane are then down-scattered to lower energies ( $< 300$  neV) by phonons in the 5 K solid ortho-deuterium converter. The UCN emerging from the deuterium source are guided to the experimental area through diamond-like carbon-coated quartz. The anticipated UCN densities in an experimental volume connected to the end of the guide should exceed densities presently obtained at the UCN source at the Institute Laue–Langevin. The current status of the design and construction will be discussed, with an emphasis on the thermal modeling of the cryostat cooling system. This work is supported in part by NSF grant #0314114 and funds from the DOE INIE program.

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