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Studies of the Production and Transport of Highly Polarized Ultracold Neutrons for the UCNA Experiment A.T. HOLLEY, North Carolina State University, UCNA COLLABORATION — The goal of the UCNA experiment is to determine the angular correlation between the electron momentum and the neutron spin (the beta-asymmetry) in neutron decay using polarized ultracold neutrons (UCN). The experimental strategy is to transport UCN into a decay volume through a 7T static magnetic field using the magnetic potential to polarize the UCN. The initial UCN spin can then be reversed via an rf adiabatic spin-flipper in a 1T field region whose gradient is tailored to optimize the adiabatic spin-flipper's performance. The spin-flipper, which also allows *in situ* measurement of the UCN depolarization rate, is a resonant 'bird-cage' cavity capable of producing rf fields in excess of 5G at 30Mhz. In order to minimize the UCN depolarization rate, UCN guides are constructed of diamond-like carbon films on quartz tubing, a technology which has been demonstrated to produce less than 3×10^{-3} depolarizations per bounce. The performance of this system will be described, and compared to expectations from detailed Monte Carlo transport models. The implications for high precision measurements of polarized ultracold neutrons will also be discussed.

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