

# Material Depolarization of Ultracold Neutrons

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Ultracold neutrons (UCN) are defined as having an energy of  $\sim 100$  neV. Polarized  $\beta$ -decay experiments using UCN require consideration of material depolarization for maximizing statistics as well as for understanding and controlling systematic effects. The Los Alamos National Lab UCN team performed an experiment to test material depolarization rates in which UCN were polarized using a 6T longitudinal field. The resulting high-field-seeking spin state neutrons were then introduced into a material test guide. UCN which depolarize become trapped between the high-field region and a shutter, while high-field-seeking UCN return through the magnet and are upscattered on a plastic foil. After loading the system with UCN and monitoring the incoming flux, the depolarization probability per bounce can be determined by opening the shutter and counting the population of trapped depolarized neutrons. Ongoing work to determine the probability of depolarization per bounce as a function of the ambient magnetic field in copper guide tubes with various surface preparations will be presented along with methods, details of the first-pass analysis, theories and observations from the analysis model.