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# Ultracold Neutron Physics at the Los Alamos National Laboratory

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The Ultracold Neutron Facility at the Los Alamos Neutron Science Center has developed one of the highest density sources of UCN in the world to perform precision measurements of neutron decay observables. The UCNA collaboration has recently published a sub-percent measurement of the beta-asymmetry, A0 = -0.11954 ± 55(stat) ± 98(sys), used to extract λ = gA/gV = -1.2756 ± 30, the ratio of the axial-vector and vector coupling constants. The 2011-2013 UCNA data set is expected to provide a modest improvement to the accuracy of the UCNA value of λ with a precision of about 0.6%, limited by the statistical uncertainty. The systematic error budget, however, is expected to improve dramatically, by over a factor of three, setting the stage for further refinement in the value of λ when higher decay rates become available. The UCNB experiment has demonstrated the first coincident detection of electrons and protons from neutron decay, and has performed a first attempt to measure the neutrino asymmetry B using 15 out of 128 pixels instrumented on the novel thick, large area, highly segmented silicon detector. The UCNτ collaboration has recently performed a successful demonstration of the UCN storage trap, with a storage time of τ = 860 ± 19 s, and is evaluating new experimental techniques that will allow development of a magneto-gravitational trap capable of achieving 0.1 s precision in the neutron lifetime. An effort to determine the neutron EDM using ultracold neutrons is now being developed, with an ultimate sensitivity goal of δd ~ 10^(-27) e-cm. An overview of these experiments, their utility for constraining beyond standard model physics, and latest results will be presented, as well as goals for the 2014 accelerator cycle.

**Primary author:** Mrs BROUSSARD, Leah (Los Alamos National Laboratory)

**Presenter:** Mrs BROUSSARD, Leah (Los Alamos National Laboratory)

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