

## Title: Polarized Neutron Decay Correlation Experiments: The Standard Model and Beyond

Polarized Neutron Decay can be used to measure correlations of the neutron spin with the electron and proton momenta. In the Standard Model, the observables and their energy dependence are related by a single parameter  $\lambda = g_A/g_V$ . Thus the Standard Model can be over constrained by a set of measurements that may including the beta-neutrino correlation measured in unpolarized neutron decay. When combined with the neutron lifetime and the muon decay rate, this provides a measure of the CKM matrix element  $V_{ud}$ . The Fundamental Neutron Physics beamline at the SNS will provide the unique possibility of using time-of-flight combined with polarized  $^3\text{He}$  as a neutron polarizer and polarization analyzer for precision measurements of the spin-momentum correlations. Plans and the potential program will be discussed.