

New Results from the NPDGamma Parity Violation Experiment at the Spallation Neutron Source

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The Hadronic Weak Interaction (HWI) is a complementary probe of nucleonic structure. Although this interaction is dominated by several orders of magnitude by the strong nuclear interaction, it can be isolated through parity violating observables. The HWI can be classified in chiral effective field theory in terms of the spin and isospin dependence of transition amplitudes involving S and P waves. There is an active program to determine the EFT parameters by measuring hadronic PV using cold neutron beams at the Spallation Neutron Source (ORNL) and the NCNR reactor (NIST). These experiments use only few-body observables, for which nuclear wave functions are calculable. The NPDGamma experiment, currently running at the SNS, will measure the gamma asymmetry relative to the neutron spin in the reaction $n + p \rightarrow d + \gamma$. This asymmetry is only sensitive to the $3S_1 \rightarrow 3P_1$ isovector transition amplitude, usually modeled in terms of weak pion exchange. We will present preliminary first results from this experiment, and show how they will be used with existing data and future experiments to characterize the four major couplings of the HWI.

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