

The NPDGamma experiment at the SNS - Probing the hadronic weak interaction through a measurement of parity violation in polarized cold neutron capture

Nadia Fomin

University of Tennessee

The Spallation Neutron Source at Oak Ridge National Lab is the most intense pulsed neutron source in the world. The recently commissioned Fundamental Neutron Physics Beamline, with a cold and a monochromatic UCN guides will be the site of the next generation of measurements of the Hadronic Weak Interaction, Neutron Beta decay, as well as the Electric Dipole Moment of the neutron.

The first experiment to run at the FnPB is NPDGamma, which aims to measure the correlation between the neutron spin and the direction of the emitted photon in neutron-proton capture. A parity violating asymmetry from this process can be directly related to the strength of the hadronic weak interaction between nucleons.

The first phase of the experiment was completed in 2006 at LANSCE. The methodology will be discussed and results will be presented. The next run will start in the summer of 2010 at the FnPB with several improvements, which will be discussed. The upcoming run will yield a measurement with a projected statistical error 1×10^{-8} , a sensitivity which is below the level of current theoretical predictions.