Contribution ID: **40** Type: **not specified**

A Future Coherent Elastic Neutrino-Nucleus Scattering Experiment at Fermilab

Tuesday, 14 May 2013 16:25 (20 minutes)

Low energy neutrinos (E
$lesssim$ 50~MeV) have a predicted, but unobserved, neutral-current coherent elastic scattering channel on nuclei.
Coherent neutrino scattering are important in supernovae and can probe weak nuclear form factors at low Q^2.
At these low energies, the coherent scattering cross section dominates, but it deposits very little energy and requires low detection thresholds ($\sim$ 30~keV).
Recent progress in direct WIMP dark matter searches has led to detector technologies capable of a first direct measurement of coherent neutrino scattering with accelerator neutrino sources.
The CENNS collaboration is proposing an experiment to develop a 1-ton, single-phase, liquid argon detector to measure coherent neutrino scattering near the booster neutrino beam (BNB) at Fermilab.
By placing the detector near the beam target in a far off-axis position, a flux of low energy neutrinos is produced with a similar energy spectrum as stopped pion sources.
The required nearness of the detector introduces beam-correlated neutron backgrounds whose elastic scatters mimic neutrino scattering.
The Indiana-built SciBath detector was recently deployed to the BNB to measure these background neutrons in a 2-month run.
SciBath measured the flux of 10-200~MeV neutrons, and this measurement is an input into the design of a neutron shield for the CENNS experiment.
In this talk, I will discuss the importance of coherent neutrino scattering, describe the SciBath detector, and highlight our measurement at the BNB.

Primary author: Dr COOPER, Robert (Indiana University)

Presenter: Dr COOPER, Robert (Indiana University)

Session Classification: Accelerator-Based Neutrino Physics III

Track Classification: Accelerator-Based Neutrino Physics Parallel