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## A Future Coherent Elastic Neutrino-Nucleus Scattering Experiment at Fermilab

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Low energy neutrinos ( $E$

*less than* 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.

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