

CEvNS Observation at the SNS with the COHERENT Experiment

Thursday, 31 May 2018 15:00 (20 minutes)

The process of coherent elastic neutrino-nucleus scattering (CEvNS) predicted more than 40 years ago eluded detection for a long time despite having the largest cross-section for low-energy neutrino interactions. This is largely because CEvNS detection requires sensitivity to low-energy nuclear recoils in a potentially high-background environment. The COHERENT collaboration is deploying a suite of low-energy detectors in a low-background corridor of the Spallation Neutron Source (SNS) at the Oak Ridge National Laboratory (ORNL) to test the N^2 -dependence of CEvNS with different nuclear targets and detector technologies. The first observation of CEvNS at a 6.7σ confidence level was recently made by the COHERENT experiment with a 14.6 kg CsI[Na] detector. The result is in agreement with the Standard Model prediction and already improves constraints on non-standard neutrino interactions. In addition, COHERENT has a 185 kg NaI[Tl] scintillating crystal array and an about 22 kg LAr detector to provide results on CEvNS from a light nucleus where nuclear form factors are close to unity. Planning is ongoing for a 10 kg PPC HPGe to be deployed in the near future. The recent observation of CEvNS at SNS, an overview of the COHERENT experiment, and a survey of the future experimental program will be presented.

E-mail

ivantols@indiana.edu

Collaboration name

COHERENT

Funding source

Collaborators are supported by the U. S. Department of Energy Office of Science, the National Science Foundation, NASA, and the Sloan Foundation.

Primary author: Dr TOLSTUKHIN, Ivan (Department of Physics, Indiana University, Bloomington, IN, 47405, USA)

Presenter: Dr TOLSTUKHIN, Ivan (Department of Physics, Indiana University, Bloomington, IN, 47405, USA)

Session Classification: Neutrino Masses and Neutrino Mixing

Track Classification: NMNM