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Update and Initial Results from The COHERENT Experiment

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Taking advantage of technologies which have come to maturity and the availability of a world-class pulsed neutrino source, the COHERENT collaboration seeks to make the first unambiguous measurement of coherent, elastic neutrino-nucleus scattering (CEvNS). Oak Ridge National Laboratorys Spallation Neutron Source is, as a by-product of the spallation process, an intense, pulsed neutrino source. The high beam power of the SNS results in a high neutrino flux, and the energy spectrum of emitted neutrinos is well-suited for CEvNS detection: coherence is preserved in nearly all scattering events while generating nuclear recoil events above threshold for a number of established detector technologies. Additionally, the pulsed nature and short duty cycle of the SNS beam allow for powerful reduction of backgrounds not associated with the beam. The COHERENT Collaboration is deploying a suite of low threshold detectors (CsI[Na] scintillator, high-purity Ge detector array, 2-phase Xe TPC) at the SNS to detect CEvNS, in a manner that limits systematic uncertainties and observes the N^2-dependence on the cross section.

The current status of the efforts of the collaborations efforts will be discussed and longer-term physics goals of the collaboration will be addressed, including searches for non-standard neutrino interactions and a measurement of the Weak mixing angle. Assessments of the backgrounds present in the detector locations will be discussed, including new measurements of neutrino-induced neutron production in candidate shielding materials. Preliminary measurements will be presented from existing deployments, as will implementation plans for upcoming detector systems.