

Update on the COHERENT multi-ton, NaI detector array, NaIvETe

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NaIvETe, a modular, ton-scale, NaI based neutrino detector is designed to measure the low-energy recoil signals from coherent elastic neutrino nucleus scattering (CEvNS) on sodium nuclei. As part of the suite of CEvNS detectors deployed by the COHERENT collaboration, NaIvETe provides the lightest target material to extend the range of measurements of the CEvNS cross section as a function of neutron number to search for deviations from the standard model prediction. The first of 5 detector modules was deployed in summer 2022 at the ORNL Spallation Neutron Source (SNS), where stopped pion neutrinos are produced as a byproduct of the spallation process. Two more detector modules were deployed in summer 2023. Initial calibration and analysis of data from our 'beta' module along with lessons learned from the additional modules informs how the NaIvETe measurement will be conducted. The collaboration plans to deploy an additional 2 modules in summer 2024 to begin production runs of about 2,300 kg of NaI material. In addition, studies were initiated to determine the sensitivity of the NaI crystals to CEvNS on iodine with a lower recoil energy, or the potential to reach the lower thresholds with minor modifications. Also of interest is the capability for NaIvETe to measure the charged-current inelastic neutrino-nucleus scattering on iodine.

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