Abstract Submitted
for the SES21 Meeting of
The American Physical Society

NaI detector characterization for coherent elastic neutrino-nucleus scattering (CEvNS) EREM UJAH, North Carolina Central University — Coherent elastic neutrino-nucleus scattering (CEvNS) is the process of a low-energy neutrino elastically scattering off a nucleus that subsequently recoils as a whole unit. The suite of detector targets ranging in neutron number (N) as part of the COHERENT experimental program includes a ton-scale array of NaI[Tl] crystals to measure CEvNS on sodium with the smallest N. Comparing CEvNS as a function of N to the Standard Model predictions will constrain new physics models. CEvNS is an irreducible background for direct dark matter measurements. The CEvNS scattering is expected to be the dominant mechanism in neutrino transport within supernovae and neutron stars, directly impacting model calculations. The 7.7 kg NaI[TI] crystals are repurposed detector modules that must be characterized for quality and suitability for the measurement of low-energy signals. The characterization procedure uses known gamma-ray sources and background lines for testing the crystal quality, analyzing gain response, determining energy resolution, and comparing the crystal response in different regions along its length. An initial 5 modules of 63 crystals each will be deployed to "Neutrino Alley" located at the Oak Ridge National Laboratory Spallation Neutron Source experimental site.

Erem Ujah
North Carolina Central University

Date submitted: 30 Sep 2021 Electronic form version 1.4