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P2.037 Physics with nal detectors at a stopped pion neutrino source

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on behalf of COHERENT collaboration

The COHERENT Collaboration is deploying a series of detectors with the goal of making the first measurement of coherent neutral-current elastic scattering of neutrinos from nuclei (CE ν NS). The baseline plan involves CsI(Na) scintillating crystals, a point-contact HPGe detector array, and a multi-phase Xe TPC, with up to 100 kg detector mass. In this contribution we discuss the physics potential of an additional target - an array of NaI(Tl) scintillating crystals, motivated in part by the acquisition of several tons of such crystals by Collaboration members. We find that if enough mass can be deployed with low threshold, statistics can overcome background challenges to allow a measurement of CE ν NS with Na, which would be the lowest-A target in the COHERENT suite. At high energy, the array should also be capable of observing charged-current interactions of neutrinos with ^{127}I , an isotope noted for its potential use in solar neutrino detectors. Moreover, the granular structure of the array would allow tagging of the excitation spectrum in the daughter nucleus, with relevance to nuclear matrix element calculations for neutrinoless double-beta decay. The experimental configuration would also be sensitive to sterile neutrinos and other possible resolutions of the LSND anomaly.