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**Rebuilding BGO detector array for neutrino physics experiments**

STUART KI, Duke Univ — Coherent elastic neutrino-nucleus scattering (CEvNS) has a large enough cross section that, if discovered, could open new doors in neutrino detection, such as reductions in size and cost of neutrino experiments. CEvNS is theorized to have a $N^2$ dependence (N being number of neutrons), which can be analyzed through detection by many different materials. Thus, we propose the use of BGO as a new, potential material for neutrino detection. BGO is in excess amount in TUNL facilities in the form of a Neutral Meson Spectrometer. Because the NMS has multiple BGO sheets, it is possible to trigger these sheets as individual data points to track the path of neutrinos through charged-current interaction. Additionally, because the BGO project is an untested use of material in neutrino detection, there will be specific designs of electronics, acquisition, analysis scripts that will be reusable for future use of BGO. The final BGO detector can be deployed to Oak Ridge National Laboratory for data acquisition and analysis in the Spallation Neutron Source in high neutrino flux to track paths of neutrinos through a charged current interaction and potential detection of CEvNS and comparison to other materials for dependence on $N^2$.

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