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Detecting neutrinos and measuring nuclear quenching factors with spherical proportional counters

Thursday, 18 March 2021 14:00 (20 minutes)

NEWS-G (New Experiments With Spheres-Gas) is a rare event search experiment using Spherical Proportional Counters (SPCs). Primarily designed for the direct detection of dark matter, this technology also has appealing features for Coherent Elastic Neutrino-Nucleus Scattering ($CE\nu NS$) studies and, potentially, searches for neutrinoless double beta decay. A study to assess the feasibility of observing $CE\nu NS$ at a nuclear reactor will be presented.

Both direct dark matter detection and $CE\nu NS$ consist of nuclear recoils from elastic scatters. The nuclear quenching factor, defined as the ratio of the measured energy induced by a nuclear recoil and an electronic recoil of the same energy, is a property of the target material and must be determined. Nuclear quenching factor measurements in a neon based gas mixture were performed at TUNL (Triangle Universities Nuclear Laboratory) using a neutron beam and preliminary results will be presented.

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