The CoGNAC Neutron Scattering, $(n,2n)$, and $(n,3n)$ Measurement Capabilities at Los Alamos National Laboratory

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The Correlated Gamma-Neutron Array for sCattering (CoGNAC) experimental campaign at Los Alamos National Laboratory is a new capability for the physics community capable of measuring neutron elastic and inelastic cross sections and emitted particle angular distributions. Uncertainties in neutron scattering nuclear data represent a dominant source of potential error in a wide variety of applications, and the CoGNAC team aims to minimize these errors through high-precision measurements with active engagement with the subsequent nuclear data evaluation process. Recent results from this measurement program were published in [1], [5], [2], and [3], with multiple additional forthcoming results. The neutron detection abilities of the CoGNAC array are also currently being expanded to include an series of large-volume CLYC-7 scintillators to enable angle-differential, spectroscopic neutron-only (i.e., no γ-ray detection requirement) measurements of $(n,2n)$ and $(n,3n)$ reactions with the Los Alamos Neutron Science Center (LANSCE) white neutron source, funded by a recent Department of Energy Early Career Research Award. These measurements are central to reduce potential errors in fusion reactor design and operation and historical radiochemical diagnostics data. The CoGNAC approach to measurements of this collection of neutron-induced neutron-emitting reactions will be described along with current results and future measurement plans.

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