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Gamma X: A Full Capture Mode Detector Array for Carbon Activation[1] CASSARAH BROWN, MELISSA CUMMINGS, STEPHEN PADALINO, SUNY Geneseo, THOMAS SANGSTER, Laboratory for Laser Energetics, TIMOTHY DUFFY, Laboratory for Laser energetics, VLADIMIR GLEBOV, Labortory for Laser Energetics — A diagnostic was developed to determine the $(\rho r)^2$ of a DT reaction via the production of tertiary neutrons. High energy neutrons, in the range of 20 to 32 MeV, were incident upon a carbon disk which became activated via the 12C(n,2n) reaction. The activated carbon was then quickly transported to the counting station where it was placed in a NaI detector system where the C11 decay via positron emission could be detected in the form of back-to-back 511 KeV annihilation gamma rays. The 6 paired detectors in the system were aligned orthogonally on Cartesian axes. In comparison to the previous 2 detector system used at Rochester, the new 6 detector system has improved counting statistics substantially by increasing sample size and collection solid angle. To obtain a better understanding of the effects of non-uniformly activated samples, radioactive copper pellets were distributed within the carbon sample matrix in a variety of volumetric distributions. In doing so the effects of non-isotropic activation on the efficiency of the detector system could be determined.

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Stephen Padalino
SUNY Geneseo

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