

Abstract Submitted
for the DPP13 Meeting of
The American Physical Society

3 by 3 Sodium Iodide Absolute Efficiency Determination

STEPHEN PADALINO, MEGAN RUSS, MOLLIE BIENSTOCK, ANGELA SIMONE, DREW ELLISON, HOLLY DESMITT, State University of New York at Geneseo, CRAIG SANGSTER, Laboratory for Laser Energetics, STATE UNIVERSITY OF NEW YORK AT GENESEO COLLABORATION, LABORATORY FOR LASER ENERGETICS COLLABORATION — Thallium doped sodium iodide (NaI-Tl) detectors are frequently used to measure the activity of samples exposed to ICF neutrons. The absolute detection efficiency for NaI-Tl detectors cannot be represented by a single quoted value. Detection efficiency is largely dependent on gamma ray energy, source location, activity, source and detector geometry and composition, all of which are quantities that are situational. A series of experiments were performed at the State University of New York at Geneseo to determine the absolute detection efficiency for both a single detector and two in-line coincidence detectors using 511 keV gamma rays. A low activity Na-22 gamma ray point source was placed flush against the detector faces of a pair of matched 3"x3" cylindrical NaI-Tl detectors. The source was then moved relative to the detector face to determine geometric and off-axis effects on the detector's absolute efficiency. The manufacturers of the NaI-Tl detectors quote the absolute photo peak efficiency, at a distance of 10 cm from the detector face, to be 1.2% for a low activity 511keV point source. Using this information the efficiency as a function of position was determined and compared to calculated values. Funded in part by a LLE contract through the DOE.

Megan Russ
State University of New York at Geneseo

Date submitted: 12 Jul 2013

Electronic form version 1.4