

Abstract Submitted
for the SES08 Meeting of
The American Physical Society

Modeling and Design of a Gadolinium Based Neutron Detector¹

DAVID TICEHURST, JEROMY TOMPKINS, HUGON KARWOWSKI, UNC-Chapel Hill — The goal is to measure the partial cross sections for (γ, xn) and (γ, f) on the actinides with the ultimate objective of developing and refining a method for the γ -ray interrogation of fissionable material. These measurements require the construction of a highly segmented neutron detector to record multiple neutrons emitted following photodisintegration and fission. Each detector segment will use a gadolinium-loaded liquid organic scintillator optically coupled to a photomultiplier tube. Gadolinium has one of the highest thermal neutron capture cross sections (49 kb), therefore its presence in the detector will greatly enhance neutron detection efficiency. A prototype detector of 3 L volume has been constructed and modeled using Geant4, a Monte Carlo based program.² The detector model and conclusions developed from it along with the results from testing the prototype detector will be presented.

¹This work was supported in part by USDOE Grant No. DE-FG52-06NA26155 and NSF/DHS Grant No. CBET-0736123.

²S.Agostinelli et al., *Nucl. Instr. and Meth.* **A506**, 250, (2003).

David Ticehurst
UNC-Chapel Hill

Date submitted: 15 Aug 2008

Electronic form version 1.4