Abstract Submitted for the APR15 Meeting of The American Physical Society

The Breakup Cross Section of the D+D Reaction at 6.94 MeV<sup>1</sup> A.L. RICHARD, C.R. BRUNE, D.C. INGRAM, S. DHAKAL, A. KARKI, T.N. MASSEY, J.E. O'DONNELL<sup>2</sup>, C.E. PARKER, Ohio University — The D+D reactions are well known and widely used for a variety of purposes, mainly due to the mono-energetic neutrons from the  $D(d, n)^3$ He reaction. The least studied of the D+D reactions is the D(d, np)D reaction known as the deuteron breakup reaction. The D(d, np)D reaction produces a continuum of neutrons at energies lower than that of the mono-energetic peak. In this work, the D(d,np)D reaction has been studied for the purpose of use as a neutron source for the active interrogation of hidden fissile materials. The neutron energy distribution as a function of angle for the cross section,  $\frac{d^2\sigma}{d\Omega dE}$ , of the D(d,np)D reaction has been measured at the Edwards Accelerator Laboratory of Ohio University, using a 6.94-MeV pulsed deuteron beam incident upon a  $D_2$  gas target. The time-of-flight technique was used to determine the energy of the neutrons detected in the array of two lithium glass scintillators and one NE-213 scintillator. The breakup cross section was determined as low as 225-keV neutron energy in the lithium glass detectors.

 $^1{\rm This}$  project was funded in part by the Defense Threat Reduction Agency (DTRA) through grant number HDTRA1-09-1-0059.  $^2{\rm deceased}$ 

Andrea L. Richard Ohio University

Date submitted: 09 Jan 2015

Electronic form version 1.4