

# **NEUTRON MULTIPLICITY DISCRIMINATION STUDIES IN DESCANT - DEUTERATED SCINTILLATOR ARRAY FOR NEUTRON ARRAY \***

J. Wong<sup>†</sup>, P.E. Garrett, D. Bandyopadhyay, G. Demand, P. Finlay, K.L. Green,  
G.F. Grinyer, K.G. Leach, A.A. Phillips, M.A. Schumaker, C.E. Svensson  
*Department of Physics, University of Guelph, Guelph, ON N1G 2W1, Canada*

A novel neutron tagging array is being developed to serve as an auxiliary detector for the TIGRESS spectrometer at TRIUMF for the study of high-spin states of neutron-rich systems. This ground-breaking design will be based upon an array of liquid deuterated scintillators for neutron detectors and is called the DEuterated SCintillator Array for Neutron Tagging or DESCANT. Neutron spectroscopy is typically performed utilizing time of flight (TOF) techniques. However, multiple scattering between detectors poses a major problem to overcome and is commonly dealt with by vetoing signals collected in adjacent detectors. This results in a much reduced detection efficiency for higher neutron multiplicity events. Fast neutron scattering from deuterium is not isotropic in the centre-of-mass frame and the measured pulse height spectra is forward-peaked. This pulse height information can be correlated with the TOF to overdetermine the neutron energy, thus rejecting multiple scattering without the need to veto nearest neighbours. Results from early feasibility tests will be presented, along with the status of our GEANT4 simulations of the array performance.

---

\* This \$1.8M project is funded by CFI, ORF and TRIUMF.

<sup>†</sup> E-mail: [jwong@physics.uoguelph.ca](mailto:jwong@physics.uoguelph.ca)