Abstract Submitted for the DNP10 Meeting of The American Physical Society

Performance study of the Liquid Deuterated Scintillator for DESCANT¹ JAMES WONG, P.E. GARRETT, L. BIANCO, C.S. SUM-ITHRARACHCHI, University of Guelph, DESCANT COLLABORATION — A novel neutron tagging array has been developed for the study of high-spin states of neutron-rich systems. This ground-breaking design is based upon an array of liquid deuterated scintillators for neutron detectors and is called the DEuterated SCintillator Array for Neutron Tagging. DESCANT will serve as an auxiliary detector for the TIGRESS spectrometer located at TRIUMF's ISAC radioactive ion beam facility. It is comprised of 70 fully close-packed neutron detectors, subtends a maximum angle of 65.5° and covers 92.6% of this solid angle or 1.08π sr. The multiple scattering of neutrons between detectors poses a major problem to overcome when performing neutron spectroscopy and is commonly dealt with by vetoing signals collected in adjacent detectors. Fast neutron scattering from deuterium is not isotropic in the centre-of-mass frame and the measured pulse height spectrum 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 of the performance tests using liquid deuterated scintillators will be presented.

¹With support by Canadian Fund for Innovation, Ontario Research Fund and TRIUMF.

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Date submitted: 02 Jul 2010

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