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Study of Beta-Delayed Neutrons From ^{77}Cu using VANDLE[1]

STANLEY PAULAUSKAS, MIGUEL MADURGA, The University of Tennessee at Knoxville, ROBERT GRZYWACZ, The University of Tennessee at Knoxville / ORNL, WILLIAM PETERS, Oak Ridge Associated Universities, VANDLE COLLABORATION — As nuclei become more neutron rich, the nuclear structure changes their properties. For example, beta decays will access increasingly more neutron unbound states. The measurement of neutrons emitted from these states is critical, as beta-delayed neutron emission becomes a dominating decay mode. To this end, the Versatile Array of Neutron Detectors at Low Energy (VANDLE)[1,2] measures the energy of neutrons emitted from excited states above the neutron separation energy populated through beta decay or transfer reactions. The time-of-flight technique determines the energy, which requires a time resolution on the order of 1 ns. In addition, the detector requires a low detection threshold to measure neutron energies of 100 keV or lower. A successful experimental campaign at the Holifield Radioactive Ion Beam Facility, using ions produced via proton induced fission on ^{238}U, has yielded results on beta-delayed neutrons emitted during the decay of ^{77,78}Cu. Of particular interest, is the observation of low-energy neutrons emitted from states well above the neutron separation energy. Results from this experiment will be presented.

[1] C. Matei et al., Proceedings of Science, NIC X, 138 (2008)
[2] S. V. Paulauskas et al., NIMA 797, 22 (2014)

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