

Abstract Submitted
for the 4CF13 Meeting of
The American Physical Society

Monte Carlo simulations of VANDLE¹ SERGEY ILYUSHKIN, FREDERICK SARAZIN, Colorado School of Mines, WILLIAM PETERS, Joint Institute for Heavy Ion Research & ORNL, ROBERT GRZYWACZ, MIGUEL MADURGA, STANLEY PAULAUSKAS, UTK, JOLIE CIZEWSKI, Rutgers, VANDLE COLLABORATION — The Versatile Array of Neutron Detectors at Low Energy (VANDLE) is a plastic-scintillator array designed for various experimental setups including β -delayed neutron spectroscopy and (d,n) transfer reactions in inverse kinematics. The neutron energy is determined through the time-of-flight technique. The array has energy resolution of ~ 120 keV @ 1 MeV and energy threshold of ~ 100 keV. We have developed a Geant4 simulation of VANDLE to optimize array geometry for different types of experiments and test neutron scattering models provided by Geant4. A typical β -delayed neutron decay study involves coupling with γ detectors to collect β - γ coincidence information. The experimental assembly including VANDLE bars, β plastic scintillators, HPGe detectors, along with the detector support structure was modeled to assist in the fine-tuning of the setup and give a detailed understanding of the array performance. The simulation was validated by comparing to available experimental data and could serve as an important guide for the design of future experiments.

¹Supported in part by the National Nuclear Security Administration under the Stewardship Science Academic Alliances program through DOE Cooperative Agreement No. DE-FG52-08NA28552.

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Date submitted: 23 Aug 2013

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