

Abstract Submitted
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Monte Carlo simulations of VANDLE for reaction and beta-delayed neutron decay studies¹ SERGEY ILYUSHKIN, FRED SARAZIN, Colorado School of Mines, ROBERT GRZYWACZ, MIGUEL MADURGA, STANLEY PAULAUSKAS, University of Tennessee, DANIEL BARDAYAN, University of Notre Dame, JOLIE CIZEWSKI, Rutgers University, WILLIAM PETERS, ORAU, VANDLE COLLABORATION — The Versatile Array of Neutron Detectors at Low Energy (VANDLE) is a plastic scintillator array designed for various experimental studies including beta-delayed neutron spectroscopy and (d,n) transfer reactions in inverse kinematics. We have developed a Geant4 simulation of VANDLE to determine neutron detection efficiency in realistic environments and optimize the array geometry for different types of experiments. The experimental assembly including VANDLE bars, beta 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. Scattering off of the different parts of the experimental apparatus contributes to a background and the ability of simulation to identify various components of the background makes it critical for the data analysis. The simulation was validated by comparing to available experimental data and will serve as an important guide for the design of future experiments.

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