

Abstract Submitted
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A prototype, high-efficiency, position sensitive neutron detector for the proposed neutron spin rotation experiment at the SNS
D.M. MARKOFF, NC Central University, V. CIANCIOLO, C.L. BRITTON, R.G. COOPER, R.J. WARMACK, ORNL — We are developing a position sensitive (~ 1 cm resolution) neutron detector with nearly 100% efficiency for use at the high flux ($> 5 \times 10^{10}$ neutrons/sec) pulsed beam at the Oak Ridge Spallation Neutron Source (SNS). The prototype detector is important for transmission experiments such as the proposed parity-violating neutron spin rotation in hydrogen measurement. The detector concept integrates the segmented ^3He ionization chamber designed for the preliminary spin-rotation in helium experiment¹ and the position sensitive, charged particle collection technology currently being developed at ORNL for low-efficiency beam-transmission monitors for the SNS². Neutron absorption on ^3He produces ^1H and ^3H that pass through a wire grid producing an e^- shower detected in current mode by wire strips mounted on a substrate. For 100% efficiency, regions are created with a series of high-voltage plates, grids, and wire strips each strategically located along the beam axis. Analysis over several regions with alternating wire strip orientation provides a two-dimensional beam profile. We will present our prototype model and test results.

¹S.D. Penn *et al.*, Nucl. Instr. and Meth. **457** 332 (2001)

²C.L. Britton *et al.*, IEEE Trans. Nucl. Sci., 51, 1016 (2004).

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