

Abstract Submitted  
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**Interior Vector Magnetic Field Monitoring for the SNS Neutron EDM Experiment**<sup>1</sup> NIMA NOURI, BRAD PLASTER, Department of Physics and Astronomy, University of Kentucky, Lexington, Kentucky 40506, USA — A concept has been developed which provides for a real-time determination of the spatial dependence of the vector components of the magnetic field (and, hence, the  $\partial B_i/\partial x_j$  field gradients) within the interior fiducial volume of the SNS neutron EDM experiment solely from exterior measurements at fixed discrete locations. This technique will be especially important during the operation of the experiment, when direct measurements of the field gradients present within the fiducial volume will not be physically possible. Our method, which is based on the solution to the Laplace Equation, is completely general and does not require the field to possess any type of symmetry. We describe the concept and our systematic approach for optimizing the locations of these exterior measurements. We also present results from prototyping studies of a field monitoring system deployed within a half-scale prototype of the experiment's magnetic field environment.

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