

Abstract Submitted  
for the APR17 Meeting of  
The American Physical Society

**Calibration of High Precision Robot Arm for the Crafting of Magnets for Use in Neutron Experiments** BENJAMIN RILEY, CHRISTOPHER CRAWFORD, Univ of Kentucky — The magnetic scalar potential can be used to design precision magnetic fields with surface currents in arbitrary geometry. We are using this technique to design holding field coils for spin transport of neutrons and  $^3\text{He}$  atoms into the measurement cell of the SNS EDM experiment. We construct holding field coils as three-dimensional printed circuits boards using a Staubli RX130 6-axis industrial robotic arm to etch the circuit. While the arm has a 35-micron repeatability position, the absolute accuracy depends on calibration of transformation matrices between each link, characterized by Denavit-Hartenberg parameters. After factors such as coordinate system degeneracies and free parameters are taken into account, there are 29 parameters that must be calibrated. The robot model, calibration method, and results are presented in this poster.

Benjamin Riley  
Univ of Kentucky

Date submitted: 29 Sep 2016

Electronic form version 1.4