Abstract Submitted
for the 4CF17 Meeting of
The American Physical Society

Analysis-Based Calibration of a Manual Coil Hand Winding Machine AVA SPANGLER, Manitou Springs High School, LELAND "CHIP" SPANGLER, Aspen Microsystems, LLC, KATHRIN SPENDIER, University of Colorado Colorado Springs — Helmholtz coils are used to make precise magnetic fields, which have a variety of biomedical applications, such as drug delivery through airway mucus via oscillating magnetic nanoparticles. Nanoparticles are particles that are smaller than 100 nm in diameter. In this study, the U.S. Solid manual coil hand winding machine model number NZ-2 was used to develop precisely wound orthogonal coils. The exact calibration of the coil winder is imperative for designing a pair of Helmholtz coils that generates a specific magnetic field. The coil winder was functionalized and calibrated by a series of analysis-based tests. The functional and calibrated manual coil winder is used to design a set of two-axis Helmholtz coils that fits inside Leicas DMI6000 and DMI3000 inverted microscopes. The coils are used to produce an oscillating magnetic field to rotate magnetic nanoparticles in high viscosity fluids.

Kathrin Spendier
University of Colorado Colorado Springs

Date submitted: 20 Sep 2017 Electronic form version 1.4