Abstract Submitted
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Effect of Metal Proximity on a Pulsed Copper Coil[1] H. K. JOHNSON, D. A. SCHAFFNER, Bryn Mawr College, M. R. BROWN, M. KAUR, Swarthmore College, C. FIEDLER-KAWAGUCHI, Bryn Mawr College — Generating and accelerating plasma in a stainless steel chamber affects the magnetic fields inside. These effects will decrease the field due to a pulsed coil (which will later be used to accelerate plasma) inside the chamber. This work is being done in conjunction with the Swarthmore Spheromak Experiment. Both facilities are collaborating in an attempt to accelerate and compress plasma as part of ARPA-E's Accelerating Low-Cost Plasma Heating and Assembly (ALPHA) program. Measurements of the impact of the chamber on the coil's magnetic fields were made using a B-dot probe inside the coil, which was placed at incremental distances from a metal plate. As the coil is moved from the plate, the plate's interference with the field was seen to exponentially decay. This process was repeated for stainless steel, aluminum, and copper, and a range of voltages (500-800V). At least seventy percent of the original signal was recovered within two inches. Pulsing the coil inside the stainless steel chamber resulted in signals about one third the strength of those measured outside of the chamber. The results of this experiment will be used to guide development of the stainless steel pulse-coil system for the Swarthmore ALPHA project.

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