

Abstract Submitted
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ALPHA (Adjustable Long Pulse High-Field Apparatus) W. J. BIRMINGHAM, E. M. BATES, C. A. ROMERO-TALAMAS, W. F. RIVERA, University of Maryland, Baltimore County — The Dusty Plasma Laboratory (DPL) at the University of Maryland, Baltimore County (UMBC) is now finalizing the design and fabricating components for ALPHA, a high-field Bitter-type electromagnet to be used for magnetized dusty plasma experiments. When the system is complete, ALPHA will be programmable to dynamically increase or decrease fields of up to 10 T for nominally 10 seconds and up to several minutes. The magnet dimensions as well as power and cooling requirements were optimized according to a genetic algorithm developed in the DPL [1]. The cooling channel pattern design was obtained using an analytic methodology also developed in the DPL [2]. The final design parameters as well as the predicted performance characteristics of the magnetic core, the water cooling shell, and the DC power source are presented. [1] E. M. Bates, W. J. Birmingham, and C. A. Romero-Talamas. *IEEE Trans. Magn.* 53, 7200310 (2017): [2] W. J. Birmingham, E. M. Bates, and C. A. Romero-Talamas, *J. Thermal Sci. Engr. Appl.* 8, 021008 (2015)

W. J. Birmingham
University of Maryland, Baltimore County

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