Abstract Submitted
for the MAR10 Meeting of
The American Physical Society

Deriving a functional form of anhysteretic magnetization function for Jiles-Atherton theory of hysteresis DAVID JILES, ARUN RAGHUNATHAN, YEVGEN MELIKHOV, JOHN SNYDER, Wolfson Centre for Magnetics, Cardiff University, Cardiff CF24 3AA, United Kingdom — The Jiles-Atherton (JA) theory explains the ferromagnetic hysteresis through contributions of irreversible and reversible magnetization components [1]. Anhysteretic magnetization function, a function of energy of the moments in a domain, forms a basic building block of this model. This function has known forms for specific cases of anisotropy: axially anisotropic (one-dimensional), planar anisotropic (two-dimensional), and isotropic (three-dimensional) [1, 2]. Hence there is a need to generalize anhysteretic magnetization function to extend JA theory to other forms of anisotropy. In this work, a functional form of anhysteretic magnetization function has been derived. It was shown that this functional form of anhysteretic magnetization with necessary boundary conditions can be reduced to the familiar specific model equations in the particular cases. This work extends the applicability of the JA model to systems with various anisotropy dependences. This research was supported by the UK EPSRC (EP/D057094) and the US NSF (DMR-0402716). [1] D. C. Jiles et. al., JMMM. **61**, 48 (1986). [2] Y. M. Shi et. al., JMMM. **187**, 75 (1998).

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Date submitted: 02 Dec 2009 Electronic form version 1.4