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Use of Analysis of Variance to Analyze Universal Scaling in Magnetocaloric Materials[1] DUSTIN D. BELYEA, CASEY W. MILLER, University of South Florida — Universal scaling analysis of magnetocaloric materials is a tool used to remove the temperature and field dependence in the measured M(H,T) space, and should in theory result in a single universal curve for all materials within a single universality class. This can be used to compare materials and predict behavior beyond measurable field ranges [1,2]. However, in many cases the scaled curves show wide variations in collapsing onto the universal curve, leading to a noisy collection of scaled curves. Hypotheses as to the origin of such scaling violations include minority phases, either magnetic or structural, or both [3]. In this work we show that it is possible to measure the degree to which a material follows universal scaling using tests for homoscedasticity, namely the Brown-Forsythe test. We use experimental magnetic phase transitions as well as some computational models and then apply this test to show general trends in the changes of magnetization with the inclusion of such magnetic and structural minority phases. [1] V Franco et al, J. Phys.: Condens. Matter 20 285207 (2008) [2] V. Franco et al, J. Appl. Phys. 106, 103911 (2009) [3] V. Franco et al, J. Magn. Magn. Mater., 321(9):1115-1120 (2009)

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