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The Effect of Relaxation on Magnetic Particle Imaging[1] YONG WU, ZHEN YAO, GARETH KAFKA, DAVID FARRELL, MARK GRISWOLD[2], ROBERT BROWN[3], Case Western Reserve University — Magnetic particle imaging[1] is a new tomographic technique that allows fast, inexpensive imaging through the use of ferro-fluid agents leading to submillimeter resolution. Selection fields combined with oscillating driving fields can move unsaturated field-free-points so as to cover the field of view. In previous studies, the average magnetization is assumed to respond instantaneously to changes in the applied field.[1-4] Realistically, however, a finite relaxation time slows the magnetic response. The present simulation demonstrates that, for contrast agents of interest, the choice of an optimal particle size is strongly dependent on this effect. A trade-off thus exists between sensitivity and resolution. [1] B. Gleich and J. Weizenecker, Nature v.435:1214, 2005 [2] J. Weizenecker et al., Phys. Med. Biol., v.54: L1, 2009 [3] J. Rahmer et al., BMC Medical Imaging, 2009 [4] P. W. Goodwill et al., IEEE Trans. on Medical Imaging, v.28:1231, 2009

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