Abstract Submitted
for the MAR06 Meeting of
The American Physical Society

Anomalous Magnetoresistance Phenomena in Organic Semiconductors[1] JEREMY D. BERGESON, DEREK M. LINCOLN, RUTH SHIMA EDELSTEIN, VLADIMIR N. PRIGODIN, ARTHUR J. EPSTEIN, The Ohio State University, Columbus, OH 43210-1117 — We report magnetoresistance (MR) phenomena with temperature and bias dependence in organic semiconductor thin films with either nonmagnetic or magnetic contacts through high field reaching 9T. For nonmagnetic organic thin films such as Alq_3 we find a low field MR up to 15%. A similar magnetic field effect has been reported earlier[1] but, as noted, the mechanism remains unclear. We propose a model of the anomalous MR where charge transport is space-charge limited. The current is determined by the e-h recombination rate. The recombination rate is field dependent, analogous to the chemical yield for radical pairs[2]. Using an organic- based magnetic semiconductor[3], $V[TCNE]_x$, and Co as magnetic contacts, with a nonmagnetic organic semiconductor (α-6T) leads to an order-of-magnitude broader zero-centered MR peak superimposed on a spin-valve effect. Possible origins of this broader MR will be discussed. 1. Francis, et al., New J. Phys. **6** 185 (2004); Frankevich, et al., Phys. Rev. B **53** 4498 (1996) 2. Steiner and Ulrich, Chem. Rev. **89** 51 (1989) 3. Pokhodnya, et al., Adv. Mater. **12** 410 (2000); Prigodin, et al., Adv. Mater. **14** 1230 (2002); Shima Edelstein, et al., Mater. Res. Soc. Symp. Proc. **871E** I7.3 (2005)

[1]Supported by AFOSR Grant No. F49620-03-1-0175 and DOE Grant Nos DE-FG02-86ER45271 and DE-FG02-01ER45931

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Date submitted: 09 Dec 2005 Electronic form version 1.4