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Anomalous Nernst Effect in High-T_c Superconductors by Layer Decoupling JOSE P. RODRIGUEZ, California State University at Los Angeles — The extended vortex-liquid phase found in high-T_c superconductors at temperatures and magnetic fields that lie above the vortex-lattice melting line can be attributed to weak inter-layer coupling. We compute the diamagnetic contribution to the equilibrium magnetization there, M, using the corresponding uniformly frustrated XY model, given in terms of the phase of the superconducting order parameter[1]. A high-temperature expansion that is valid in the vicinity of the mean-field phase transition yields (i) that $-M$ increases monotonically with the external magnetic field, and (ii) that it vanishes as the mean-field phase transition is approached from below. Further, we show (iii) that the assumption of a direct dependence between M and the Peltier transport coefficient results in an anomalous Nernst signal inside of the vortex-liquid phase. These results are compared to recent experimental determinations of the equilibrium magnetization and of the Nernst effect in the vortex-liquid phase of high-T_c superconductors[2].

[1] J.P. Rodriguez, PRB **66**, 214506 (2002); **69**, 069901(E) (2004).
[2] Y. Wang, et al., PRL, in press (arXiv: cond-mat/0503190).

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