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Giant Thermomagnetic Effects in High-T_c Cuprates: Fermi Liquid vs Vortex Liquid[1] ANDREI SERGEEV, University at Buffalo, MICHAEL REIZER, VLADIMIR MITIN, University at Buffalo — We developed a gauge-invariant formulation of the thermomagnetic effects [1] and prove that the thermomagnetic coefficients in the Fermi liquid with particle and hole excitations are always proportional to the square of the particle-hole asymmetry. Therefore, thermomagnetic effects in the Fermi liquid are always small. Vortices are topological excitations which are completely different from particle-hole excitations. Thermomagnetic transport in the vortex liquid is widely described in terms of the "transport entropy," S_d. According to the current views, the main contribution to S_d originates from the electromagnetic energy of superconducting currents circulating around vortex cores. However, this concept strongly contradicts to the London postulate [2]. We revise the theory and show that the transport entropy is, in fact, the entropy of normal electrons in vortex cores determined with respect to the superconducting (or partly superconducting, if cores overlap) background [2]. Only in this form the theory becomes simultaneously consistent with the London postulate and Onsager principle. The theory naturally explains the observed temperature dependence of S_d. 1. A. Sergeev et al., Phys. Rev. B 77 064501 (2008). 2. A. Sergeev et al., arXiv:0807.0450.

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