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On the heat current in the magnetic field: Nernst-Ettingshausen effect above the superconducting transition[1] ANDREI SERGEEV, VLADIMIR MITIN, University at Buffalo, MICHAEL REIZER, 5614 Naiche Rd, Colubmus OH — For maintaining gauge invariance in a magnetic field, the heat current operator should include the magnetic term. Taking this term into account, we revised calculations of the Nernst-Ettingshausen effect above the superconducting transition. We found that the fluctuations of the modulus of the order parameter do not change the particle-hole asymmetry (PHA) of the thermomagnetic effects. As in the normal state, the thermomagnetic effects in the fluctuation region are proportional to the square of PHA and, therefore, small. Magnetization currents in the electric field contribute to the charge and energy transfer, but not to the heat current. Only in this way, one can obtain the Nernst and Ettingshausen coefficients that satisfy to the Onsager relation Large Nernst effect observed in the high-temperature cuprates requires vortex-like excitations due to the phase fluctuations, which are beyond the Gaussian-fluctuation theory.

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