Thursday

Hall-drag and magneto-drag in graphene via kinetic equation approach

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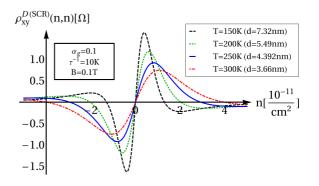
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Only since recently Coulomb drag measurements in Graphene have been available and right from the start they have been performed in the presence of a magnetic field as well [1]. In this work we calculate the magneto-drag and the Hall-drag resistivity at finite temperature for two graphene monolayers within the kinetic equation approach [2,3]. The presented theory is valid for the hydrodynamic regime $\tau_{dis}^{-1} \alpha_g^2 T \ll 1$ and appears there as hydrodynamic equations [2]. This way our theory corresponds to a microscopic formulation supporting a phenomenological Drude-like picture which for large concentrations equals the usual Drude form and for small concentration an effective two-band-Drude equation [4]. The theory presented allows for a qualitative description for arbitrary chemical potentials (see Fig. 1). An emphasis is put on the Hall-drag which is absent when derived from the standard Drude equation. Complete asymptotics of the magneto-drag and the Hall-drag resistivity are given. In particular, we have shown that the Hall-drag vanishes along the line of opposite carrier concentration in the layers. Additional we found non trivial concentrations at which the Hall-drag vanishes (see Fig. 1).

References:

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Fig. 1: **Right:** The Hall-drag resistivity for equal concentration varying temperature and distance.



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