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Graphene transport in a parallel magnetic field: Spin polarization effects at finite temperature

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We present an analysis of the temperature and magnetic field dependence of the total electron conductivity in monolayer graphene systems due to screening effects around charged impurities [1]. The evaluation of the two spin channels polarization functions and screening coefficients is based on the random phase approximation (RPA) [2]. The total electron conductivity due to both spin-up and spin-down electrons decreases as function of temperature in the low temperature regime, presents a minimum in the intermediate temperature regime, and increases linearly with temperature in the high temperature regime. As function of magnetic field, the system total electron conductivity increases across all temperature regimes. The evaluation of the electron transport functions involves complicated self-consistent calculations that require numerical work. All numerical work was completed using Mathematica.

Keywords
graphene, electron transport, magnetic field

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