SPIN THERMOELECTRIC EFFECTS IN TRANSPORT THROUGH TWO – LEVEL QUANTUM DOT COUPLED TO FERROMAGNETIC LEADS

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9.7 cm

The spin Seebeck effect (spin version of the Seebeck effect) has been recently observed in a metallic magnet when a temperature gradient was applied [1]. This novel phenomenon enables conversion of heat currents into spin voltage, driving non-equilibrium spin currents. Such a generation of pure spin currents is of great interest for spintronics applications. Therefore, we have investigated spin thermoelectric effects in a two-level quantum dot attached to external ferromagnetic leads having different temperatures. We have calculated basic spin thermoelectric coefficients by means of the non-equilibrium Greens functions approach in the Hartree - Fock approximation. Specifically, we have calculated spin-dependent thermopower (spin-Seebeck coefficient) and charge thermopower, which measure spin and charge voltage drop across the device (when spin accumulation in the external leads becomes relevant), respectively. Moreover, the figure of merit and its spin analog are presented. The latter measures the spin-dependent thermoelectric efficiency. Our results also show that the indirect coupling between dot's levels *via* the leads can greatly influence the thermoelectric effects.

[1] K. Uchida *et al*, Nature (London) **455**, 778 (2008).

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