Abstract submitted to the
NATO ADVANCED RESEARCH WORKSHOP
New materials for thermoelectric applications: theory and experiment
September 19 - 25, 2011 Hvar, Croatia

Monte-Carlo Approach to Stationary Non-equilibrium of Mesoscopic Systems

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Keywords : Stationary non-equilibrium, Quantum Monte-Carlo

Calculating properties of correlated systems out of equilibrium is a challenging task, even if on targets only stationary situations. In particular, transport through nano-objects like molecules or quantum dots is of strong interest, and a theory to calculate transport properties or merely local quantities in a reliable way for reasonably strong correlations very desirable.

Based on a suggestion by Han and Heary [1] we show that one can use advanced quantum Monte-Carlo techniques to calculate quantities with high accuracy [2]. Although the actual goal is to extract current or conductance respectively thermoelectric effects, a first step is to calculate local properties, like the double occupancy, as function of external bias.

We present results for this quantity, which shows interesting non-monotonic behavior. This feature has been observed earlier [3], but was restricted to $T = 0$ and comparatively weak correlations.

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