Adiabatic pumping through quantum dots

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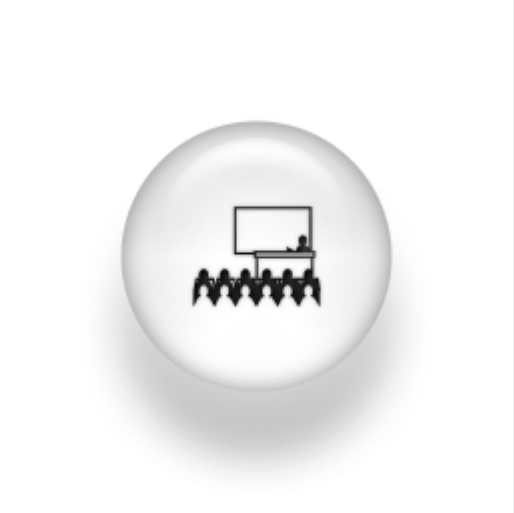

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A finite charge can be pumped through a mesoscopic system in the absence of an applied bias voltage by changing periodically in time some parameters of the system. If these parameters change slowly with respect to all internal time scales of the system, pumping is adiabatic.
The scope of this work is to investigate adiabatic pumping through a quantum dot, in particular the influence of Coulomb interaction between electrons in the dot on the pumped charge.
On one hand we develop a formalism based on Green's functions, in order to calculate the pumped charge from the weak-tunnel-coupling regime down to the Kondo regime. We extend our calculations to a system with a superconducting contact.
On the other hand we use a systematic perturbation expansion for the calculation of the pumped charge, giving us the possibility to analyze processes which contribute to charge pumping and to highlight the important role of interaction-induced level renormalization.