

## Theory of Nonequilibrium Coherent Transport Through an Interacting Mesoscopic Region Weakly Coupled to Electrodes

ZHU Yu,<sup>1</sup> LIN Tsung-Han,<sup>1</sup> and SUN Qing-Feng<sup>2</sup>

<sup>1</sup> State Key Laboratory for Mesoscopic Physics and Department of Physics, Peking University, Beijing 100871, China

<sup>2</sup> Center for the Physics of Materials and Department of Physics, McGill University, Montreal, PQ, Canada H3A 2T8

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**Abstract:** We develop a theory for the nonequilibrium coherent transport through a mesoscopic region, based on the nonequilibrium Green function technique. The theory requires the weak coupling between the central mesoscopic region and the multiple electrodes, but allows arbitrary hopping and interaction in the central region. An equation determining the nonequilibrium distribution in the central interacting region is derived and plays an important role in the theory. The theory is applied to two special cases for demonstrations, revealing the novel effects associated with the combination of phase coherence, Coulomb interaction, and nonequilibrium distribution.

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