

Resonance in an open quantum dot system with a Coulomb interaction: a Bethe-ansatz approach

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We study the two-lead interacting resonant-level model, which consists of two leads of non-interacting electrons that interact with an electron on a quantum dot in between the two leads. We obtain N-electron scattering states, generalizing the Bethe-ansatz approach to open systems. By using the scattering states, we exactly calculate the quantum-mechanical expectation value of the electric current through the quantum dot, thereby observing resonance peaks. Some of the resonance peaks appear only when the interaction exists; they reflect the effect of many-body scattering. (Joint work with Naomichi Hatano)