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Analytical Perturbative Treatment of Multiterminal Nonequilibrium Anderson Impurity Models[1] NOBUHIKO TANIGUCHI, University of Tsukuba — We investigate analytically the nonequilibrium Anderson impurity model connecting with multiterminal leads[2]. Within the validity of the second-order perturbation regarding the interaction strength, the full dependence on frequency and bias voltage of the nonequilibrium self-energy and spectral function is determined for a generic multiterminal setting where the current preservation has been an issue.[3] Our analytical perturbative treatment respects the current conservation as well as the spectral sum rule, and it encompasses Fermi-liquid and non-Fermi liquid behaviors, showing that increasing finite-bias voltage leads to a crossover from the Kondo resonance to the Coulomb blockade phenomena. Analysis on two-terminal and multiterminal settings shows that finite-bias voltage does not split the Kondo resonance in this order; no specific structure due to multiple leads emerges in the spectral function. Overall bias dependence is quite similar to finite-temperature effect, which could be understood by help of the Ward identity and the limit of $N \gg 1$ terminals.

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Nobuhiko Taniguchi
University of Tsukuba

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