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Seeing the strongly-correlated zero-bias anomaly in double quantum dot measurements

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Experiments in doped transition metal oxides often show suppression in the single-particle density of states at the Fermi level, but disorder-induced zero-bias anomalies in strongly-correlated systems remain poorly understood. Numerical studies of the Anderson-Hubbard model have identified a zero-bias anomaly that is unique to strongly correlated materials, with a width proportional to the inter-site hopping amplitude t.[PRL **101**, 086401 (2008)] In ensembles of two-site systems, a zero-bias anomaly with the same parameter dependence also occurs, suggesting a similar physical origin.[PRB **82**, 073107 (2010)] We describe how this kinetic-energy-driven zero-bias anomaly in ensembles of two-site systems may be seen in a mesoscopic realization based on double quantum dots. Moreover, the double-quantum-dot measurements provide access not only to the ensemble-average density of states but also to the details of the transitions which give rise to the zero-bias anomaly.

Keyword-1

double quantum dot

Keyword-2

strong correlations

Keyword-3

zero-bias anomaly

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