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Two-channel Kondo effect and phonon-assisted transport in single-molecular junctions[1] LUIS DIAS DA SILVA, ELBIO DAGOTTO, Oak Ridge Natl. Laboratory, Oak Ridge TN, and University of Tennessee, Knoxville TN — The interplay between vibrational modes and Kondo physics is a fundamental aspect of transport properties of correlated molecular conductors. In this theoretical work, we study such interplay in a system consisting of a single molecule in a metallic break junction tuned (by gate voltages) to be in an "odd-N" coulomb blockade valley (Kondo-prone). The connection to left and right metallic leads creates the usual coupling to a conduction channel with left-right symmetry (the "even"-parity channel). A center-of-mass vibrational mode introduces an additional, phonon-assisted tunneling through the asymmetric ("odd"-parity channel). Our numerical renormalization-group calculations reveal that the phonon-mediated coupling to the odd channel leads to the appearance of a two-channel Kondo (2chK) effect, characterized by a non-Fermi-liquid (NFL) fixed point. The ground-state has NFL properties for a critical value of the phonon-mediated coupling strength and critical lines are present for wide range of parameters, including the regime away from particle-hole symmetry. Signatures of this 2chK non-Fermi-liquid behavior are prominent in the thermodynamic properties as well as in the linear conductance.

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