Time-dependent numerical renormalization group study of quench dynamics in quantum dot systems

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We study the quench dynamics in quantum dots strongly coupled to normal and/or ferromagnetic contacts. The system is described by the single-impurity Anderson Hamiltonian, while its real-time evolution for arbitrary temperatures is calculated by means of time-dependent density-matrix numerical renormalization group method, implemented in the framework of matrix product states. We consider two general types of quantum quenches: the first one performed in the coupling strength between the dot and the leads, and the second one obtained by changing the position of the dot level. For these two cases we analyze the time-evolution of local observables, such as dot occupation and spin. We identify the relevant time scales associated with the emergence of Kondo correlations and an exchange field in the case of ferromagnetic leads.

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