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Numerical Renormalization-Group Approach to the Non-Equilibrium Dynamics of Quantum Impurity Problems FRITHJOF ANDERS, Department of Physics, Universität Bremen, P.O. Box 330 440, D-28334 Bremen, AVRAHAM SCHILLER, Racah Institute of Physics, The Hebrew University, Jerusalem 91904, Israel — We present a novel approach to time dependent non-equilibrium quantum impurity problems. It is based on a combination of Feynman's concept of a reduced density matrix and Wilson's numerical renormalization group. We discuss how dissipation and decoherence arises and benchmark our algorithm using the known exact solution of the resonant-level model. Depending on the cutoff scheme, all states are needed for tracking the full time evolution, for which we show a suitable resummation procedure. As a first application, we extract the two different time scales for spin- and charge-relaxation processes in the single impurity Anderson model. An outlook for pulse-driven quantum dot problems will be given.

Frithjof Anders
Department of Physics, Universität Bremen
P.O. Box 330 440, D-28334 Bremen

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