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The Dynamical Renormalization Group - Beyond the van Hove Time Scale

Given an arbitrarily large, but fixed, time $t > 0$, we derive approximations for the time evolution of the spin-boson model in terms of the propagator generated by a free effective Hamiltonian. For initial states spectrally localized close to a resonance energy, the error made by these approximations tends to zero, as t grows large, even compared to the exponential decay induced by the resonance. Our construction rests on the renormalization group induced by the isospectral Feshbach-Schur map. This is joint work with Jacob Schach Möller and Matthias Westrich.