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Periodic time dependent problems in nonequilibrium quantum statistical mechanics SELMAN HERSHFIELD, Univ. of Florida — The usual Kadanoff-Baym or Keldysh formulation of nonequilibrium quantum statistical mechanics can be reformulated for steady state problems in terms of a nonequilibrium density matrix of the form $\exp(-(H-Y)/k_BT)$, where H is the hamiltonian and Y contains the information about how the system is driven out of equilibrium.* This approach has now been used to solve exactly solvable models as well as in approximate techniques. Here we show that for a periodic time dependent hamiltonian there is a similar formulation in terms of a nonequilibrium density matrix, where the density matrix acts in one higher dimension than in the original problem. Thus, a time dependent nonequilibrum problem is mapped onto a time independent nonequilibrium problem in one higher dimension. This is true for interacting as well as noninteracting problems. The approach is illustrated by applying it to some exactly solvable time dependent nonequilibrium problems such as tunneling through a resonant level where the level and/or the voltage applied are time dependent.
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