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Wigner dynamics for quantum gases under inhomogeneous gain and loss processes with dephasing

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We present a Wigner function-based approach for the particle density evolution in fermionic and bosonic open quantum many-body systems, including the effects of dephasing. In particular, we focus on chains of noninteracting particles coupled to Lindblad baths. The dissipative processes, described by linear and quadratic jump operators, are modulated by inhomogeneous couplings. Following a semiclassical approach, we find the differential equation governing the Wigner function evolution, which can be solved in closed form in some particular cases. We check the accuracy of the Wigner approach in different scenarios (ie, Gaussian jump rates), describing the density evolution and the transport phenomena in terms of classical quasiparticles.
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