

Unified non-Hermitian-Lindblad approach and its applications to quantum dissipative systems

We compare two approaches to open quantum systems far from equilibrium, namely, the non-Hermitian dynamics and the Lindblad master equation. In order to deal with more general dissipative phenomena, we propose the unified master equation that combines the characteristics of both of these approaches. This allows us to assess the differences between them as well as to clarify which observed features come from the Lindblad or the non-Hermitian part, when it comes to experiment. Using a generic two-mode single-atom laser system as a practical example, we analytically solve the dynamics of the normalized density matrix operator.