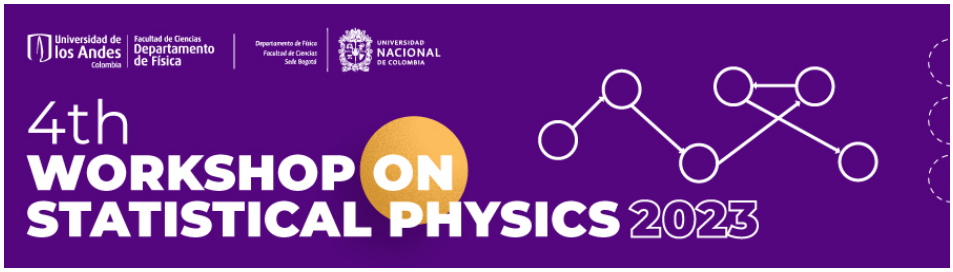

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Quantum density matrix formalism for systems with non-Hermitian Hamiltonians

In the conventional quantum mechanics of conserved systems, Hamiltonian is assumed to be a Hermitian operator. However, when it comes to quantum systems in presence of dissipation and/or noise, including open quantum optical systems, the strict hermiticity requirement is no longer necessary. In fact, it can be substantially relaxed: the non-Hermitian part of a Hamiltonian is allowed, in order to account for effects of dissipative environment, whereas its Hermitian part would be describing subsystem's energy. Within the framework of the quantum statistical mechanics, we consider the standard approach to dissipative phenomena based on a master equation for the reduced density operator and a non-Hermitian Hamiltonian. As an example, we consider an environment-assisted energy transfer in photobiological complexes.
References: https://tinyurl.com/rgnhdo

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