Universidad de Valladolid

Q-CAYLE COMUNICACIONES CUÁNTICAS

Exact solution and dynamics of the driven Jaynes-Cummings model

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Abstract: We will review a method to solve the Schrödinger equation for the driven Jaynes-Cummings (JC) Hamiltonian. Such operator considers the conventional JC Hamiltonian plus a pair of additional (time-dependent) terms that involve the classical electromagnetic field driving both the two-level system and the quantized field. The method of solution consists of the transformation of the Hamiltonian of the driven system into the one of the standard JC model by means of two unitary transformations. Then, the dynamical variables of the driven system can be straightforwardly obtained and analyzed. Some examples are given: atomic inversion, mean-photon number of the quantized field, and the entropy of the system, among others. As the two-level system is actually a qubit, the presented results have direct application in the management and control of quantum information.

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