Quantum stochastic equation for quasi-two-level solid-state laser

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Abstract

A quantum-mechanical description of a radiation-balanced solid-state laser is presented. The impurity ion levels are coupled both by the phonons of the host lattice and by the radiation field. The set of dynamic Heisenberg-Langevine equations for the material system and the phonon operators has been derived. These equations include radiative and nonradiative damping terms and quantum-stochastic forces. This description could be used for investigation of the influence of phonon dynamics on laser stability.

Keywords

Cooling, Laser, Quantum theory