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Population Dynamics and Emission Spectrum of a Cascade Three-Level Jaynes-Cummings Model with Intensity-Dependent Coupling in a Kerr-like Medium

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Abstract: By using the method of eigenvectors, the atomic populations and emission spectrum are investigated in a system that consists of a cascade three-level atom resonantly interacting with a single-mode field in a Kerr-like medium. The atom and the field are assumed to be initially in the upper atomic state and the Fock state, respectively. Results for models with intensity-dependent coupling and with intensity-independent coupling are compared. It is found that both population dynamics and emission spectrum show no indications of atom-field decoupling in the strong field limit if the intensity-dependent coupling is taken into account.

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