Resonant fluorescence in a monochromatically driven two-level quantum system with broken inversion symmetry

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Abstract

Resonant fluorescence phenomenon in a two-level quantum system possessing dipole moment operator with permanent non-equal diagonal matrix elements and driven by an external semi-classical monochromatic EM (laser) field was studied. An expression for the fluorescent radiation spectrum in a far-distant zone was derived. It was shown that such two-level system can radiate continuously at much lower frequency when driven by high-frequency laser field. It was also found that the same driven two-level quantum system is able to amplify weak probe EM radiation waves belonging to the low frequency range. Possible ways to observe the predicted effects experimentally and employ them for a wide range of practical applications are discussed.

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