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Iterative solution of non-autonomous Bloch equations: Fluorescence spectrum with detuned squeezed vacuum field
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Abstract
The non-autonomous Bloch equations modelling a driven 2-level atom in the presence of an off-resonant broadband squeezed vacuum (SV) field is treated analytically. This concerns iterative solutions valid for large SV detuning parameter but for arbitrary strength of the laser field. Computational results are presented for the averaged atomic variables for various data and compared with the resonant SV field case. The iterated analytical results for nonzero SV detuning are compared with the (exact) numerical solutions of the Bloch equations, hence we have an insight about the range of other system parameters (other than the Rabi frequency) for which the iterated solutions are valid to O(10-2) orless. The main purpose of deriving these analytical results is to calculate analytically the transient fluorescent spectrum. For an initially ground-state atom, both the SV phase and detuning parameters induce pronounced asymmetrical spectrum in the strong field case.

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