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A Keldysh formalism approach to superradiance of two-level system HANZHEN MA, SUSANNE YELIN, Univ of Connecticut - Storrs — We use a non-equilibrium Keldysh formalism to develop a method of describing superradiance. A time evolution operator on the Schwinger-Keldysh contour is written in terms of the field and atomic operators. The quantized fields degrees of freedom are formally eliminated to obtain an effective two-atom master equation. Using non-equilibrium Greens function method and Dyson equation formalism, we derive a self-consistent expression for superradiant decay rates. We consider a homogeneous gas of initially inverted two-level atoms, and numerical results are obtained by solving the closed form of its equation of motion. The effect of optical depth on super- and sub-radiance is also discussed.

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