

Collective Lamb Shift in Single Photon Dicke Superradiance

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The collective Lamb shift and associated radiative decay of a large cloud of radius R containing N atoms uniformly excited by one photon of wavelength λ will be discussed. Specifically it will be shown how the time evolution of the symmetric state prepared by single photon absorption in the limit $R \gg \lambda$ is similar to that encountered in the Dicke limit of small sample ($R \ll \lambda$) superradiance. The analysis includes virtual (counter-rotating) terms naturally and thus provides a simple calculation of the collective Lamb shift of a single Dicke state.