The role of Lamb shifts

in the quantum interference of spontaneous emission

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Abstract

The role of the Lamb shifts quantum interference is investigated, which has significant influence on the effective decay rates of two levels of a multilevel system, even when the transition dipole elements of the two are the same and the energy separation of the two is small. We also show that the energy shift has also substantial influence on the spectrum emitted by the atom. The Lamb shifts come from the emission and then re-absorption of virtual photons as well as the real photon emission. The experiment to test the effect of the role of the Lamb shift is suggested.