Inversion of an Atomic Wave Packet in a Circularly Polarized Electromagnetic Wave

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Abstract: We study behavior of an atomic wave packet in a circularly polarized electromagnetic wave, and particularly calculate the atomic inversion of the wave packet. A general method of calculation is presented. The results are interesting. For example, if the wave packet is very narrow or/and the interaction is very strong, no matter the atom is initially in its ground state or excited state, the atomic inversion approaches zero as time approaches infinity. If the atom is initially in its ground state and excited state with the probability 1/2 respectively, and if the momentum density is an even function, then the atomic inversion equals zero at any time.

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