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Atomic excitation probability for Fock and coherent-state pulses: asymptotic results HEMLIN SWARAN RAG, JULIO GEA-BANACLOCHE, Univ of Arkansas-Fayetteville — For a two-level atom in a cavity or waveguide, interacting with a single-photon pulse, the excitation probability P_e can never equal one unless the pulse shape is the exact time-reverse of the spontaneous decay. For pulses with the "wrong" shape, we investigate (following the work of Wang et al.[1]) how many photons it takes to bring the excitation probability close to 1. For square pulses we find analytically that for large average photon numbers $\bar{n}$, $P_e - 1$ scales as $1/\sqrt{\bar{n}}$, with a coefficient that is the same for Fock states as for coherent states. We also present analytical and numerical results for how the presence of additional losses affects P_e and makes it necessary to increase the number of photons, even for the optimal-shape pulse.

[1]Y. Wang, J. Minář, and V. Scarani, Phys. Rev. A **86**, 023811 (2012)

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