

Quantum recoil effects in finite-time disentanglement of two distinguishable atoms

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Abstract

Starting from the requirement of distinguishability of two atoms by their positions, it is shown that photon recoil has a strong influence on finite-time disentanglement and in some cases prevents its appearance. At near-field interatomic distances well-localized atoms—with maximally one atom being initially excited—may suffer disentanglement at a single finite time or even at a series of equidistant finite times, depending on their mean interatomic distance and their initial electronic preparation.