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Entanglement generation and bound states in one-dimensional QED

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An excited atom in free space decays towards its ground state through spontaneous emission. Boundary conditions and artificial dimensional reduction drastically modify this picture, enhancing or inhibiting (sometimes hindering) decay.

We investigate the behaviour of two quantum emitters (two-level atoms) embedded in a linear waveguide, in a quasi-one-dimensional configuration. We focus on the single- and two-excitation sector. We explore the relaxation towards bound states for resonant values of the interatomic distance, the stability of such states, the generation of entanglement and the existence of plasmonic modes.

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