

Cavity Induced Non-adiabatic Effects and Modifications of the Spin-orbit Coupling

A numerically exact diagonalisation of the non-relativistic Pauli-Fierz Hamiltonian is performed for quantized three-body problems coupled to one cavity mode in 3D. The resulting 10-dimensional setup can be transformed into an effectively five dimensional problem, which is fully diagonalisable with state-of-the-art computers. This allows to investigate polaritonic effects for real systems (e.g. He or HD+) with high accuracy, potentially giving access to cavity induced non-adiabatic effects. Modifications of the fine-structure arising from the coupling to a quantized cavity mode can be treated perturbatively.