Abstract Submitted
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Ultrafast dynamics in the vicinity of quantum light-induced conical intersections[1] GNES VIBK, ANDRS CSEHI, University of Debrecen, Department of Theoretical Physics, MARKUS KOWALEWSKI, Department of Physics, Stockholm University , GBOR J. HALSZ, University of Debrecen, Faculty of Informatics — Nonadiabatic effects appear due to avoided crossings (AC) or conical intersections (CIs) that are either intrinsic properties in field-free space or induced by a classical laser field in a molecule. It was demonstrated that avoided crossings in diatomics can also be created in an optical cavity. Here, the quantized radiation field mixes the nuclear and electronic degrees of freedom creating hybrid field-matter states called polaritons. In the present theoretical study we go further and create CIs in diatomics by means of a radiation field in the framework of cavity quantum electrodynamics. By treating all degrees of freedom, that is the rotational, vibrational, electronic and photonic degrees of freedom on an equal footing we can control the nonadiabatic quantum light-induced dynamics by means of CIs. First, the pronounced difference between the the quantum light-induced avoided crossing and the CI with respect to the nonadiabatic dynamics of the molecule is demonstrated. Second, we discuss the similarities and differences between the classical and the quantum field description of the light for the studied scenario.

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