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PULSE-INDUCED OPTOELECTRONIC RESPONSE OF MOLECULAR JUNCTIONS

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Based on quantum many-body transport formalism, we analyse the quantum dynamics of a donor-acceptor molecule sandwiched between two metallic electrodes throughout the effects of metal-molecule coupling, Coulomb and exciton interactions, and pulse intensity. The photocurrent reveals internal frequencies of the system emerging from a non-equilibrium reorganization of the molecular orbitals which manifests itself in unexpected features of the dynamical electronic structure. Indeed, the time-resolved local density of states we define exhibits two types of signature: a dynamical Rabi shift and Floquet-like states generation. Our combined theoretical-numerical methodology is of strong interest for ultrafast photocurrent spectroscopy, and it also opens avenues toward the possibility of controlling or analysing the internal quantum properties of nanosystems by means of pump-push photocurrent spectroscopy.

Biography

K Beltako is about to complete his PhD from Aix-Marseille University (AMU) and is Graduated from AMU excellence Master's Program P3TMA. He is working to develop an efficient and faster numerical technique to handle various aspects of time-dependent quantum transport in nanodevices.

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