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Coulomb and spin-orbit effects in quantum dot molecules under harmonic fields[1] LILIA MEZA-MONTES, Instituto de Fisica B. Universidad Autonoma de Puebla, Mexico, AREZKY H. RODRIGUEZ, Universidad Autonoma de la Ciudad de Mexico, SERGIO E. ULLOA, Dept. of Phys. and Astron. CMSS-NQPI Ohio University — The time evolution of a two-electron quantum dot molecule under strong harmonic electric fields is studied. The wave function is determined in terms of the single-electron orbitals using the Floquet approach. We pay particular attention to the evolution of the spin states of the system, as the surface inversion asymmetry (Rashba-type) and bulk inversion asymmetry (Dresselhaus-type) spin-orbit effects are known to introduce spin mixing. We also study the role of a perpendicular magnetic field, which is shown to have dramatic effects on the dynamics. We present an analysis of the physical behavior of the system in terms of the quasi-energy spectrum, and study the time evolution of the occupation probabilities of the dots. Conditions for singlet-triplet mixing, similar to the spin-flips observed in the single-electron case, are analyzed. These results are relevant for applications in spin-controlled devices.

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