Time-dependent Electric Field Effect on Two Interacting Electrons in Vertically Coupled Quantum Dots

Wiem Ben Chouikha,[1] Sihem Jaziri[2] and Raouf Bennaceur[3]

[1]Laboratoire de Physique de la Matiere Condensee
Faculte des Sciences de Tunis, El Manar
Tunis 1080
Tunisia

[2]Departement de Physique
Faculte des Sciences de Bizerte, Jarzouna
Bizerte 7021
Tunisia

[3]Laboratoire de Physique de la Matiere Condensee
Faculte des Sciences de Tunis, El Manar
Tunis 1080
Tunisia

To investigate useful properties of localization caused by an external time dependent uniform electric field on two electrons in a vertically coupled quantum dots, we carry out a numerical analysis of the two electron wave functions including their Coulomb interaction. In the case where the sizes of the dots are different, we use a method including two electron states and describing a double occupation of a quantum dot. This model gives us some insight into how the Coulomb interaction and exchange combined with an appropriate time dependent electric field affect the success of the localization and entanglement effects of the two electrons states on a very fast time scale.