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Vacillation in density of correlated electron-electron pair confined in 2D quantum dot TAKUMA OKUNISHI, ATSUSHI TSUBAKI, TOMOKI TAGAWA, KYOZABURO TAKEDA, Waseda University, WASEDA UNIV. TAKEDA LABORATORY TEAM — We studied an electronic structure of charged particles confined in a 2D quantum dot (QD), taking into account an electron correlation through a configuration interaction (CI) by employing resonating unrestricted Hartree-Fock (res-UHF) approach. The UHF solutions for the QD are nonorthogonal mutually but are appropriate for a basis functions of a res-UHF CI calculation because they represent a conceivable electron- spin configurations rationally. Consequently, the res-UHF CI provides intuitive understandings for an electron correlation with narrowing down the number of employed Slater bases, although at an expense of orthogonality among the Slater bases. We further embedded this res-UHF CI approach to solve a time- dependent (TD) Schroedinger equation, and studied the TD features caused by an electron correlation computationally. We found that the electron correlation induces the characteristic vacillation in the total charge density. We then employed a projection analysis and investigated the change in the vacillation frequencies by varying the confinement length and also the initial charge distribution.

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