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Energy Spectra and Oscillatory Magnetization of Two-Electron Self-Assembled InGaAs/GaAs Ring-Like Nanostructures[1] V.M. FOMIN, V.N. GLADILIN, J.T. DEVREESE, TFVS, Universiteit Antwerpen, Belgium, N.A.J.M. KLEEMANS, H.C.M. VAN GENUCHTEN, P.M. KOENRAAD, PSN, COBRA, TU Eindhoven, The Netherlands — We have analyzed the effect of the Coulomb interaction on the energy spectrum and the magnetization of two electrons in a strained $In_xGa_{1-x}As/GaAs$ ring-like nanostructure with realistic parameters inferred from our X-STM data. With increasing magnetic field, the lowest spin-singlet and spin- triplet states sequentially replace each other as the ground state. This is reminiscent of the Aharonov-Bohm effect for the ring-like structures. The exchange interaction leads to a more complicated oscillatory structure of the magnetic moment of the two electrons as a function of the magnetic field as compared to the magnetization pattern for a single-electron ring-like nanostructure. We discuss the relevance of the two-electron systems for the interpretation of the Aharonov-Bohm oscillations in the persistent current observed in low temperature magnetization measurements on self-assembled $In_xGa_{1-x}As/GaAs$ ring-like nanostructures.

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