Quantum Statistics, Coherent Migration of Charges in Topological Thin Film Cluster Structures and the Electron Energy States

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1. We consider, firstly, the exciton-photon statistics radiation from pillar microcavity. We obtain unconventional photon antibunching and small polariton antibunching. Secondly, we use two strong-coupled pillar microcavities to achieve pronounced polariton antibunching. 2. We present a new mechanism of the charge transport in thin nanocluster films based on coherent migration due to the deformation of the nanoclusters potential, which carries with it an electron. We define a defect in the form of a potential deformation as a quasiparticle in a distorted structure. We can represent a distortion migration as quantum jumps between random variables via ballistic mechanism and/or the inversion mechanism by the Anderson lattices. For that, a correlation between deformation and charges results in the distortion-inversion quasiparticle. This effect is based on the inversion of the potential energy of nanoclusters due to the Jahn-Teller effect in a nanocluster when the charges flow occurs in a network of nanoclusters.