TF-P018

Magnetoconductance of a Hybrid Quantum Ring: Effects of Antidot Potentials

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The electronic structures of a hybrid magnetic-electric quantum ring and two terminal conductance taking into account the resonant backscattering via both magnetic and electric edge channels are studied.

The hybrid magnetic-electric quantum ring is formed by a magnetic quantum dot combined with an additional antidot electrostatic potential at the center of the dot.

Electrons are both magnetically and electrically confined to the plane.

The antidot potential repelling electrons from the center of the dot plays an important role in the energy spectra and magnetoconductance.

The angular momentum transition in the ground state and the behavior of magnetoconductance due to a change of the antidot potential are shown in comparison with the conventional magnetic quantum dot.

Keywords: Magnetotransport phenomena, Magnetoelectric devices, Ballistic transport, Hybrid quantum structure

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Effect of annealing temperature on Al2O3 layer for the passivation of crystalline silicon solar cell

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The fixed negative charge of the Al2O3 passivation layer gives excellent passivation performance for both n-type and p-type silicon wafers. For the best passivation quality, annealing is known to be a prerequisite step and a lot of studies concerning annealing effect on the passivation characteristics have been performed. Meanwhile, for manufacturing a crystalline silicon solar cell, firing process is applied to the Al2O3 passivation layer. Therefore, study on not only annealing effect but also on firing effect is necessary. In this work, Al2O3 passivation performance (minority carrier lifetime) for p-type silicon wafer was evaluated with Quasi-Steady-State Photoconductance(QSSPC) measurement after annealing at different temperatures. For the samples which showed different aspects, C-V measurement was performed for the cause – whether it is due to the chemical effect or field-effect. The change in Al2O3 passivation property after firing processes was investigated and the mechanism for the change could be estimated.

Keywords: crystalline silicon solar cell, Al2O3 passivation, thermal stability, annealing temperature