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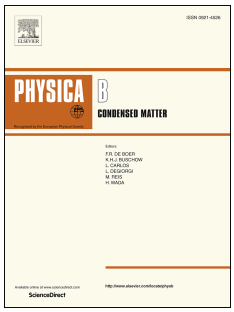

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The influence of side-coupled quantum dots on thermoelectric effect of parallel-coupled double quantum dot system

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Abstract: The thermoelectric transport properties of a parallel-coupled double quantum dot (PCDQD) system with side-coupled quantum dots (QDs) is investigated by using the Keldysh non-equilibrium Green's function technique. The thermoelectric quantities, including the thermal conductance, thermopower, and thermoelectric figure of merit denoted by *ZT*, are sensitive to the inter-dot coupling strength. With the help of side-coupled QD, unusual double Fano resonances are created in the conductance spectra to largely enhance the thermoelectric effect at low-temperature. Benefited from the coexistence of local bipolar effect and Fano resonance, the *ZT* can be improved by one-fold higher than that of original PCDQD system. Moreover, when the asymmetry parameter α, which indicates the geometric arrangement of coupled QDs with a given lead, takes appropriate value, the optimization of *ZT* can be achieved at high temperature. Our work suggests that the side-coupled QDs scheme holds promise for the designing of high-efficiency thermoelectric conversion devices.

Keywords: quantum dot, thermoelectric effect, non-equilibrium Green's function, thermoelectric

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