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Quantum heat transport in a spin-boson nanojunction: Coherent and incoherent mechanisms YUE YANG, CHANG-QIN WU, Department of Physics, Fudan University — Quantum heat transport in a spin-boson system is investigated by the nonequilibrium Green's function (NEGF) method. Spin-spin correlators are calculated via the Majorana fermion representation of spin operators, which allows us to make use of the Wick's theorem by standard diagrammatic techniques. A formula of heat current is obtained and numerical results are presented in comparison with other methods. Two kinds of transport mechanisms are identified in high and low temperatures, respectively, which indicate there exists a transition from incoherent to coherent transport with the temperature decreasing. Additionally, a saturation of heat current is confirmed by increasing the coupling strength between the baths and the intermediate system, which is possibly a sign of the quantum Zeno effect in the transport process.

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