

Abstract Submitted
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Thermopower of few-electron quantum dots with Kondo correlations¹ LVZHOU YE, University of Science and Tech of China — The thermopower of few-electron quantum dots is crucially influenced by on-dot electron-electron interactions, particularly in the presence of Kondo correlations. We present a comprehensive picture which elucidates the underlying relations between the thermopower and the spectral density function of two-level quantum dots. The effects of various electronic states, including the Kondo states originating from both spin and orbital degrees of freedom, are clearly unraveled. With these insights, we have exemplified an effective and viable way to control the sign of thermopower of Kondo-correlated quantum dots. This is realized by tuning the temperature and by selecting the appropriate level spacing and Coulomb repulsion strength. Such a physical picture is affirmed by accurate numerical data obtained with a hierarchical equations of motion approach. Our understandings and findings provide useful insights into controlling the direction of electric (heat) current through a quantum dot by applying a temperature (voltage) gradient across the two coupling leads. This may have important implications for novel thermoelectric applications of quantum dots.

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