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Spin-Orbit Coupling Effect over Kondo Temperature and Thermoelectric transport Properties of a Quantum Dot

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In this work, we present the research results of the spin-orbit coupling effect over Kondo Temperature and thermoelectric transport properties through a quantum dot. The problem is modeled as a single impurity Anderson model in the presence of the spin-orbit interaction which mixes the spins of the conduction electrons, and consequently, the SU(2) spin symmetry, important to the Kondo state of the system is broken. The SU(2) symmetry is recovered doing a spin rotation along the axis \hat{r} , where the system form Kondo many body singlet state. On this new quantization axis, the hybridization function is diagonal, the Haldane formula for the Kondo temperature is renormalized by spin-orbit interaction, The thermoelectric transport properties, it was observed that the electrical, thermal conductance, and the thermopower have universality behavior with the spin-orbit interaction, and similarly we observe that the Wiedemann-Franz law and the ZT improve with the spin-orbit interaction.

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