Entanglement negativity of a single-channel Kondo system

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Abstract

Negativity is an entanglement measure applicable to thermal mixed states. Based on the numerical renormalization group (NRG) approach, we develop a method of computing the negativity between the impurity and the bath of a quantum impurity system. The computational cost is reduced exponentially by adopting the energy-scale separation structure of the NRG. We apply the method to the single-impurity Kondo model and the Anderson model, and find a power-law temperature dependence of the negativity near the Kondo-fixed point. The power-law exponent is 2, which is identical to the exponent [1] of the entanglement of formation. [1] S. S. B. Lee, J. Park, and H. S. Sim, Macroscopic Quantum Entanglement of a Kondo Cloud at Finite Temperature, Phys. Rev. Lett. 114, 057203 (2015)

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