Thermal effect and the role of entanglement and coherence on the excitation transfer in a spin chain

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Abstract
We analyze the role of bath temperature, coherence and entanglement on the excitation transfer in a spin chain induced by the environment. In the Markovian regime, we show that coherence and entanglement are very sensitive to bath temperature and vanishing in time, in contrary to the case of having the zero-temperature bath. Meanwhile, finding the last qubit of the chain in the excited state increases by raising the bath temperature. The obtained results showed the destructive role of temperature on the coherence and entanglement, thereby confirming that these quantum mechanical features cannot affect the probability of finding the last qubit in the excited state.

Keywords: open quantum systems, entanglement, quantum coherence, transport

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