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Entanglement in quantum thermal machines

Entanglement is a key resource for quantum information processing, and generating and maintaining entanglement is therefore a central challenge in quantum information science.

Entangled states are fragile and generally degrade under unavoidable interactions of a system with its environment. Surprisingly, it has nevertheless been realised that dissipation may in some cases aid the generation and stabilisation of entanglement. In particular, heat gradients can induce entanglement in a steady state out of thermal equilibrium.

I will describe small quantum thermal machines capable of generating many interesting entangled states, both bipartite and multipartite, which would be useful for quantum information processing tasks such as teleportation, quantum cryptography, sensing, and ultimately quantum computing.

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