

Entropy flow in CR-gate

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Cross-resonance gate is a two-qubit gate performed by driving one of the qubits (control) at the frequency of the other (target). We study such a system in the presence of external reservoirs [1]. In our model each qubit is coupled to a reservoir, where each reservoir is at a different temperature. The qubits also interact with each other and hence evolve to become entangled. We calculate the entropy flow through the reservoirs and see how it is affected by the entanglement between the qubits [2]. We use Keldysh formalism to calculate this entropy flow [3]. Obtaining such a relation makes it feasible to control the entropy flow within a system by controlling the entanglement between qubits.

[1] Mohammad H. Ansari, Yuli V. Nazarov, Phys. Rev. B 91, 104303(2015)

[2] Mohammad H. Ansari, Alwin van Steensel, Yuli V. Nazarov, Entropy 2019, 21(9), 854 (2019)

[3] M.H. Ansari, Y.V. Nazarov, Journal of Experimental and Theoretical Physics 122, 3(2016)