Surface Code Threshold in the Presence of Correlated Errors[1]
EDUARDO NOVAIS, Universidade Federal do ABC (Brazil), EDUARDO MUC-CIOLO, Uniiversity of Central Florida — We study the fidelity of the surface code in the presence of correlated errors induced by the coupling of physical qubits to a bosonic environment. By mapping the time evolution of the system after one quantum error correction cycle onto a statistical spin model, we show that the existence of an error threshold is related to the appearance of an order-disorder phase transition in the statistical model in the thermodynamic limit. This allows us to relate the error threshold to bath parameters and to the spatial range of the correlated errors.

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