

Error-mitigated quantum computation of string order parameters across a topological phase transition

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Recently, Smith et al. investigated a topological phase transition in a spin chain by measuring string order parameters on the IBM quantum computers [Phys. Rev. Research 4, L022020 (2022)]. The measured quantities showed appreciable reduction from theoretical values, owing to inherent noise in the devices. In this work, we reproduce their results in the noisy quantum circuit simulator (Qiskit Aer), and improve the accuracy of the measurements by exploiting the error mitigation technique called the virtual distillation. This technique enables an exponential error suppression given the preparation of n copies of the original circuits and some additional gates.

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