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**Tensor network characterization of superconducting circuits**

GUILLAUME DUCLOS-CIANCI, Anyon Systems Inc., DAVID POULIN, Université de Sherbrooke, ALIREZA NAJAFI-YAZDI, Anyon Systems Inc. — Superconducting circuits are promising candidates in the development of reliable quantum computing devices. In principle, one can obtain the Hamiltonian of a generic superconducting circuit and solve for its eigenvalues to obtain its energy spectrum. In practice, however, the computational cost of calculating eigenvalues of a complex device with many degrees of freedom can become prohibitively expensive. In the present work, we investigate the application of tensor network algorithms to enable efficient and accurate characterization of superconducting circuits comprised of many components. Suitable validation test cases are performed to study the accuracy, computational efficiency and limitations of the proposed approach.

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