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Quantum Circuit Complexity of Random Singlet Phases[1] NOAH BRAY-ALI, Joint Quantum Institute, University of Maryland, College Park and National Institute of Standards and Technology, Gaithersburg, MD 20899 — We use quantum circuit complexity to characterize the entanglement of random singlet phases in one-dimension. Random singlet phases are infinite-randomness fixed points of the strong-disorder renormalization group. They arise in strongly-correlated, quantum many-body systems of bosons, fermions, or anyons, and have long-range entanglement. We compute the depth of the local quantum circuit required to generate the random singlet phase and find that it scales as a super-linear, universal power of the system size.

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