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**Approximating the Sachdev-Ye-Kitaev model with Majorana wires**[1] AARON CHEW, Caltech, ANDREW ESSIN, UC Davis, JASON ALICEA, Caltech — The Sachdev-Ye-Kitaev (SYK) model describes a large collection of Majorana fermions coupled via random, 'all-to-all' four-fermion interactions. This model enjoys broad interdisciplinary interest because it provides a solvable realization of holography in 0+1 dimensions, exhibits unusual spectral and thermodynamic properties, and shares deep connections to chaos and black holes. We propose a solid-state implementation of the SYK Hamiltonian that employs quantum dots coupled to arrays of topological superconductors hosting Majorana end-states. All-to-all four-Majorana couplings are mediated by interactions in the dot, while the randomness originates from disorder in the hoppings between the Majorana modes and dot levels. Using perturbation theory and explicit numerics, we study the properties of the dot-wire array system under various experimental conditions. Interestingly, our setup not only allows exploration of SYK physics, but also provides a controlled testbed for interaction effects on the topological classification of fermionic phases.

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