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## Quantum critical Eliashberg theory in a finite dimensional SYK model

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We present a model of superconductivity in a higher dimensional generalization of the Sachdev-Ye-Kitaev model. In the normal state this model features a critical phase in (1+1) dimensions and a quantum phase transition in (2+1) dimensions. For (2+1) dimensions the superconductivity emerges around the quantum critical point. We derive the Eliashberg equations of superconductivity from the saddle point equations of the field theory in the limit of a large number of degrees of freedom. Finally we analyse the effect of pair-breaking and tuning of the boson to fermion flavour ratio on the superconducting phase.

### Category

Solid State (Theory)

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