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【104】 Strong enhancement of superconductivity in fractal lattices

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Using the Sierpinski gasket as an example, we theoretically study the properties of fractal superconductors. We focus on the phenomenon of s -wave superconductivity in the Hubbard model with attractive on-site potential and employ the Bogoliubov-de Gennes approach. For the case of the Sierpinski gasket, we demonstrate that fractal geometry of the underlying crystalline lattice can be strongly beneficial for superconductivity, not only leading to a considerable increase of the critical temperature as compared to the regular triangular lattice but also supporting macroscopic phase coherence of the Cooper pairs.

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