

Pseudogap in strongly disordered conventional superconductors

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Excited states of Bogliubov-de Gennes equations are examined for two dimensional negative-U Hubbard Hamiltonian with on-site disorder. It is shown explicitly that the temperature (pseudogap temperature) when the superconducting gap opens is different from that (the superconducting transition temperature) the long range order appears. In the excited state solutions the system is self-organized into blocks, which behave like superspins and are coupled with their neighbors. Only if the couplings between these blocks become strong enough, the true long range order can be realized.

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¹X. T. Wu and R. Ikeda, Phys. Rev. B **83**, 104517 (2011).