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Superconductivity in the repulsive Hubbard model: an asymptotically exact weak-coupling solution STEVEN KIVELSON, SRINIVAS RAGHU, Stanford University, DOUGLAS SCALAPINO, University of California, Santa Barbara — We study the superconducting instability of the Hubbard model in the limit where U, the onsite repulsive interaction, is much smaller than the electron hopping. We present an asymptotically exact expression for Tc, the superconducting transition temperature, in terms of the correlation functions of the non-interacting system which remains valid for arbitrary densities so long as the interactions are sufficiently small. Our strategy for computing Tc involves first integrating out all degrees of freedom having energy higher than an arbitrarily chosen initial cutoff. The renormalization group (RG) flows of the resulting effective action are computed and Tc is obtained by determining the scale below which the RG flows in the Cooper channel break down. Using this method, we present results of Tc and pairing symmetries as a function of electron concentrations for a wide variety of lattice systems in two and three dimensions.

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