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Conditions for magnetically induced singlet d-wave superconductivity on the square lattice[1] S.R. HASSAN, B. DAVOUDI, B. KYUNG, A.-M.S. TREMBLAY, Universite de Sherbrooke — It is expected that at weak to intermediate coupling, d-wave superconductivity can be induced by antiferromagnetic fluctuations. However, one needs to clarify the role of Fermi surface topology, density of states, pseudogap, and wave vector of the magnetic fluctuations on the nature and strength of the induced d-wave state. To this end, we study the generalized phase diagram of the two-dimensional half-filled Hubbard model as a function of interaction strength U/t, frustration induced by second-order hopping t'/t, and temperature T/t. In experiment, U/t and t'/t can be controlled by pressure. We use the two-particle self-consistent approach (TPSC), valid from weak to intermediate coupling. D-wave superconductivity can be induced by magnetic fluctuations but only if they are near commensurate wave vectors and not too close to perfect nesting conditions where the pseudogap becomes detrimental to superconductivity. For given U/t there is thus an optimal value of frustration t'/t where the superconducting T_c is maximum. The symmetry $d_{x^2-y^2}$ vs d_{xy} of the superconducting order parameter depends on the wave vector of the underlying magnetic fluctuations in a way that can be understood qualitatively from simple arguments.

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