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Analytic derivation of the equivalence between the Gutzwiller-projected BCS Hamiltonian and the t - J model at half filling KWON PARK, Korea Institute for Advanced Study — A connection between quantum antiferromagnetism and high T_C superconductivity is theoretically investigated by analyzing the t - J model and its relationships to the Gutzwiller-projected BCS Hamiltonian. In particular, it is analytically shown that the ground state of the t - J model at half filling (i.e., the 2D antiferromagnetic Heisenberg model) is entirely equivalent to the ground state of the Gutzwiller-projected BCS Hamiltonian with strong pairing. The relationship between the ground state of the projected BCS Hamiltonian and Anderson's resonating valence bond state (i.e., the projected BCS ground state) is discussed.

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