

MAR08-2007-003003

Abstract for an Invited Paper
for the MAR08 Meeting of
the American Physical Society

The Question of Pairing Glue in the Cuprate Superconductors¹

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The Hubbard and t-J models exhibit many of the properties which are observed in the cuprate superconductors. Thus they provide a framework for addressing the question of whether one should expect to find a “pairing glue” in the cuprates. This question is basically a question regarding the dynamics of the pairing interaction. If the dynamics of the pairing interaction arises from virtual states, whose energies correspond to the Mott gap, and give rise to the exchange coupling J , the interaction is instantaneous on the relative time scales of interest. In this case one would not speak of a pairing glue. However, if the energies correspond to the spectrum seen in the dynamic spin susceptibility, then the interaction is retarded and one could speak of a spin-fluctuation glue which mediates the d-wave pairing interaction. We will review results from recent numerical calculations which provide insight into this question.

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