Abstract Submitted
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Superconducting Fluctuations in Strongly Correlated Electronic Systems[1] WILLIAM PUTIKKA, Physics Department, Ohio State University — Superfluid behavior is relatively common in strongly correlated fermion systems. This suggests there is a common reason for this behavior rooted in the strong correlations. I propose such a mechanism, developed in the context of the 2D t-J model, where $d_{x^2-y^2}$ superconducting fluctuations have recently been observed[1]. The $d_{x^2-y^2}$ fluctuations are *not* due to antiferromagnetic fluctuations; the AF fluctuations compete with superconducting fluctuations. Pair fluctuations have their own, separate origin based in the strong correlations. If the on site repulsion is strong enough it can affect the electronic degrees of freedom while the entropy still dominates the free energy. This requires the entropy to be maximized under the constraint of no double occupancy, thereby rearranging the electronic degrees of freedom into separate spin and charge excitations. These excitations have different statistics and very different energy scales, allowing the charges to develop pair correlations before the spin degrees of freedom become coherent. Below the spin coherence temperature, the spins determine the symmetry of the pair wave function for the *electronic* pair fluctuations. The symmetry which best *avoids* the AF fluctuations on a square lattice is $d_{x^2-y^2}$.
1. WO Putikka and MU Luchini, PRL**96**, 247001 (2006).

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