

Abstract Submitted
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D-wave Superfluidity in a Cold Atomic Trap ANNE-LOUISE G. LARSEN, Department of physics, Aarhus University, H. FRANCIS SONG, KARYN LE HUR, Department of Physics, Yale University — We have studied strongly repulsive fermions in a 2D optical lattice with harmonic confinement in the under doped regime. To study this we have taken the t-J model as our starting point and used the renormalized mean-field theory, where the projection to the singly occupied space is taken care of through the Gutzwiller factors. The Bogoliubov-de Gennes equations have then been derived by diagonalization of the mean-field Hamiltonian. These have been solved, and the equations for the Fermi liquid order parameter, the pairing order parameter, and the doping concentration have been solved self-consistently. Our results show that we are able to have a co-existence of phases in the trap if we choose the trapping frequency and the number of particles correct. This is manifested by a finite gap in the centre of the trap and a Fermi liquid at the boundaries at finite temperature.

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