Emergence of Cooper Pairs, d-wave Duality and the Physics of Cuprates

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Abstract. Recent experiments point to strong vortex fluctuations and enhanced quantum diamagnetism within the so-called pseudogap state of high temperature cuprate superconductors. I discuss a theory of the cuprates based on the physics of a strongly correlated, quantum phase-disordered d-wave superconductor. Particular attention is paid to the charge 2e sector of the theory and its interplay with the Mott-Hubbard correlations of the insulating undoped materials. The presentation will follow an informal pedagogical style, with emphasis on experiments and general principles.