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Pseudogap in a Magnetic Field: A Case of Quantum Vortex Liquid in a Corelated d-wave Superconductor[1] ZLATKO TESANOVIC, Johns Hopkins University — Recent experiments by the Princeton group provide a clear indication of enhanced superconducting fluctuations in the pseudogap state of underdoped cuprates. In addition to the giant Nernst effect, which testifies to the thermal vortex excitations, strong diamagnetic and "vortex liquid-type" responses at very low temperatures point to predominance of *quantum* phase fluctuations throughout the pseudogap regime. This is of much importance: while *all* superconductors exhibit thermal phase fluctuations, the quantum phase disorder – leading to a non-superconducting ground state despite robust local pairing correlations – is decidedly outside the reach of any BCS-like, weak-coupling style theory. I will introduce general aspects of the theory of quantum disordered, strongly correlated d-wave superconductors and will use the theory to sketch the phenomenology of quantum vortex-liquid in heavily underdoped cuprates.

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