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Valence bond glassy order and the pseudogap phase in underdoped high Tc cuprates LIANG REN, ZIQIANG WANG, Boston college — Different origins of the pseudogap phenomena in underdoped high Tc cuprate have been proposed over the years, but a consistent theory has been challenging. We argue that the low-energy fluctuations of the valence bond, originating from the superexchange interaction, are pinned by the doping induced electronic disorder to give rise to a valence bond glass (VBG) pseudogap phase Using an extended t-J model within the Gutzwiller approximation, we show that the normal state VBG phase exhibits a genuine Fermi arc and a V-shaped average density of state at low energies. In the superconducting phase below Tc, the VBG can coexist and compete with an inhomogeneous d-wave superconductor, leading to the two-gap phenomena. We discuss the evolution of the local and momentum-space spectroscopy with doping and temperature, which capture the salient properties of the pseudogap phenomena and electronic disorder observed by recent ARPES and STM experiments.

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