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Magnetic field dependent of the local density of states in cuprate superconductors HONG-YI CHEN, Q. WANG, C.S. TING, Texas center for superconductivity and advanced material — The d-wave superconductivity (dSC) with competing antiferromagnetic (AF) order as a function of magnetic fields B has been studied by using a phenomenological $t - t' - U - V$ model and the Bogoliubov-de Gennes' equations. Our calculations are performed in a magnetic field B ranging from about $9T$ to $54T$ which corresponding to the magnetic unit cell with size from 40×80 to 16×32 . Without the AF order ($U = 0$), the system is in the pure dSC state. We show that the local density of states (LDOS) far from the vortex core at the Fermi energy is proportional to \sqrt{B} for $B < 18T$, in agreement with the Voloviks result. For $U = 2.42$, we show that the field induced spin-density-wave (SDW) appears and it has the stripe-like structure with a periodicity of $8a$. The amplitude of the induced SDW stripes decreases as the strength of B is reduced. We also point out that the LDOS at the Fermi energy far from the vortex core does not follow the Voloviks prediction when the induced SDW is in presence.

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