

Abstract Submitted
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Quantum Oscillations in the mixed state of d-wave superconductors¹ ASHOT MELIKYAN, Argonne National Laboratory, OSKAR VAFAEK, National High Magnetic Field Lab and Florida State University — We show that the low-energy density of quasiparticle states in the mixed state of ultra-clean *d*-wave superconductors is characterized by pronounced quantum oscillations in the regime where the cyclotron frequency $\hbar\omega_c \ll \Delta_0$, the *d*-wave pairing gap. Such oscillations as a function of magnetic field B are argued to be due to the internodal scattering of the *d*-wave quasiparticles near wavevectors $(\pm k_D, \pm k_D)$ by the vortex lattice as well as their Zeeman coupling. The periodicity of the oscillations is set by the condition $k_D[hc/(eB)]^{1/2} \equiv k'_D[hc/(eB')]^{1/2} \pmod{2\pi}$. We find that there is additional structure within each period which grows in complexity as the Dirac node anisotropy increases.

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