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Quantum Oscillations from Fermi Arcs TAMAR PEREG-BARNEA, GIL REFAEL, California Institute of Technology, MARCEL FRANZ, University of British Columbia, HEIDI WEBER, University of Cologne , BABAK SERADJEH, University of Illinois at Urbana-Champaign — Recent experiments[1] in a variety of High Tc superconductors revel 1/B oscillations in the vortex-liquid state. The period of oscillations in underdoped samples is short and can be translated, via the Onsager relation to an area in k-space which makes up a few percents of the Brillouin zone. Quantum oscillations are usually thought of as arising from closed orbits in momentum space along the Fermi surface and are used to measure the Fermi vector. Thus, the observation of quantum oscillations in the cuprates seems to be at odds with the observation of Fermi arcs in ARPES experiments[2] due to their fragmented Fermi surface topology. In this talk we show that quantum oscillations can arise from a partially gapped Fermi surface. We adopt a phenomenological model of arcs which terminate at a regime with a superconducting gap of d-wave symmetry to describe the pseudo gap phase. Without invoking any additional order, quantization of energy is found well below the gap maximum. Semiclassically the quantization condition arises from closed orbits in real-space. When translated to momentum space, the area enclosed by the orbits is much smaller than that of the full Fermi surface. [1]N. Doiron-Leyaraud et al. nature 447, 565 (2007) [2]Kanigel et al. Nature Physics 2 447 (2006)

Tamar Pereg-Barnea
California Institute of Technology

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