

Abstract Submitted  
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**Theory of de Haas van Alphen Oscillations in Superconductors with Preformed Pair** YAN HE, PETER SCHERPELZ, KATHRYN LEVIN, University of Chicago — We address recent observations of quantum oscillatory behavior in high temperature superconductors within a preformed pair theory of the pseudogap phase. These non condensed pairs, present in the normal and superconducting phases are shown to be reflective of a slightly distorted vortex lattice phase <sup>1</sup>. Importantly they contribute a separate additive (“bosonic”) component to the field dependent thermodynamics in addition to that arising from fermions. In this talk we report our findings that the bosonic component appears to display the same Lifshitz-Kosevich oscillation frequencies as also found in the mixed state of conventional superconductors (associated with gapless fermionic states). We explore the different amplitude weighting factors for the bosonic and fermionic contributions and the effects of varying the pairing symmetry from *s* to *d*-wave. For the latter and for many properties, the bosonic component is most strongly associated with the anti-node, while the fermionic contribution comes from the node. Ref.1. Pseudogap Effects in Fermi Gases in the Presence of a Strong Effective Magnetic Field, P. Scherpelz, Dan Wulin, K. Levin and A. K. Rajagopal, ArXiv 1207.4826

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