

Abstract Submitted
for the MAR15 Meeting of
The American Physical Society

The charge susceptibility in the cuprate pseudogap phase: Similarities and differences between Fermi pockets and Fermi arcs scenarios
PETER SCHERPELZ, ADAM RANCON, James Franck Institute, University of Chicago, YAN HE, College of Physical Science and Technology, Sichuan University, K. LEVIN, James Franck Institute, University of Chicago — Recent experimental results have provided a variety of evidence for incommensurate charge ordering in underdoped cuprates. To understand these experimental findings, here we address the calculation of charge response functions. We perform these calculations for both the Fermi arcs approach, and the Fermi pockets scenario of Yang, Rice, and Zhang. Critically, we include vertex corrections that have previously been omitted, and which are shown to exactly satisfy the sum rules. We show that these corrections lead to a double-peak structure in the susceptibility, as well as significant suppression of the susceptibility for low q . These effects have a straightforward physical interpretation: They represent the inclusion of charged bosonic, spin singlet degrees of freedom. See also Scherpelz et al., PRB 90 060506(R) (2014).

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Date submitted: 11 Nov 2014

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