Abstract Submitted
for the MAR17 Meeting of
The American Physical Society

Superconductivity near a quantum-critical point — special role of the first Matsubara frequency ARTEM ABANOV, Dept. of Physics and Astronomy, Texas AM University , YUXUAN WANG, University of Illinois, EMIL YUZBASHYAN, Rutgers University, BORIS ALTSHULER, Columbia University, ANDREY CHUBUKOV, University of Minnesota — Near a quantum-critical point in a metal strong fermion-fermion interaction mediated by a soft collective boson gives rise to incoherent, non-Fermi liquid behavior. It also often gives rise to superconductivity which masks the non-Fermi liquid behavior. We analyze the interplay between the tendency to pairing and fermionic incoherence for a set of quantum-critical models with effective dynamical interaction between low-energy fermions. We argue that superconducting T_c is non-zero even for strong incoherence and/or weak interaction due to the fact that the self-energy from dynamic critical fluctuations vanishes for the two lowest fermionic Matsubara frequencies $\omega_m = \pm\pi T$. We obtain the analytic formula for T_c which reproduces well earlier numerical results for the electron-phonon model at vanishing Debye frequency.

Artem Abanov
Dept. of Physics and Astronomy, Texas A
M University

Date submitted: 11 Nov 2016 Electronic form version 1.4