

Abstract Submitted
for the MAR14 Meeting of
The American Physical Society

Superconducting gap in LiFeAs from three-dimensional spin-fluctuation pairing calculations¹ YAN WANG, ANDREAS KREISEL, PETER HIRSCHFELD, Department of Physics, University of Florida, Gainesville, FL 32611, USA, VOLODYMYR ZABOLOTNYY, SERGEY BORISENKO, BERND BÜCHNER, Leibniz-Institute for Solid State Research, IFW-Dresden, D-01171 Dresden, Germany, THOMAS MAIER, Center for Nanophase Materials Sciences and Computer Science and Mathematics Division, Oak Ridge National Laboratory, Oak Ridge, TN 37831-6494, USA, DOUGLAS SCALAPINO, Department of Physics, University of California, Santa Barbara, CA 93106-9530, USA — The lack of nesting of Fermi-surface sheets in the Fe-based superconductor LiFeAs, with a T_c of 18 K, has led to questions as to whether the origin of superconductivity in this material might be different from other Fe-based superconductors. Here we present calculations of the superconducting gap and pairing in the random-phase approximation using Fermi surfaces derived from ARPES. The gaps obtained are qualitatively different from previous 2D theoretical works and in good agreement with ARPES on the main Fermi-surface pockets. We analyze the contributions to the pairing vertex thus obtained and show that the scattering processes between electron and hole pockets still dominate the pairing as in other Fe-based superconductors despite the lack of nesting, leading to gaps with anisotropic s_{\pm} structure.

¹P.J.H., Y.W., and A.K. were supported by Grant No. DOE DE-FG02-05ER46236. V.B.Z., S.V.B. and B.B. acknowledge support under Grants No. ZA 654/1-1, No. BO1912/2-2, and No. BE1749/13.

Yan Wang
Department of Physics, University of Florida, Gainesville, FL 32611, USA

Date submitted: 14 Nov 2013

Electronic form version 1.4