Abstract Submitted
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Effective doping and suppression of Fermi surface reconstruction via Fe vacancy disorder in $\mathbf{K}_x\mathbf{Fe}_{2-y}\mathbf{Se}_2$[1] TOM BERLIJN, PETER J. HIRSCHFELD, University of Florida, WEI KU, Brookhaven National Laboratory — We investigate[1] the effect of disordered vacancies on the normal-state electronic structure of the newly discovered alkali-intercalated iron selenide superconductors. To this end we use a recently developed Wannier function based method[2] to calculate from first principles the configuration-averaged spectral function $\langle A(k,\omega)\rangle$ of $K_{0.8}Fe_{1.6}Se_2$ with disordered Fe and K vacancies. We find that the disorder can suppress the expected Fermi surface reconstruction without completely destroying the Fermi surface. More interestingly, the disorder effect raises the chemical potential significantly, giving enlarged electron pockets similar to highly doped KFe_2Se_2, without adding carriers to the system. [1] T. Berlijn, P. J. Hirschfeld, and W. Ku, Phys. Rev. Lett. 109, 147003 (2012) [2] T. Berlijn, D. Volja and W. Ku, Phys. Rev. Lett. 106, 077005 (2011)

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