Abstract Submitted
for the MAR16 Meeting of
The American Physical Society

Magnetic penetration depth in disordered iron-based superconductors[1] ALEX LEVCHENKO, University of Wisconsin-Madison, MAXIM DZERO, Kent State University , MAXIM KHODAS, Hebrew University of Jerusalem, ALEX KLIRONOMOS, American Physical Society, MAXIM VAVILOV, University of Wisconsin-Madison — We study the effect of disorder on the London penetration depth in iron-based superconductors. The theory is based on a two-band model with quasi-two-dimensional Fermi surfaces, which allows for the coexistence region in the phase diagram between magnetic and superconducting states in the presence of intraband and interband scattering. Within the quasiclassical approximation we derive and solve Eilenberger's equations, which include a weak external magnetic field, and provide analytical expressions for the penetration depth in the various limiting cases. A complete numerical analysis of the doping and temperature dependence of the London penetration depth reveals the crucial effect of disorder scattering, which is especially pronounced in the coexistence phase. The experimental implications of our results are discussed.

[1]NSF-DMR-1401908, NSF-DMR-1506547, NSF-DMR-0955500, BSF-2014107

Alex Levchenko
University of Wisconsin-Madison

Date submitted: 31 Oct 2015 Electronic form version 1.4