

Abstract Submitted
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Effect of pseudogap formation on the penetration depth of underdoped high T_c cuprates K.A.G. FISHER, E.J. NICOL, University of Guelph, J.P. CARBOTTE, McMaster University, J.P.F. LEBLANC, University of Guelph — The temperature-dependent penetration depth is calculated over the entire doping range of the cuprate phase diagram with emphasis on the underdoped regime. Pseudogap formation on approaching the Mott transition, for doping below a quantum critical point, is described within the YRZ model [1]. Fermi surface reconstruction is found to have a strong effect on the superfluid density at $T = 0$ producing a sharp drop in magnitude, but does not change the slope of the linear low temperature variation. Comparison with recent data on Bi-based cuprates provides validation of the theory and shows that the effects of correlations, captured by Gutzwiller factors, are essential for a qualitative understanding of the data. We compare our results with those for the Fermi arc and the nodal liquid models.

[1] K.Y. Yang, T.M. Rice and F.C. Zhang, Phys. Rev. B 73, 17541 (2006).

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