

Abstract Submitted
for the MAR06 Meeting of
The American Physical Society

Real-Space Picture of the Cooper Pair ALAN M. KADIN, Princeton Junction, NJ 08550 — The Cooper pair is generally analyzed in momentum space, but its real-space structure also follows directly from the BCS theory. From this viewpoint [1], a Cooper pair consists of a spherical quasi-atomic wavefunction of radius $\sim \pi\xi_0$ for both electrons, with radial nodes separated by π/k_F . An induced commensurate quasi-static charge modulation in the underlying lattice provides the interaction potential, similar to that in the simple BCS approximation, which leads to a bound state. This picture can be generalized for alternative pairing symmetries (p or d-wave) as well as alternative pairing mechanisms (excitonic or spin-based) and extended to disordered superconductors. While it does not derive essentially new physics, this real-space approach may provide a more heuristic picture for developing and understanding new phenomena in superconductivity. [1] A.M. Kadin, <http://www.arxiv.org/abs/cond-mat/0510279>

Alan M. Kadin
Princeton Junction, NJ 08550

Date submitted: 11 Nov 2005

Electronic form version 1.4