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Understanding the Protected Nodes and the Fermi Arcs in the Cuprate Superconductors[1] QIJIN CHEN, K. LEVIN, University of Chicago — We address a recent analysis of photoemission data which elucidates the superconducting phase of the underdoped cuprates. We first present a simple phenomenological approach to the spectral function which shows how the d-wave order parameter symmetry results in protected nodes, which, above T_c broaden into Fermi arcs; this "protection" is associated with superconducting coherence rather than reduced thermal broadening. A microscopic theory, consistent with this phenomenology, is presented. It reconciles the observations that the excitation gap below T_c is temperature independent while the superfluid density necessarily vanishes at T_c.
Reference: Q.J. Chen, K. Levin, and I. Kosztin, Phys. Rev. B **63**, 184519 (2001).

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