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Protected nodes and the collapse of the Fermi arcs in high T_c cuprates AMIT KANIGEL, U. CHATTERJEE, Department of Physics, University of Illinois at Chicago, M. RANDERIA, Department of Physics, Ohio State University, Columbus, M.R. NORMAN, Materials Science Division, Argonne National Laboratory, S. SOUMA, M. SHI, Department of Physics, University of Illinois at Chicago, Z.Z. LI, Laboratorie de Physique des Solides, Universite Paris-Sud,France, H. RAFFY, Laboratorie de Physique des Solides, Universite Paris-Sud, France, J.C. CAMPUZANO, Department of Physics, University of Illinois at Chicago — Angle resolved photoemission studies on underdoped samples of $Bi_2Sr_2CaCu_2O_{8+\delta}$ reveal that the superconducting gap's magnitude and anisotropy remain unchanged up to T_c. Above T_c, the nodes of the d-wave gap abruptly expand into finite length Fermi arcs. As this change occurs within the resistive width of the transition, we argue that the Fermi arcs are not simply thermally broadened nodes, but rather a unique signature of the pseudogap phase. This is in contrast to BCS theory, which predicts a gap with fixed anisotropy that changes with temperature and disappears above T_c.

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