

Abstract Submitted
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Breakup of superconducting order parameter into 2 subbands of Cooper pairs increases temperature range of fluctuations in the pseudogap phase FU-CHUN ZHANG, Department of Physics, Zhejiang University, Hangzhou 310027, China, YE-HUA LIU, Theoretische Physik, ETH Zurich, 8093 Zurich, Switzerland, ROBERT KONIK, Condensed Matter Physics and Material Science Department, Brookhaven National Laboratory, Upton, NY 11973, THOMAS MAURICE RICE, Theoretische Physik, ETH Zurich, 8093 Zurich, Switzerland — The opening of the pseudogap in underdoped cuprates breaks up the Fermi surface, into 4 disconnected arcs centered on the nodal directions. In the superconducting phase, the d-wave order parameter breaks up into 2 subbands of Cooper pairs along (1,1) and (1,-1), with strong intra-subband and weak inter-subband couplings. This multiple-band superconductivity allows a low-energy Leggett mode to emerge due to phase fluctuations between the subbands. We propose that the overdamped Leggett mode is responsible for the highly unusual wide temperature range of superconducting fluctuations observed in the c-axis infrared conductivity in the pseudogap phase.

Ye-Hua Liu
ETH - Hoenggerberg

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