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Direct test of pairing fluctuations in the pseudogap phase of an underdoped cuprate JEROME LESUEUR, NICOLAS BERGEAL, MARCO APRILI, BRIGITTE LERIDON, UPR5-CNRS ESPCI 10 rue Vauquelin 75005 Paris (France), GIANCARLO FAINI, LPN-CNRS Route de Nozay, 91460 Marcoussis (France), JEAN PIERRE CONTOUR, UMR Thales-CNRS Route departementale 128, 91767 Palaiseau Cedex (France) — In underdoped cuprates, many experiments have provided evidence for the presence of a gap-like structure in the electronic excitations spectrum, in a region above the critical temperature and below a characteristic temperature T^* . The origin of this so-called pseudogap is still hardly debated and the answer to this question turns out to be essential for the understanding of high- T_c superconductivity. One doesn't know if the pseudogap is related to superconductivity or to an order in competition. In the former case, it has been suggested that superconducting pairing fluctuations may be responsible for the partial suppression of electronic excitations. This remains to be tested experimentally, but most of the probes used to investigate the pseudogap are not sensitive to pairs and therefore cannot provide such a test. Here, we report for the first time on a direct test of pairing fluctuations in the pseudogap regime using a Josephson-like experiment. Our results shows that fluctuations survive only in a restricted range of temperature close to T_c ($T - T_c < 15\text{K}$), and therefore cannot be responsible for the opening of the pseudogap at high temperature.

Jerome Lesueur
UPR5-CNRS ESPCI 10 rue Vauquelin 75005 Paris (France)

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