

Abstract Submitted
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Long range proximity effect in High Tc Josephson NanoJunctions: a quantitative study JEROME LESUEUR, NICOLAS BERGEAL¹, Physique Quantique, LPEM-CNRS-ESPCI, 10 Rue Vauquelin, 75231 Paris, France, MARCO APRILI, LPS-Universite Paris Sud, Bat 510, 91 405 Orsay Cedex, France, TAKIS KONTOS, LPA ENS, 24 rue Lhomond, 75005 Paris, France, MARTIN SIRENA, Physique Quantique, LPEM-CNRS-ESPCI, 10 Rue Vauquelin, 75231 Paris, France, GIANCARLO FAINI, LPN-CNRS, Route de Nozay, 91460 Marcoussis, France, JEAN-PIERRE CONTOUR, UMR-CNRS/THALES, Route N128, 91120 Palaiseau, France — Proximity effect (PE) between a superconductor S and a normal metal N has been a powerful tool to study conventional superconductors. In High Tc (HTc) compounds, low quality interfaces and poor Fermi wave-vector match with most of metals considerably reduce the PE, and make really difficult its study. We have designed Josephson NanoJunctions in which two S reservoirs are coupled through an N layer at a nanoscale, where N is a lightly disordered HTc, whose Tc has been reduced by ion irradiation. In these SNS junctions, Cooper pairs propagate through the N layer by PE. In this situation with no metallurgical interfaces within the same material, we have shown that a long range PE takes place, which can be quantitatively described by the diffusive Usadel equations. The Josephson coupling temperature can be computed. The role of the order parameter symmetry will be also discussed.

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