Please proofread this information

You submitted the following abstract information for the APS March 2000.

Tunneling study of dynamic pair-breaking by spin-polarized quasiparticle injection in high-T_c superconducting thin films

John Y. T. Wei (Department of Physics, University of Toronto), Nai-Chang Yeh (Department of Physics, California Institute of Technology), Chu-Chen Fu (Department of Physics, California Institute of Technology), Richard P. Vasquez (Jet Propulsion Laboratory, California Institute of Technology),

Studies of how spin-polarized quasiparticles can suppress high-T_c superconductivity have recently become possible by injecting currents from a lattice-matched layer of perovskite half-metallic ferromagnet into a high-T_c thin film. We report on tunneling studies of epitaxial heterostructures comprising superconducting YBa_2Cu_3O_{7-elta} (YBCO) and ferromagnetic La_{0.7}A_{0.3}MnO_{3} (A=Ca,Sr). Samples with nonmagnetic LaNiO_3 underlayers were also measured as a control without spin-polarization. Scanning tunneling spectroscopy was used to directly probe the quasiparticle density-of-states in YBCO under the injection of spin-polarized currents. The tunneling spectra observed at 4.2K were consistent with d-wave pairing symmetry, which appeared to be invariant under the injection. The spectral evolution was non-thermal in character, indicating pair-enhancement at low injection and pair-suppression at high injection, as well as quasielectron/quasihole branch-imbalance, consistent with the formation of a nonequilibrium quasiparticle distribution. These results enabled an estimate of the spin diffusion length and spin relaxation time in YBCO, and provide microscopic evidence for dynamic pair-breaking by spin-polarized quasiparticle injection in high-T_c thin films.

Presentation type: Oral
Sorting category: 5.4 Electronic Structure and Spectroscopic Properties

Submitter: John Y. T. Wei
Submitting Member ID: 60021028
submitting member email address: wei@physics.utoronto.ca
Submitting Member affiliation: Department of Physics, University of Toronto

Email address[1]: wei@physics.utoronto.ca
Email address[2]: ncyeh@caltech.edu
Email address[3]: andy@its.caltech.edu
Email address[4]: richard.vasquez@jpl.nasa.gov
CategoryType: E
Subtitle: Jointly supported by NSF, NASA and Connaught Fund; work done at Caltech.

If the information is correct, press the "Submit" button below. If the information is *not* correct, please use the **Back** button on your browser to return to the input form and correct the problem.

Do **NOT** press the submit button more than once or multiple copies of the abstract will be entered in the system.