

Abstract Submitted
for the MAR09 Meeting of
The American Physical Society

Quasi-reentrant resistive behavior in $\text{Bi}_2\text{Sr}_2\text{CaCu}_2\text{O}_x$ whiskers¹

SEVDA AVCI, Northern Illinois University, UMESH PATEL, SUHONG YU, Argonne National Laboratory, Northern Illinois University, ZHILI XIAO, RALU DIVAN, ULRICH WELP, WAI-KWONG KWOK, Argonne National Laboratory, MILIND KUNCHUR, University of South Carolina — BSCCO (2212) whiskers were fabricated via a melt-quench-growth method and their morphology was characterized with scanning/transmission electron microscopy and atomic force microscopy. Four-probe magneto-transport measurements were conducted as a function of temperature and current. In low magnetic fields and currents, the resistance decreases monotonically and vanishes at a temperature of ~ 80 K. However, at large currents and magnetic fields the resistance shows a non-monotonic dependence on temperature, even showing values that are higher than the normal state resistance for certain ranges of the parameters. We attribute the observed behavior to the brick-wall morphology of the whiskers leading to a competition between normal and superconductive tunnelings that is known to take place in granular superconductive systems.

¹This work is supported by the US Department of Energy, under Award DE-FG02-06ER46334 and contract DE-AC02-06CH11357.

Sevda Avci
Northern Illinois University

Date submitted: 21 Nov 2008

Electronic form version 1.4