Abstract Submitted
for the MAR07 Meeting of
The American Physical Society

Dynamics of a current-biased $Bi_2Sr_2CaCu_2O_{+d}$ surface intrinsic[1]

SHAOXIONG LI, WEI QIU, SIYUAN HAN, Department of Physics and Astronomy, University of Kansas, Y. F. WEI, X. B. ZHU, C. Z. GU, S. P. ZHAO, Beijing National Laboratory for Condensed Matter Physics, Institute of Physics, Chinese Academy of Sciences, H. B. WANG, National Institute for Materials Science, Tsukuba, Japan — The dynamics of switching from superconducting to voltage state of a current-biased $Bi_2Sr_2CaCu_2O_{+d}$ surface intrinsic Josephson junction is studied by measuring the temperature-dependent switching current distributions at temperatures ranging from 15 mK to 4.8 K. Crossover from phase diffusion to Kramers switching and thermal activation to quantum tunneling have been observed. Quantitative analysis indicates that the dynamics of a single high T_c Josephson junction can be described very well by theories whose predictions have been confirmed by experiments performed on low T_c Josephson junctions. Our result aslo indicate that the d-wave order parameter symmetry has no observable effect on the dynamics of $Bi_2Sr_2CaCu_2O_{+d}$ surface intrinsic Josephson junctions where current is along c-axis of the crystal.

[1]The work at University of Kansas was supported in part by the NSF Grant No. DMR-0325551 and AFOSR Grant No. F49620-01-1-0439. The work at the Institute of Physics was supported by the NSF of China and the Ministry of Science and Technology of China

Shaoxiong Li
Department of Physics and Astronomy, University of Kansas

Date submitted: 03 Dec 2006 Electronic form version 1.4