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Anomalous Current-Voltage Characteristics of Submicron High-T_c Superconducting Wires[1] P. MORALES, M. DICIANO, J.Y.T. WEI, Department of Physics, University of Toronto — We report anomalous non-linearities in the superconducting current-voltage characteristics of submicron $YBa_2Cu_3O_{7-\delta}$ wires. Submicron-wide and 100μm-long samples were fabricated using a chemical-free technique based on selective epitaxial growth. Both current-biased and voltage-biased measurements were made between 4.2 K and T_c, using pulsed signals to minimize Joule heating. S-shaped non-linearities were observed under voltage-biasing and sharp discontinuities were observed under current-biasing, in striking agreement with phase-slip phenomenology established for low-T_c superconductors in quasi-1D geometries. For our quasi-2D high- T_c wires, these observations indicate the formation of phase- slip lines transverse to the current.

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