Abstract Submitted
for the MAR05 Meeting of
The American Physical Society

Superconducting ultra narrow Al nanowires FABIO ALTOMARE, ALBERT M. CHANG, Dept. of Physics, Purdue Univ., West Lafayette, IN, Dept. of Physics, Duke Univ., Durham, NC, MICHAEL R. MELLOCH, School of Electrical and Computer Engineering, Purdue Univ., West Lafayette, IN , YUGUANG HONG, CHARLES W. TU, Dept. of Computer and Electrical Engineering, UCSD, La Jolla, CA — We have successfully developed a technique[1,2] for the fabrication of nanowires, of width comparable or smaller to 10 nm, using the $(1\bar{1}0)$ plane of a narrow MBE-grown ridge as a template. These wires are formed with direct connections to 4 terminal measurement pads. The versatility and reliability (yield exceeding 75%) in the fabrication process, together with the small lateral size achievable, makes this technique uniquely suited for the study of diverse physical phenomena in nanowires composed of a variety of materials. In particular we have characterized AuPd wires as long as 20 μm and Al wires with length exceeding 10 μm. The Al wires superconduct at low temperature despite having a normal state resistance much greater than the superconducting quantum resistance($= \hbar/4e^2$). We will discuss the observed behavior of the normal-superconducting transition in applied magnetic field and the Current-Voltage characteristics of these wires. This work has been supported by NSF DMR 0135931 and 0401648.

[1]F. Altomare *et al.*,*March Meeting 2001*
[2]F. Altomare *et al.*,*March Meeting 2004*

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Date submitted: 22 Dec 2004 Electronic form version 1.4