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Gate Controlled Negative Differential Resistance and Photoconductivity Enhancement in Carbon Nanotube Intra-connects SEON WOO LEE, Electronic Imaging Center at NJIT and the Electrical and Computer Engineering Department, New Jersey Institute of Technology (NJIT), Newark, NJ 07102, SLAVA ROTKIN, Physics Department and CAMN, Lehigh University, Bethlehem, PA 18015, ANDREI SIRENKO, Physics Department, New Jersey Institute of Technology (NJIT), Newark, NJ 07102, HAIM GREBEL, Electronic Imaging Center at NJIT and the Electrical and Computer Engineering Department, New Jersey Institute of Technology (NJIT), Newark, NJ 07102 — Field effect transistors were fabricated using carbon nanotubes (CNT). Gate-controlled, N-shaped negative differential resistance (NDR) has been demonstrated. In addition, a large photoconductance effect was associated with the NDR. The intra-connects – bridges spanning across planar electrodes and contain individual tube or in a small bundle – were grown using chemical vapor deposition (CVD) precisely between very sharp metal tips on the pre-fabricated electrodes. NDR was observed for intra-connects exhibiting either, ohmic or, non-ohmic contacts. Yet, the enhanced photoconductivity was more pronounced for intra-connects exhibiting ohmic contact at zero gate bias.

Seon Woo Lee
New Jersey Institute of Technology

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