MAR08-2007-002726

Abstract for an Invited Paper
for the MAR08 Meeting of
the American Physical Society

Nanoelectromechanical switches

MARC BALDO, MIT, Department of Electrical Engineering and Computer Science

Power dissipation is perhaps the most important problem confronting the electronics industry. To address this issue, we investigate vertical nanoelectromechanical (NEM) switches suitable for complementary logic, reconfigurable interconnects, and static power management. NEM switches have the following advantages: (i) Near elimination of source-drain static tunneling losses, (ii) Improved subthreshold characteristics [1]– allowing lower operating voltage and hence lower dynamic power dissipation, (iii) Ability to run at much higher temperatures than Si-based CMOS. Our approach employs a carbon nanotube-based relay. We have prototyped this approach by inserting a tube into an etched gap between two contacts. Using a nanopositioner to align the tube, the prototype has demonstrated multiple switching at 5V. We will characterize this device and also integrated NEM switches.

[1] Ghosh, A. W., Rakshit, T. & Datta, S. Gating of a molecular transistor: Electrostatic and Conformational. Nano Letters 4, 565-568 (2004).