Abstract Submitted
for the MAR10 Meeting of
The American Physical Society

Characterization of aligned single walled carbon nanotube high frequency devices[1] ANDREW TUNNELL, VINCE BALLAROTTO, VINOD SANGWAN, ELLEN WILLIAMS, University of Maryland — Parallel arrays of single-walled carbon nanotubes (CNTs) grown on quartz substrates have been incorporated into field effect transistors (FETs) that exhibit effective mobilities of 3000 cm^2/Vs and conductances as high as $800\mu S$. To decrease the transistor switching time, parasitic capacitances have been reduced by minimizing gate source/drain overlap and the channel resistance has been decreased by increasing the density of CNTs and decreasing the channel length. Initial measurements on simple amplifiers using these optimized FETs show switching times less than 100 ns, a significant improvement from 100 μs with the previous device geometry. The high frequency performance of these devices will be presented. When patterned thin films of iron are used as the growth catalyst, aligned CNTs grow away from the catalyst area and dense random networks of CNTs grow in the regions where the iron was deposited. Devices using these dense random networks as source/drain electrodes will be compared with traditional metallic source/drain electrodes.

[1]Work supported by the Center for Nanophysics and Advanced Materials, Dept. of Physics, University of Maryland, and the Laboratory for Physical Science, College Park, MD.

Andrew Tunnell
University of Maryland

Date submitted: 27 Nov 2009 Electronic form version 1.4