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Atomic-scale and electronic structure of double-walled carbon nanotubes. KYLE RITTER, NOUREDDINE TAYEBI, JOSEPH LYDING, Beckman Institute for Advanced Technology, University of Illinois, Urbana-Champaign — Ultra-high vacuum scanning tunneling microscopy (STM) and spectroscopy have been used to elucidate the electronic and atomic-scale structure of double-walled carbon nanotubes[1] (DWNTs) on the Si(100) 2x1:H surface. Atomically clean DWNT-surface interfaces were facilitated by an *in situ* deposition method[2] which enables simultaneous resolution of the DWNT chirality and surface atomic structure. A key result includes the observation of periodic 2.7 nm spatial modulation superimposed on the nanotube chirality at both positive and negative scanning biases for a 2 nm diameter semiconducting DWNT. The periodic modulation of the DWNT topography suggests the lattices of the inner and outer nanotubes produce an interference pattern depending on the relative alignment of the constituent carbon atoms. Experimental data (diameter, chiral angle, and local density of state measurements) will be supplemented with simulated STM images which illustrate subtle changes in the outer nanotube topography depending on the inner nanotube chirality. 1. DWNTs synthesized by Nanocyl (www.nanocyl.com) 2. P.M. Albrecht and J.W. Lyding. Appl. Phys. Lett. 83, 5029 (2003).

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