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Bending and Twisting of Suspended Single-Walled Carbon Nanotubes in Solution ARTHUR BARNARD, School of Applied and Engineering Physics, Cornell University, YA-QIONG XU, Department of Electrical Engineering & Computer Science, Vanderbuilt University, PAUL MCEUEN, Laboratory of Atomic and Solid State Physics, Cornell University — We combine suspended, aligned carbon nanotube transistors with optical trapping techniques and scanning photocurrent microscopy to investigate the mechanics of suspended single-walled carbon nanotubes as well as DNA-nanotube systems in solution. We study the movement of nanotubes by monitoring their photocurrent images and measure their thermal fluctuations by imaging microbeads that are tightly attached to nanotubes by single-stranded DNA. By analyzing thermal fluctuations of these microbeads and by using optical tweezers we are able to obtain the torsional and bending stiffness of nanotubes and then calculate their diameters. We can also measure, with subangstrom resolution, the effective attachment point of the microbead to the nanotube.

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