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Resonant Tunneling at Carbon Nanotube Telescope Junctions YOUNG-WOO SON, MARVIN L. COHEN, STEVEN G. LOUIE, Dept. of Physics, UC Berkeley and Material Science Division, LBNL, Berkeley, CA 94720 — We present a first-principles study of the quantum conductance of carbon nanotube 'telescope' junctions. The junctions consist of two partially overlapping concentric metallic or semiconducting carbon nanotubes. The quantum conductance of the open system is calculated using a newly developed scattering state approach [1] combined with *ab initio* electronic structure calculations. Localized states associated with the edges of each nanotube are found to contribute resonant tunneling channels and the resulting conductance spectra are very sensitive to the adsorption of gaseous particles. The spin-dependent conductances of semi-metallic $(3n, 0)$ nanotube telescope junctions will also be discussed. This work was supported by NSF Grant No. DMR04-39768 and by the Director, Office of Science, Office of Basic Energy Sciences, Division of Materials Sciences and Engineering, U.S. Department of Energy under Contract No. DE-AC03-76SF00098. Computational resources have been provided by NPACI.

[1]Hyoung Joon Choi, Marvin L. Cohen, and Steven G. Louie, *to be published*

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