

Abstract Submitted
for the MAR06 Meeting of
The American Physical Society

Modulation of Luttinger liquid exponents in multi-walled carbon nanotubes J. GONZALEZ, E. PERFETTO, Instituto de Estructura de la Materia (CSIC), Madrid, Spain, S. BELLUCCI, P. ONORATO, Laboratori Nazionali di Frascati (INFN), Frascati, Italy — We develop a theoretical framework that applies to the intermediate regime between the Coulomb blockade and the Luttinger liquid behavior in multi-walled carbon nanotubes [1]. We show that, in the crossover regime, the tunneling conductance follows a power-law behavior as a function of the temperature, with an exponent that oscillates with the gate voltage as observed in the experiments. We also evaluate the effects of a transverse magnetic field on the transport properties of the multi-walled nanotubes. For fields of the order of 4 T, we already find important changes in the band structure of the outer shells. We then predict the appearance of sensible modulations in the exponent of the conductance for higher magnetic fields, as the different subbands are shifted towards the formation of flat Landau levels. [1] S. Bellucci, J. Gonzalez and P. Onorato, Phys. Rev. Lett. 95, 186403 (2005).

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Date submitted: 28 Dec 2005

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