Abstract Submitted
for the MAR06 Meeting of
The American Physical Society

**Magnetic field effects in double-walled carbon nanotubes** ANDREA LATGE, Universidade Federal Fluminense, DANIEL GRIMM, Leibiniz Institute of Dresden, MAURO FERREIRA, Trinity College - Dublin — Double-wall carbon nanotubes (DWCNs) are coaxial two-tube systems which are now considered very important from their mechanical and electronic properties. They may be achieved, for instance, by peapod-derived methods or synthetized by pulsed arc dicharge processes. The distance between both cilinders are quite the same of the one found between carbon planes in graphite structures, and the correspondent inter-tube electronic interactions (van der Waals energies) are also much inferior than the electronic correlation within each single tube. Here we present a theoretical discussion of electronic and transport properties of a particular family of DWCNs named commensurate structures of the armchair (n,n)@(2n,2n) and zigzag (n,o)@(2n,0) types. Emphasis is given on the role played by the geometrical aspects of the tubes and the relative atomic positions on the local density of states and conductance of the systems. We investigate the origin of the conductance suppression and the possibility of founding Aharonov-Bohm effects in the double walled carbon when applying a magnetic field along the axial direction. The field is theoretically described by following the Peierls approximation into the hopping energies and by adding a Zeeman energy in the diagonal term of the tight-binding Hamiltonian. This should be interesting not only for the basic understanding of DWCNs but also to allow a characterization upon their responses under external fields.

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Date submitted: 11 Dec 2005 Electronic form version 1.4