

Abstract Submitted  
for the MAR06 Meeting of  
The American Physical Society

**Numerical Results for SU(4) and SU(2) Kondo Effect in Carbon Nanotubes** GEORGE MARTINS, Department of Physics, Oakland University, Rochester, MI 48309, CARLOS BUSSER, Condensed Matter Sciences Division, Oak Ridge National Laboratory, Oak Ridge, Tennessee, 37831 — New numerical results are presented for the Kondo effect in Carbon Nanotube (CNT) quantum dots (QDs). As recently reported by P. Jarillo-Herrero *et al.* (Nature **434**, 484 (2005)), the Kondo effect in CNTs presents an SU(4) symmetry, which arises from the entanglement of orbital and spin degrees of freedom. As the number of co-tunneling processes increases, thanks to the extra (orbital) degree of freedom, the Kondo temperature reaches a high value of  $T_K = 7.7K$ . Interesting considerations can be drawn regarding the change from SU(4) to SU(2) symmetries depending on the hopping matrix elements between the leads and the CNT QD. Our results will analyze the transition between the SU(4) and the so-called two-level SU(2) (2LSU(2)) Kondo regimes induced by the variation of the coupling of the QD to the leads. The effect of an external magnetic field along the tube direction will also be analyzed. Our results will be compared with available Numerical Renormalization Group (NRG) results by M-S Choi *et al.* (Phys. Rev. Lett. **95**, 067204 (2005)). A comparison with the experimental results will be made to gauge the adequacy of the model and approximations made.

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Date submitted: 28 Nov 2005

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