Abstract Submitted for the MAR05 Meeting of The American Physical Society

Transport properties of small Quantum rings in the Kondo regime C.A. BÜSSER, Department of Physics, University of Tennessee and ORNL, E. DAGOTTO, S. ULLOA, Department of Physics and Astronomy, Ohio University, E.V. ANDA, Pontificia Universidade Católica do Rio de Janeiro, Brazil — The possibility to construct small rings of few electrons give rise to a different physics effects.¹ In such systems the transport properties of quantum dots are combined with electronic interference phenomena as the Aharonov-Bohm. In this work a small quantum ring, where the Coulomb repulsion between electrons U and the magnetic flux Φ are important energies scales, is studied as a function of the gate potential applied to the ring. This model can resemble all the possible effects as Kondo physics, Aharanov-Bohm effect and the degeneracy between states k and -k. For T = 0 the Kondo effect is present and the valley between the Coulomb peaks are fullfilled when the total charge in the ring is odd. However, there is an special case for the Coulomb blockade peak corresponding to a gate potential where the states kand -k are degenerated. We found that the system still in the Kondo regime even for an even charge due a S = 1 ring's state.² When Φ is applied the degeneracy is broken destroying the S = 1 state and eliminating the Kondo effect.³ 1- A. Fuhrer et al, Phys. Rev. Lett. 93 176803 (2004). 2- C.A. Büsser et al, cond-mat/0404426, to appears in Phys.Rev. B. 3- C.A. Büsser, S. Ulloa, E. Dagotto and E.V. Anda (preprint).

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