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NRG study of field induced crossover from SU(4) to SU(2) Kondo state in a carbon nanotube quantum dot YOSHIMICHI TERATANI, AKIRA OGURI, Department of Physics, Osaka City University, RUI SAKANO, The Institute for Solid State Physics, the University of Tokyo, MEYDI FERRIER, Laboratoire de Physique des Solides, CNRS, Université Paris-Sud, Université Paris Saclay, TOKURO HATA, TOMONORI ARAKAWA, KENSUKE KOBAYASHI, Department of Physics, Osaka University — We study Fermi-liquid properties of carbon nanotube quantum dot in the Kondo regime, using numerical renormalization group(NRG) method with a multi-orbital Anderson impurity model. Carbon nanotube quantum dot has orbital and spin degrees of freedom which give an variety to the Kondo effect. For instance, the SU(4) Kondo effect which is caused by the combination of these degrees of freedom has been observed[1]. Recently, a new type of crossover from SU(4) to SU(2) Kondo state evolving in magnetic field has been observed by transport measurements. This crossover can be explained by the fact that the two levels among four still remain near the Fermi level due to a matching between the orbital and spin Zeeman splitting. We have examined the low-energy Fermi-liquid behavior, which gradually varies as magnetic field increases[2]. The Fermi-liquid parameters such as renormalization factor continuously decrease from the SU(4) value to the SU(2) value. These results indicate that the electron correlation is significantly enhanced as symmetry lowers to the SU(2). [1] M. Ferrier, T. Arakawa, K. Kobayashi, *et al*, Nat. Phys. Lett. **12**, 230 (2016). [2] Y. Teratani, M. Ferrier, *et al*, J. Phys. Soc. Jpn. **85**, 094718 (2016)

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