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Suppression mechanism of inter-tube transfer in double-wall carbon nanotubes SEIJI URYU, TSUNEYA ANDO, Department of Physics, Tokyo Institute of Technology — Double-wall carbon nanotubes have incommensurate lattice structure and are quasi-periodic[1,2]. Therefore, inter-tube transfer of electrons between incommensurate tubes is the key to understanding of double-wall tubes. Although some theoretical studies reported suppression of inter-tube transfer in multiwall tubes[3], the mechanism has not been well understood. The purpose of this paper is to clarify effects of inter-tube transfer in double-wall tubes. Using a tight-binding model length-dependence of conductance due to inter-tube transfer is calculated. The conductance is negligibly small in comparison to the conductance quantum and oscillates around an average which is approximately independent of the length. It is revealed based on the first-order perturbation theory that the result is attributed to quasi-periodic oscillation of position dependence of small local effective inter-tube coupling. [1] M. Kociak, K. Suenaga, K. Hirahara, Y. Saito, T. Nakahira, and S. Iijima, Phys. Rev. Lett. **89** (2002) 155501. [2] J. M. Zuo, I. Vartanyants, M. Gao, R. Zhang, and L. A. Nagahara, Science **300** (2003) 1419. [3] Y.-G. Yoon, P. Delaney, and S. G. Louie, Phys. Rev. B **66** (2002) 073407.

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