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Exciton Distribution between the Bright and Dark States in Single Carbon Nanotubes Studied by Magneto-Photoluminescence Spectroscopy RYUSUKE MATSUNAGA, KAZUNARI MATSUDA, YOSHIHIKO KANEMITSU, Institute for Chemical Research, Kyoto University — We have performed micro-photoluminescence (PL) spectroscopy for single carbon nanotubes under magnetic fields at various temperatures. Sharp PL spectra of single carbon nanotubes allow us to directly observe the dark exciton PL peak a few meV below the bright exciton PL peak due to the Aharonov-Bohm effect [1]. From the PL intensity ratio of the dark to the bright excitons under magnetic fields, we found that the non-equilibrium (non-Boltzmann) distribution occurs between the bright and dark states, because phonons cannot scatter excitons between the two states with different parities [2]. Furthermore, we discuss the diameter dependence of the exciton population of the bright and dark states in single carbon nanotubes. [1] R. Matsunaga, K. Matsuda, and Y. Kanemitsu, Phys. Rev. Lett. **101**, 147404 (2008). [2] V. Perebeinos, J. Tersoff, and Ph. Avouris, Nano Lett. **5**, 2495 (2005).

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