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Pressure-Induced Metal-Insulator Transition in Single-Walled Carbon Nanotubes LI LU, Institute of Physics, Chinese Academy of Sciences, J. Z. CAI, W. J. KONG, H. W. ZHU, C. ZHANG, B. Q. WEI, D. H. WU, FENG LIU — The resistance of single-walled carbon nanotube (SWNT) bundles was studied under combined extreme conditions of high pressure (up to 10 GPa), low temperature (down to 2 K) and strong magnetic field (up to 12 T). A pressure-induced metal-insulator transition was found to occur at $\sim$ 1.5 GPa, across which the temperature and field-dependent functional forms of the resistance changes dramatically. The transition pressure of $\sim$ 1.5 GPa correlates closely with the structural phase transition of SWNT under pressure. In the insulator phase, the magnetoresistance of the samples shows typical behaviors of two-dimensional electron weak localization, presumably reflecting the coherent hopping processes of the electrons in the collectively flattened plane of the SWNTs bundles.

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