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Magnetization of Finite Carbon Nanotubes R.-B. CHEN, Center for General Education, National Kaohsiung Marine University, C.-P. CHANG, Center for General Education, Tainan Woman's College of Arts and Technology, J.-S. HWANG, Department of Physics, National Cheng Kung University, F.-L. SHYU, Department of Physics, Chinese Military Academy, M.-F. LIN, Department of Physics, National Cheng Kung University — Magnetoelectronic properties of finite carbon nanotubes (CN's) are studied for any field direction. Energy gap and agnetization are strongly affected by the nanotube geometries (length, radius; boundary structure), the magnitude and the direction of the magnetic field, the Zeeman effect, and the temperature. Geometric structures determine electronic structures and magnetic properties, which, thus, leads to three types of energy gaps and induced magnetic fields. The critical angle, which corresponds to the change of magnetism, exists in armchair CN's, but not in zigzag CN's. It also depends on the length and the radius. Finite CN's are very different from infinite CN's in the strength of magnetic response and the critical angle. The Zeeman splitting could induce the conductor- metal transition, the drastic change in magnetization, and the gigantic paramagnetic response for all zigzag CN's. The predicted results are observable even at room temperature.

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