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**Electronic structure of carbon nanotube under extreme shear strains** SEON-MYEONG CHOE, SEUNG-HOON JHI, Department of Physics, Pohang University of Science and Technology, Pohang 790-784 — Deformation such as stretching, compression, torsion, or bending is known to change the electronic properties of carbon nanotubes in a controlled manner. Previous studies [1,2] provided details of such behavior based on understanding at linear response regimes. We have studied the electronic and optical properties of zigzag single-walled carbon nanotubes (SWNTs) at extreme shears. It is found that a certain type of small-radii semiconducting SWNTs can have an indirect band gap while other types exhibit armchair-like metallic characteristics. These behaviors can be understood in terms of electronic states in the twisted Brillouin zone of a single graphene layer with an appropriate folding constraint. We briefly discuss a possible application of these phenomena. [1] C. L. Kane and E. J. Mele, Phys. Rev. Lett. 78, 00193(1997). [2] Liu Yang and Jie Han, Phys. Rev. Lett. 85, 154, (2000).

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