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**Optical transitions of small-diameter carbon nanotubes** TAKASHI KORETSUNE, KOICHIRO KATO, SUSUMU SAITO, Tokyo Institute of Technology — The optical properties for most of carbon nanotubes have been well understood based on the band structure of graphene with some curvature effects. In small-diameter nanotubes, however, it is well known that the curvature drastically affects the electronic structures. Thus, to clarify the optical properties of these small-diameter tubes from first principles, we theoretically study all the small-diameter nanotubes including chiral ones using the density-functional theory, and predict the absorption and emission properties within the single-particle picture. It is found that the wavefunction that originates from M point in the hexagonal Brillouin zone of the graphene plays an key role to understand the optical properties of small-diameter nanotubes.

Takashi Koretsune  
Tokyo Institute of Technology

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