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Electromagnetic Properties of the Graphene Layered Medium

By

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Abstract

In this study, we investigate the nonlocal optical properties of the periodic lattice of graphene layers with the period much less than the wavelength. Based on the effective medium model, strong nonlocal effects are found in a broad frequency range for TM polarization, where the effective permittivity tensor exhibits the Lorentzian resonance. The resonance frequency varies with the wave vector and coincides well with the polaritonic mode. Nonlocal features are manifest on the emergence of additional wave and the occurrence of negative refraction. By examining the characters of the eigenmode, the nonlocal optical properties are attributed to the excitation of plasmons on the graphene surfaces.

Biography

Prof. Ruey-Lin Chern received his PhD. degree in Applied Mechanics from National Taiwan University in 1991. He was an Assistant Researcher in Chung-Shan Institute of Science and Technology from 1992 to 2002. From 2002 to 2004, he was a Postdoctoral Fellow in Institute of Physics, Academia Sinica. In 2004, he joined National Taiwan University as an Assistant Professor in Institute of Applied Mechanics, and became Professor in 2011. In 2006, he received the best paper contribution award from the Center on Nanostorage Research at National Taiwan University. In the summer of 2007, he was a Visiting Associate in Department of Mechanical Engineering, California Institute of Technology. In 2009 and 2014, he received the excellent teaching award at National Taiwan University. His current research interests are in the area of nanophotonics, which includes photonic crystals, plasmonic structures, and electromagnetic metamaterials as major research topics.

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