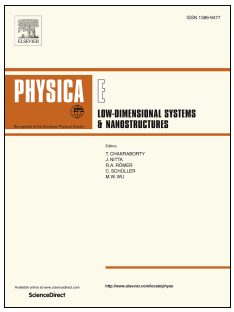
Accepted Manuscript



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PII: S1386-9477(18)31047-6

DOI: 10.1016/j.physe.2018.08.016

Reference: PHYSE 13261

To appear in: *Physica E: Low-dimensional Systems and Nanostructures*

Received Date: 17 July 2018

Revised Date: 26 August 2018

Accepted Date: 29 August 2018

Please cite this article as: E.I. Kukhar, Effect of high-frequency electromagnetic radiation on the plasmon dispersion in biased graphene bilayer, *Physica E: Low-dimensional Systems and Nanostructures* (2018), doi: 10.1016/j.physe.2018.08.016.

Effect of high-frequency electromagnetic radiation on the plasmon dispersion in biased graphene bilayer

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Abstract

The Floquet spectrum of electron in biased graphene bilayer subjected to the high-frequency electromagnetic radiation has been derived. The magnitude of gap in electron spectrum renormalized by radiation has been calculated. The quasienergy gap has been shown to increase with electromagnetic wave intensity. The possibility of controlling of curvature of dispersion curve for plasmon by changing of both bias voltage and high-frequency field intensity has been shown. The dependence of this curvature on both bias voltage and electromagnetic field amplitude has been predicted to have the nonmonotonous character. Intensity of electromagnetic radiation causing the suppression of the plasma oscillations has been found.

Keywords: graphene bilayer, Floquet spectrum, plasma oscillations, plasmon

1. Introduction

Modern achievements in solid state physics [1] and in the field of optoelectronics [2] enable the manipulation of electronic properties of different condensed-matter structures with a high-frequency (HF) electromagnetic (EM) field. The technology using the time-dependent driven (ac-driven) quantum systems is known as Floquet engineering [3]. The aim of the Floquet engineering is to find the unique exploitable features of the solid structures strongly coupled to EM

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