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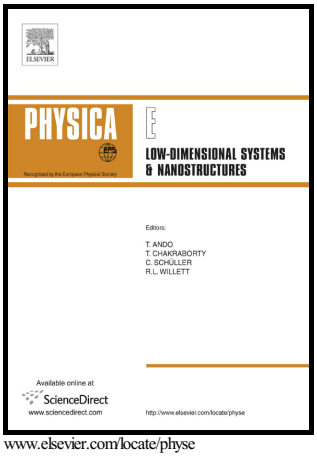

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Temporal evolutional absorption behaviors of graphene under Landau quantization

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Abstract

We investigate the evolutional absorption behaviors of Landau- quantized graphene structure based on the transient solution to the density matrix equations of the motion. The impact of various system parameters on temporal evolution of probe absorption is studied. In addition, the required times for switching the high- absorption case to the zero- absorption (transparency) of a probe field is discussed. Due to unusual optical and electronic characteristics of graphene resulting from linear, massless dispersion of electrons near the Dirac point and the chiral character of electron states, our study may have potential applications in telecommunication, biomedicine, and optical information processing and may cause significant impact on technological applications.

Keywords: Transient evolution; Switching time; Graphene.

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1. Introduction

In the past few decades, comprehensive research in the area of quantum and nonlinear optics has led to considerable attention in the study of optical response of the atomic system interacting with a number of coherent fields. Due to many limitations for practical applications in two- level traditional systems, researchers are more interested in multi-level configurations. An additional field probing another excitation path can lead to an induced coherence to the system. The induced coherence can lead to various quantum optical effects