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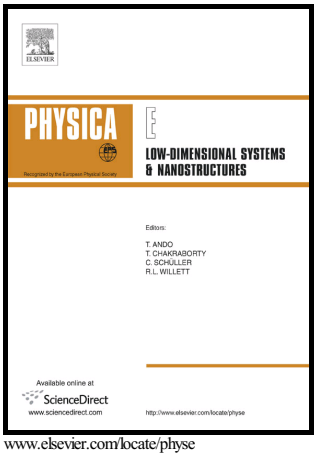

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PLASMONIC AMBIENT LIGHT SENSING WITH MoS_2-GRAPHENE HETEROSTRUCTURES

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Abstract

We present experimental results on plasmonic photodetection of ambient light using MoS_2-graphene heterostructures illuminated with three very-low-power light emitting diodes (LEDs) radiating in blue, green, and red, respectively. The working principle of this photodetector validates the recent predictions of hot-carrier plasmonic doping of MoS_2. The obtained responsivity for each spectral domain is in agreement with photopic standards of the luminosity function. The response time of the detector is less than the eye blinking time.

1. Introduction

Sensing ambient light is deeply involved in our daily life. It can be encountered, for example, in automatic brightness control, automatic turn-off in any touch-screen display, including that of mobile phones, or automatic activation of keypad lightning and screen brightness adjustments in laptops. The application list is very long, involving almost all consumer electronics products such as digital cameras, television, printers, games and automotive applications. A good survey of photonic sensors is found in [1], while the applications of sensing ambient light are detailed in [2].