

**DTU Library** 

## **Tuning of light-graphene interactions**

Xiao, Sanshui

Publication date: 2015

Document Version Publisher's PDF, also known as Version of record

Link back to DTU Orbit

Citation (APA): Xiao, S. (2015). Tuning of light-graphene interactions. Abstract from 2015 Progress In Electromagnetics Research Symposium, Prag, Czech Republic.

## **General rights**

Copyright and moral rights for the publications made accessible in the public portal are retained by the authors and/or other copyright owners and it is a condition of accessing publications that users recognise and abide by the legal requirements associated with these rights.

- Users may download and print one copy of any publication from the public portal for the purpose of private study or research.
- You may not further distribute the material or use it for any profit-making activity or commercial gain
- You may freely distribute the URL identifying the publication in the public portal

If you believe that this document breaches copyright please contact us providing details, and we will remove access to the work immediately and investigate your claim.

## Tuning of light-graphene interactions

## Sanshui Xiao<sup>1,2</sup>

<sup>1</sup>Department of Photonics Engineering, Technical University of Denmark, DK-2800 Kongens Lyngby,
Denmark

<sup>2</sup>Centre for Nanostructured Graphene (CNG), Technical University of Denmark, DK-2800 Kongens Lyngby, Denmark

Abstract— Graphene opens up for novel optoelectronic applications thanks to its high carrier mobility, ultra-large absorption bandwidth, and extremely fast material response. In particular, the opportunity to control optoelectronic properties through Fermi-level tuning enables electro-optical modulation, optical-optical switching, and other optoelectronics applications. Except for the statistic gating and chemical doping, the Fermi level of graphene can also be optically tuned. With the aid of external optical pumping, electrons can be excited in the substrate, then move to the graphene layer, leading to the electrical doping in graphene. In this talk, I will firstly discuss how the graphene property changes when applying the optical pumping with different incident power. Then I will discuss graphene-silicon microring devices with having a high modulation depth and with a relatively low bias voltage. Finally, I will discuss a novel hybrid graphene-metal system for studying light-matter interactions with gold-void nanostructures exhibiting resonances in the visible range. The hybrid system is further explored for sensing of Rhodamine 6G molecules with respect to the strong surface-enhanced Raman scattering.