Departamento de Física de Materiales

SEMINARIO

How and why to excite plasmons in graphene

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MIÉRCOLES 18 DE JUNIO A LAS 12:00

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Surface plasmon polaritons (for short, plasmons) have, compared to usual propagating light, a much shorter wavelength. This opens the door to nano-optical applications otherwise inhibited by the diffraction limit of conventional optics.

Recently, the possibility to use graphene for plasmonic devices received considerable attention [1,2]. In comparison to conventional conductors, graphene offers unique possibilities for tuning its plasmonic properties. However, an efficient method to excite propagating graphene plasmons for the use in integrated, scalable devices is so far still lacking. Trying to overcome this problem, we proposed a method to couple light into graphene plasmons by periodically deforming an extended graphene sheet with electrically generated surface acoustic waves [3].

In this talk, we would like to give a brief review about graphene plasmonics, its possible applications, about the different methods used so far in the generation of graphene plasmons, and explain our novel approach [3].

[1] F.H.L. Koppens, D.E. Chang, and F.J. García de Abajo, Graphene Plasmonics: A Platform for Strong Light–Matter Interactions, Nano Letters 11, 3370 (2011).

[2] T. Low and P. Avouris, Graphene Plasmonics for Terahertz to Mid-Infrared Applications, ACS Nano 8, 1086 (2014).

[3] J. Schiefele, J. Pedrós, F. Sols, F. Calle and F. Guinea, Coupling Light into Graphene Plasmons through Surface Acoustic Waves, PRL 111, 237405 (2013).