

Chez Pierre

Presents ...

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MIT Room 4-331



Chez Pierre Seminar

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"Graphene plasmonics: opportunities and open questions"

The development of nanophotonics depends on our ability to confine and control light at scales much smaller than the wavelength of light. One, and perhaps the only viable path towards this goal, is to use surface plasmons - collective excitations of electrons and light at the interface of a conductor and a dielectric. Graphene plasmons became a very hot topic of research in the nanophotonic community due to their strong confinement of light [1], the possibility of electronic control [2-4], via design of patterned structures [2], their existence in the broad frequency domain (THz to mid-IR and possibly higher) [5], and potentially smaller losses than in the previously used systems [1]. They have been experimentally observed by numerous spectroscopic techniques (e.g. see [5] and Refs. therein), and notably by nanoimaging [3,4]. There are numerous opportunities for applications in optical sensing and electro-optic modulation, light harvesting, nonlinear optics etc. which provide considerable drive to the field [2-5]. There are also challenges to be discussed: one of them being our understanding of plasmon losses [6].

[1] M. Jablan, H. Buljan, and M. Soljačić, Phys. Rev. B 80, 245435 (2009).

[2] H. Yan et al., Nature Nanotechnology 7, 330 (2012).

[3] Z. Fei et al., Nature 487, 82 (2012).

[4] Y. Chen et al., Nature 487, 77 (2012).

[5] M. Jablan, M. Soljačić, and H. Buljan, Proceedings of the IEEE 101, 1689 (2013).

[6] M. Jablan, M. Soljačić, and H. Buljan, Phys. Rev. B 89, 085415 (2014).