

## Plasmonic Figures of Merit in a Doped Graphene Sheet Materials



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"Dirac" plasmons are self-sustained density oscillations that occur in a doped graphene sheet. These collective modes have recently attracted enormous experimental interest for their potential use in plasmonic circuits. In this talk I will discuss the two most important figures of merit of 'graphene plasmonics', namely the ratio between the Dirac plasmon wavelength and the illumination wavelength, and the Dirac plasmon damping rate. More precisely, I will first discuss the fundamental properties of the Dirac plasmon dispersion, highlighting the main differences with respect to plasmons in ordinary two-dimensional parabolic-band electron liquids. I will then emphasize the subtle difference between plasmon lifetime and Drude transport scattering time. Finally, I will present a theoretical framework that allows to calculate in a fully microscopic fashion Dirac plasmon damping rates due to electron-electron, electron-impurity, and electron-phonon collisions.

Thursday, May 15, 2014  
2-3 pm  
Hermann Haus Room, 36-428  
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