

凝聚态物理-北京大学论坛

2016年第05期 (No. 368 since 2001)

Progress in Graphene Plasmonics

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时间: 3月31日 (星期四) 15:00—16:30

地点: 北京大学物理大楼中212教室

摘要: Graphene holds great promise for ultra-compact and electronically controlled plasmonics. Recently, resonant coupling of propagating THz waves to plasmons in micro-ribbons has been demonstrated, while IR near-field microscopy has been applied to observe the coupling of graphene plasmons to phonons. In our work we use scattering-type scanning near-field optical microscopy (s-SNOM) to visualize propagating and localized infrared plasmon modes in graphene nanostructures in real space. By spectroscopic imaging we measure the graphene plasmon wavelength λ_p as a function of excitation wavelength, which confirms the theoretically predicted plasmon dispersion. We observe that the plasmon wavelength $\lambda_p = \lambda_0/40$ is remarkably reduced compared to the illumination wavelength λ_0 , which can directly be attributed to the two-dimensionality and unique conductance properties of graphene. Furthermore, we demonstrate tunability of the plasmon wavelength by gating graphene nanoribbons on a SiO₂ substrate. The possibility to tune plasmons of extreme subwavelength electronically opens up a new paradigm in optical and opto-electronic telecommunications and information processing.

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