Max-Planck-Institut für Struktur und Dynamik der Materie

Max Planck Institute for the Structure and Dynamics of Matter

Monday, November 21st 2016 - 14:00
CFEL Seminar room V (Bldg. 99)

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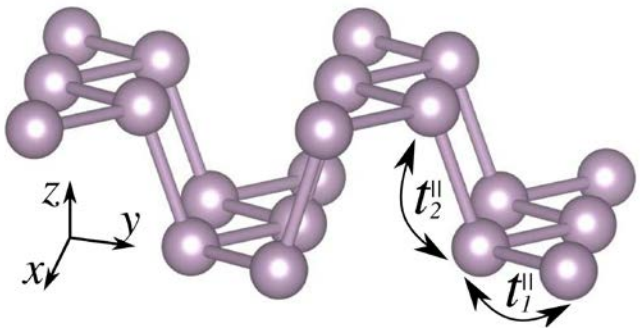
Some aspects of intrinsic electron-photon interaction in black phosphorus

Flexural and in-plane thermal fluctuations in crystalline membranes affect the band structure of the carriers, which has an effect on transport properties as well as carrier density of states of 2D systems. I consider a specific example of one-layer black phosphorus, which is a highly anisotropic material, and present our recent results on intrinsic carrier mobility. In contrast to graphene, where the mobility is determined by two-phonon (flexural) scattering, in black phosphorus one-phonon (in-plane) processes dominate. I also will show the results on DOS tail for holes in black phosphorus that have quasi-one-dimensional dispersion (my /mx » 1) and, as a result, an enhanced Van Hove singularity at the valence band top. Interaction with flexural phonons results in smearing of this singularity and to an appearing of a tail in DOS in the gap. The material parameters are determined by ab initio GW calculations and then are used for quantitative estimation of the above-mentioned effects.



Host: Angel Rubio

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