Westfälische Wilhelms-Universität Münster

Fachbereich Physik

› Allgemeines Physikalisches Kolloquium

› Donnerstag, 12.01.2017 um 16 Uhr c.t.

Prof. Dr. Annick Loiseau

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Structure and spectroscopic properties of 2D materials beyond graphene with a focus on Boron nitride and Black Phosphorus

This lecture will first introduce general features on graphene and 2D materials, which motivate the considerable attention this new class of materials is receiving since about ten years. We shall in particular consider the promising electronic and optical properties of these materials which turned to depend on the number of layers and on the nature of the layer stacking and to be dominated by unusual electron-hole interactions resulting in non trivial excitonic effects.

We shall then focus on two particular examples: on one hand hexagonal boron nitride (h-BN), which is a wide band gap semiconductor (~ 6.5 eV), with sp^2 hybridation, which meets a growing interest for deep UV LED and graphene and 2D materials engineering and on the other hand, P(black) thin layers, which have recently raised interest for their original semi-conducting properties, such as tunable direct bandgap and high carrier mobilities. We will examine the interplay between structure and spectroscopic properties of both BN and Black Phosphorus (P(black)) mechanically exfoliated layers, using cathodoluminescence (CL) at 4K, Raman spectroscopy, HRTEM and angular resolved Electron Energy Loss Spectroscopy (EELS) using a monochromated Libra 200 TEM-STEM at low tension. In the case of h-BN, we will show in particular how the spectroscopic properties can be the basis for defining a characterization metrics for h-BN. In the case of Black Phosphorus, we will first show how we have understood and solved the problem of its degradation under ambient conditions and how thanks to this knowledge, we can investigate basic properties of this material as the gap dependence on the number of layers.

Kolloquiums-Kaffee
ab 16 Uhr vor dem Hörsaal

Wilhelm-Klemm-Straße 10
Institutsgruppe 1 Hörsaal HS 2

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