

物理工学談話会 11月19日 (火)) 午後13:30~

会場：総合研究棟W701 世話人：レービガー ハンネス

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Few Challenges in Electronic Properties of Two-Dimensional Materials beyond a Single-Layer Graphene Sheet

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Future nanoscale technological applications in electronics require research on two-dimensional materials with exceptional transport and magnetic properties. In this talk we review recent advances in electron-related problems beyond monolayer graphene. First, we discuss on the properties of gapless states in gated bilayer graphene induced by the change between AB and BA stackings, states that have a topological origin but are here investigated from an atomistic point of view [1]. We then investigate transition metal dioxides in the form of layers, and we report on their distortions and magnetism, focusing on the quest for intrinsic magnetic semiconductor layers [2]. When time allows, we shall talk on pursuing the expansion of 2D materials searching for semiconductors properties by considering compounds isoelectronic to phosphorene as CS layers [3].

[1] W Jaskólski, M Pelc, GW Bryant, L Chico, A Ayuela. Controlling the layer localization of gapless states in bilayer graphene with a gate voltage. 2D Materials 5 (2), 025006 (2018).

[2] F Aguilera-Granja, A Ayuela. Magnetism and Distortions in Two-Dimensional Transition-Metal Dioxides: On the Quest for Intrinsic Magnetic Semiconductor Layers. The Journal of Physical Chemistry C (doi.org/10.1021/acs.jpcc.9b06496) (2019).

[3] T Alonso-Lanza, F Aguilera-Granja, JW González, A Ayuela. Stable carbon monosulfide nanostructures: Chain arrays and monolayers. Physical Review Materials 1 (2), 024001 (2017).