# Intra- and interlayer optical transitions at K points of multilayers of transition metal dichalcogenides

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We study the optical transitions in **K** valleys of few-layer 2H stacked transition metal dichalcogenide (TMDC) crystals encapsulated in hBN medium. The description of such processes is based on the effective Hamiltonians derived as an extension of the 7-band **kp** model for a multilayer case [1,2]. The Hamiltonians are considered up to quadratic in momentum **k** terms to incorporate the magnetic field effects in TMDC [3,4].

We focus on the bi- and trilayers as the simplest representatives of even- and odd-layered systems. The classification of their bands and eigenstates in **K** points is done with respect to the crystals' symmetry (bilayer possesses an in-plane mirror symmetry, while trilayer has an inverse symmetry). It allows to define the two types of optical transitions in TMDC -- intra- and interlayer ones, and obtain the optical selection rules for both cases. The latter is used to analyze the behaviour of excitons (which are formed due to above-mentioned transitions) in the presence of magnetic field. We examine the optical spectra of both systems, demonstrate the good agreement between theory and experiment and extract the model parameters of few-layer TMDC.

Finally, we discuss the experimental manifestations of intra- and interlayer excitons in few-layer TMDC.

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