

## Temperature dependence of 2D MoS<sub>2</sub> photoconductivity.

*Saturday, 13 November 2021 13:00 (5 minutes)*

Photoelectric properties of a two monolayer thick (indirect-gap) MoS<sub>2</sub> flake with lateral Ag contacts on a SiO<sub>2</sub>/Si substrate were studied. Photocurrent spectra were obtained with AC technique using a lock-amplifier at temperatures from 10 to 290 K. Apart from a band due to Si substrate, a contribution of MoS<sub>2</sub> reveals in the spectra as a broad background of band-to-band transitions and sharp peaks of A and B excitons originating from a spin-orbital split of the valence band. An increase of the exciton contribution with temperature is observed, being followed by a decrease above 110 K. Above 200 K, the exciton peaks transfer to valleys on the background originated from band-to-band transitions. The temperature increase of integral A and B exciton photoresponse with temperature is analyzed in terms of thermal dissociation of the excitons. The exciton binding energy of 680 meV was estimated from the exponential part of temperature dependency.

### Topics

Session A. Physics of condensed matter and spectroscopy

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