

Resonant Raman Scattering in Transition Metal Chalcogenides

Graphene has already been hailed as the future of electronics. Built of six-atom carbon rings arranged in a honeycomb-like structure, it forms extremely resilient sheets just a single atom thick. However, we do know of other materials that have a similar, layered structure. Importantly, some of them, such as transition metal dichalcogenides (TMDs), have properties just as intriguing as those of graphene.

The observation and recent achievements of the Applicant pave the way to the proposed study. It is proposed to study light - matter interactions in thin layers of TMDs in order to get insight into the electronic structure of those materials. The studies will be focused on resonant Raman scattering of light in the crystal. The resonant Raman effect provides valuable information not only on the dynamics of the crystal lattice but also on the electron excitations in the crystal.

In this project it is proposed to set off to uncharted area of excited electronic states. The modulation of the electronic energy structure by means of temperature and pressure will allow to get important information on the excitons in TMDs.