

Spin relaxation in transition metal dichalcogenide monolayers and heterostructures



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The report will present the latest results on the processes of spin relaxation in heterostructures based on the molybdenum and tungsten diselenides and its alloys. Different optical methods of the studying spin relaxation in TMDC monolayers will be highlighted. Van der Waals heterostructures based on the transition metal dichalcogenide monolayers are new promising objects of research in semiconductor physics. By choosing the material of semiconductor layers, the mutual orientation of the crystallographic axes of different layers and the distances between them, the optical transition energy and the lifetime of photoexcited states can be varied over a wide range, which allows engineering of various photoelectric devices based on them. The complex structure of the spin sublevels associated with the presence of several degenerate valleys and strong spin-valley interaction requires separate study of the dynamics of the spin degrees of freedom of charge carriers in such heterostructures.

The career of Prof. Roman Cherbunin was started from the studying the spin relaxation of electrons in a gallium arsenide heterostructures. As a student he has constructed in St.Petersurg State University one of the first experimental laser pump-probe Kerr rotation setups and has defended his Mr. Sc. in 2006 based on the results obtained on this setup. As a Ph.D.-student, Roman Cherbunin started to actively collaborate with the laboratory of Prof. M. Bayer in Technical University of Dortmund, Germany, where he was involved in the research of carrier and nuclear spin relaxation processes in semiconductors. After the PhD defence, he took a one-year postdoc position in TU-Dortmund where he continued these studies. Now Dr Roman Cherbunin is working in St. Petersburg State University as an associate professor. He lectures on the electronic properties of semiconductors for 4th year students. His research interests include the processes associated with the spins of electrons and nuclei in semiconductors, diluted magnetic semiconductors, quantum dots of narrow-gap materials, and the role of spin relaxation in the life activity of living organisms.

Time: June 10th, 2019, 11:00a.m.-12:00p.m.

**Host: Dr. Stella Kutrovskaya, International Center
for Polaritonics**

Venue: Room 709, 7th Floor, Build 4, Yunqi Campus