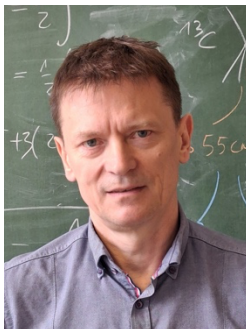
Dresden University of Technology

Faculty of Physics

PHYSICS COLLOQUIUM

Speaker:

Prof. Eduard Lavrov
Institut für Angewandte Physik,
TU Dresden



Topic:

The physics of imperfection: Defects in semiconductors
Research Introduction

Time and place:

Tuesday, June 23, 2026, **2:50 pm** – hybrid event
The colloquium will be held in REC/C213.
Online participation possible:
Zoom-Meeting: Meeting-ID: 674 4304 6840 / passcode: PC-SoSe26
https://tu-dresden.zoom-x.de/j/67443046840?pwd=QAEHLWawl2P3iDmQToOSHhNYgu3Fzz.1

Host:

Dean of the Faculty of Physics, Prof. Gesche Pospiech

Abstract:

In initial courses on solid-state physics, the concept of an ideal crystal is introduced in which each atom occupies a certain place. This, however, is an idealization that is very far from reality. There are no ideal crystals. Already in the early stages of the solid-state research, it was established that defects often have a profound effect on their physical properties. The very existence of semiconductor electronics is based on the ability to control both the magnitude and type of electrical conductivity by introducing small additions of chemical impurities that have the properties of shallow donors or acceptors. This presentation will focus on one of the most technologically important and scientifically fascinating impurities—hydrogen—which has been a central theme of our research for more than two decades. Depending on the host material, hydrogen may passivate defects and enhance semiconductor performance, while in other cases it may constitute a major obstacle preventing otherwise promising materials from reaching their full technological potential. Particular attention will be devoted to hydrogen-related donors, molecular hydrogen species, their ortho-para transitions, photodissociation processes, and the phase transition of a two-dimensional hydrogen "gas" confined within platelets. The discussion will encompass a variety of semiconductors, including Si, Ge, GaAs, and ZnO.

Bio:

Education: 1984–1990: Moscow Institute of Physics and Technology (MIPT); 1994 Ph.D. (Doctoral Thesis); Dissertation: *Fine Structure of the Photoluminescence Spectra of Excitons Bound to Isoelectronic Centers in Silicon* Supervisor: Prof. Alexander Kaminskii; 2006 Habilitation (Doctor of Sciences), Thesis: *Optical Spectroscopy of Hydrogen and Carbon Centers in Semiconductors* Professional Experience: 1992–2006 Research Staff Member

Institute of Radioengineering and Electronics, Russian Academy of Sciences; 1997–1999 Postdoctoral Research Fellow Aarhus University, Denmark Host: Prof. Brian B. Nielsen; 2000–2001: As a Alexander von Humboldt Research Fellow joined Prof. Jörg Weber's group to establish the Chair of Semiconductor Physics; Since 2001 Research Staff Member TUD Dresden University of Technology, Germany.