

## SEMINARIUM RENTGENOWSKIE

Dnia 21.09.2018 r. o godz. 10.00, w sali 203 Instytutu Fizyki PAN, odbędzie się seminarium rtg., na którym **dr Rada Savkina i dr Oleksii Smirnov z V. Lashkaryov Institute of Semiconductor Physics, National Academy of Science of Ukraine**, wygłoszą referat na temat:

### "A review of recent research on multifunctional composite structures with their applications"

Summary:

Solid state composite structures are currently receiving significant interest and becoming one of the most attractive topics in the interdisciplinary fields of nanoscience and nanotechnology, surface and material science, bioscience and bioengineering, etc. Composites systems, combined from inorganic constituents in different ways, are gaining increasing attention because of their intriguing fundamental physics at the nanoscale level. That's why the search for compositional materials with novel functionality is one of the most challenging projects. The creation of such materials is now possible with a high degree of complexity because of impressive developments in these technologies. As a result, new compositional material will have characteristics which unexpectedly differ from parent constituents. It will allow the integration of several key functions in a single structure and more complex properties for the new devices.

We want to present our latest achievements in the field of creating composite structures using methods that use high-energy fluxes to affect the semiconductor surface. In our report, the latest advances in the field of sonochemistry as well as ion implantation and laser deposition methods of the solid-state composites systems formation will be discussed. In particular:

- ✓ ultrasonically stimulated formation of the nanostructured  $\text{Si/SiO}_2/(\text{CaSiO}_3)$  composite demonstrating strong optical emission in the visible spectral range and biocompatibility;
- ✓ composite produced by ion implantation, which integrates the nanostructured ternary compound (HgCdTe) with metal-oxide ( $\text{Ag}_2\text{O}$ ) inclusions and extends the spectral sensitivity region of the basic semiconductor of IR technology to the MM range;
- ✓ oxide-based composite system of the alternate layers characterized by a close coupling of magnetization and polarization properties (such as transitional metal oxides  $\text{Fe}_2\text{O}_3$ ,  $\text{Cr}_2\text{O}_3$ ) for the new class of sensing multifunctional devices which can be controlled not only by magnetics or electric fields but also by light.

Prof. dr hab. Krystyna Jabłońska