Conference program

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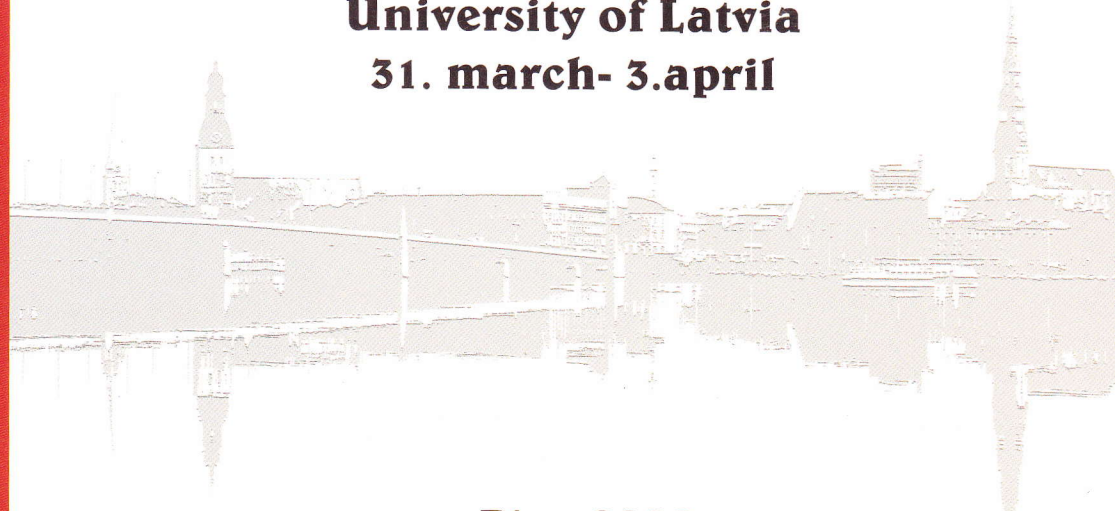
International Baltic Sea Region conference

FM&NT

# Functional materials and nanotechnologies 2009

Institute of Solid State Physics
University of Latvia
31. march- 3.april



Riga 2009

# WELCOME

The Organizing Committee kindly welcomes you to the International conference "Functional materials and nanotechnologies" **FM&NT-2009**. The conference is organized in co-operation with projects **ERANET "MATERA", National Research programme in Materials Science of Latvia** and **COST Action MP0701 "Composites with Novel Functional and Structural Properties by Nanoscale Materials (Nano Composite Materials-NCM)"**.

The purpose of the conference is to bring together scientists, research staff, engineers, and students from universities, research institutes and related industrial companies aware in the field of advanced material science and materials technologies trends and future activities.

**Scientific themes are following:**

- Advanced organic and inorganic materials for photonics, energetics and nanoelectronics
- Theory and modelling
- Perspective biomaterials and medicine technologies
- Development of technologies for design of nanostructured materials, nanoparticles, and thin films
- Design of nanocomposites and development of their technologies

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The Organizing Committee sincerely hopes that the Conference will give all the participants new insights into the wide spread development of functional materials and nanotechnologies and will enhance the circulation of information released at the meeting.

On behalf of FM&NT-2009 organizers thank you all for coming and we wish you most successful and enjoyable Conference.

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# INORGANIC NANOPARTICLE – MOLECULAR COMPLEX (CAPSID) ASSEMBLY

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It is well-known that Hepatitis B virus core protein (HBc) assembles into non-infective virus-like particles (VLPs) after expression in bacteria, yeast, and eukaryotic cell lines. HBc particles are widely used as a most efficient VLP carrier for foreign epitopes to expose the latter on the outer VLP surface. Moreover, HBc is able to pack foreign molecules. By packing of therapeutic molecules, HBc VLPs could be used as potential carriers (lorries) for recognition and treatment of cells. We supposed that a local increase of HBc VLP concentration could give rise to more evident biological manifestations, e.g. for antigenicity and immunogenicity of VLPs. For this reason the adherence of HBc VLPs to Si and SiO2 nanoparticles was studied. HBc VLPs were mixed with the inorganic nanoparticles and co-interaction was tested by changes in absorption spectra (measurements were performed on UV/VIS spectrophotometer), as well as by electron microscopy. The calibration experiments showed the linearity in extend of the optical absorbance as a function of ratio of HBc VLPs to inorganic nanoparticles. The calibration curves for SiO2 and for n- and p - Si semiconductors were obtained. Our experiments show that HBc VLPs adhere to p - Si and to SiO2. In the future the structure as well as the functional properties of such complexes of biological and inorganic nanoparticles will be studied in detail.