

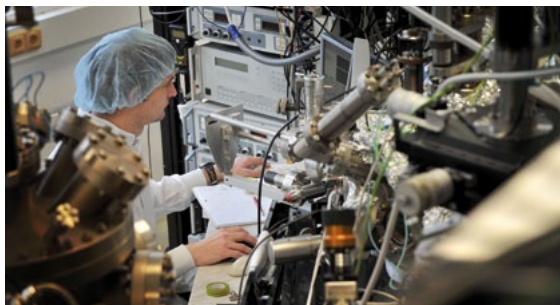
## INSTITUTE CONTACT



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## THEMATIC RESEARCH FOCUS

### RESEARCH AREA

Nanotechnologies and nanoscience covering materials and functional structures suitable for nanoelectronics and nanophotonics, generally. The research consider semiconductor nanostructures, metallic and magnetic nanostructures, nanotubes and nanowires, supramolecular structures and novel nanoelectronic circuits.

### EXCELLENCE

- » Preparation and analysis of nanostructures for applications in nanotechnology and biosensors
- » Deposition of magnetic and nonmagnetic thin films
- » Development of analytical and measurements method

### MISSION

- » Creation of a centre of excellence in the field of nano and microtechnology

## DEVELOPED TECHNOLOGIES

### CONTENT OF RESEARCH

- » Fabrication of nanostructures by "bottom-up" methods
- » Fabrication of nanostructures by "top-down" methods (nanolithography)
- » Investigation of the functional properties of nanostructures
- » The development of submicron devices and nanostructures
- » The development of analytical and measurement methods

### MAIN CAPABILITIES

- » Acquiring the methods for the fabrication of a wide range of metallic,

semiconducting and dielectric structures, including their functional combinations

- » Understanding the basic principles of nanostructures, discovering their specific properties and finding their correlation with geometrical/ structural parameters of nanostructures and operational parameters
- » Design and realization of final products as advanced materials, nanostructures, nanodevices and systems with applications in electronics, photonics, (bio)sensing, etc.
- » The development of the techniques and methods for microscopy, analysis and metrology of nanomaterials and nanostructures. The newly developed, or at least extended or upgraded methods will be, as a rule, offered to manufacturers, including domestic ones. Some parts of the research will be performed as contractual or collaborative research with manufacturers
- » New diagnostic and therapeutic applications
- » The development of novel small molecules. Understanding molecular mechanisms involved in RNA surveillance and gene regulation mechanisms that occur at the RNA level

### FIELDS OF RESEARCH RESULTS APPLICATION

- » Nanotechnology
- » Nanostructure properties
- » Magnetism
- » Spintronics
- » Plasmonics
- » Coatings, sensors

## NUMBER OF RESEARCH POSITIONS

### SENIOR RESEARCH STAFF

44

### JUNIOR RESEARCH POSITIONS (INCL. PH.D. STUDENTS)

116



## KEY RESEARCH EQUIPMENT ↘

### LIST OF DEVICES

#### Nanofabrication (Core Facility)

- » E-Beam Lithography, Photolithography
- » Chemical and Thermal Processing
- » Deposition
- » Etching
- » Packaging and Testing
- » Design and Simulation

#### Nanocharacterisation (Core Facility)

- » Electrical and Magnetical Measurements
- » X-ray Analysis
- » Microscopy/Analysis
- » Nanolithography and Nanomanipulation
- » Optical Characterization
- » Fabrication and in situ Characterisation I - II
- » Experimental PECVD

#### Other Technology Units

- » Confocal Microscopy
- » Metrology
- » NMR and Mass Spectrometry
- » Micromechanical/Morphology Testing
- » Tomography
- » Molecular Chemistry and Bioelectrochemistry
- » Electrical and Thermal Properties of Nanomaterials

## BUDGET ↘

### TOTAL (MIL. CZK/ MIL. EUR)

65 / 2.6

### PART OF THE TOTAL BUDGET FROM PRIVATE RESOURCES (%)

5

### PART OF THE TOTAL BUDGET FROM FOREIGN RESOURCES (%)

10

## MAIN PROJECTS ↘

**2007-2011:** Functional hybrid nanosystems of semiconductors and metals with organic materials (FUNS) (project KAN400100701 financed by the programme Nanotechnologies for Society, Academy of Sciences of the Czech Republic)

**2006-2011:** Structures for Nanophotonics and Nanoelectronics (project LC06040 financed by the Ministry of Education, Youth and Sports)

**2008-2010:** Multifunctional Nanomaterials Characterisation Exploiting Elipsometry and Polarimetry (project 218570 financed by the 7th Specific RTD Programme - Cooperation)

## MAIN COLLABORATING PARTNERS ↘

### COLLABORATION WITH ACADEMIC PARTNERS

- » Institut für Angewandte Physik, Vienna University of Technology (Vienna, AT)
- » Elettra Synchrotron Light Laboratory (Trieste, IT)
- » Max-Planck-Institut für Eisenforschung (Düsseldorf, DE)
- » University of Cologne (Cologne, DE)
- » Technische Universität Wien (Vienna, AT)
- » Geballe Laboratory of Advanced Materials, Stanford University (Stanford, US)
- » Imperial College London, United Kingdom of Great Britain and Northern Ireland (London, GB)
- » University of Fribourg, (Fribourg, CH)
- » Max Planck Institute for Solid State Research (Stuttgart, DE)
- » Institute of Physics, Academy of Sciences of the Czech Republic (Prague, CZ)
- » Department of Macromolecular Physics, Faculty of Mathematics and Physics, Charles University in Prague (Prague, CZ)
- » Centre for Nanomaterials Research, Faculty of Science, Palacky University Olomouc (Olomouc, CZ)

### COLLABORATION WITH COMPANIES

- » FEI Czech Republic (Brno, CZ)
- » ON Semiconductor Czech Republic (Brno, CZ)
- » Tescan (Brno, CZ)
- » Vakuum Praha (Prague, CZ)
- » DIGITAL PRO (Prague, CZ)
- » BVT Technologies (Brno, CZ)

## EXPECTATIONS ↘

### REQUIREMENTS

- » Partners for FP7 research project in the field of nanotechnology
- » Company contribution in basic research and PhD. work
- » Partners for utilization of nanotechnology research outputs

### OFFERS

- » Expertise in nanotechnology
- » Surface analysis
- » Preparation and analysis of nanostructures
- » Equipment utilization