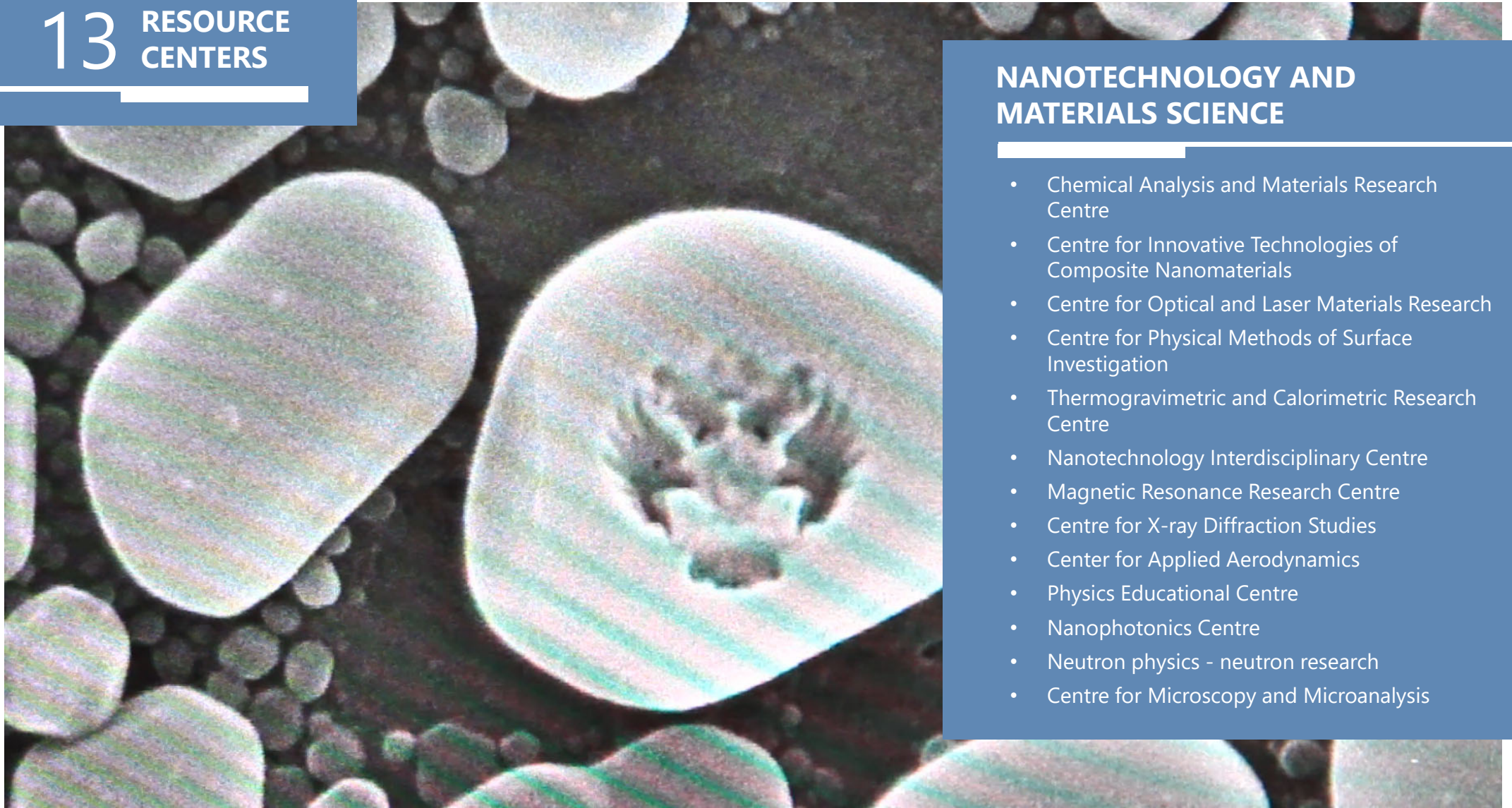


13 RESOURCE CENTERS



NANOTECHNOLOGY AND MATERIALS SCIENCE

- Chemical Analysis and Materials Research Centre
- Centre for Innovative Technologies of Composite Nanomaterials
- Centre for Optical and Laser Materials Research
- Centre for Physical Methods of Surface Investigation
- Thermogravimetric and Calorimetric Research Centre
- Nanotechnology Interdisciplinary Centre
- Magnetic Resonance Research Centre
- Centre for X-ray Diffraction Studies
- Center for Applied Aerodynamics
- Physics Educational Centre
- Nanophotonics Centre
- Neutron physics - neutron research
- Centre for Microscopy and Microanalysis

Nanotechnology and materials science



107

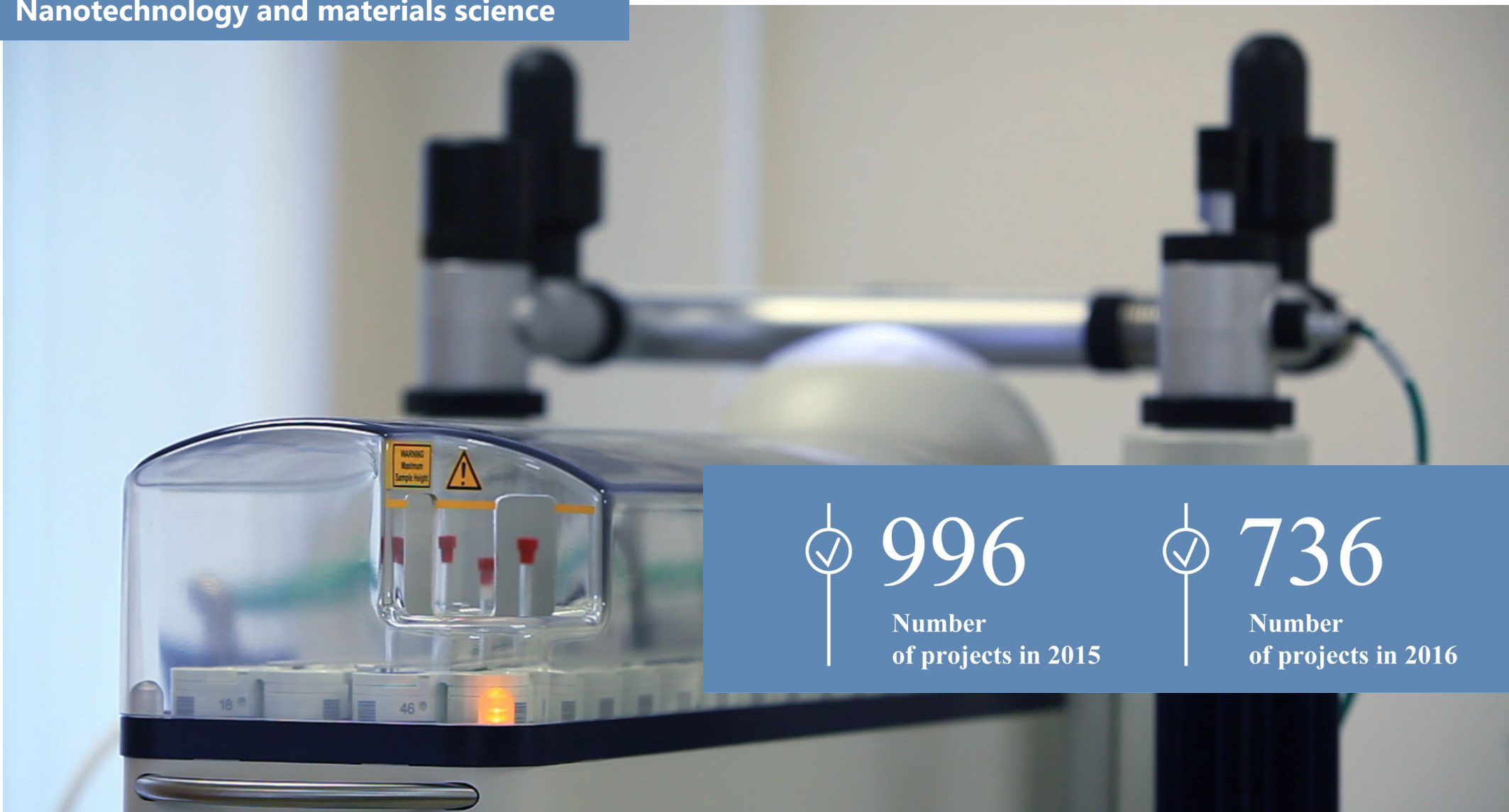
Number
of staff



1497

Number
of users

Nanotechnology and materials science



996

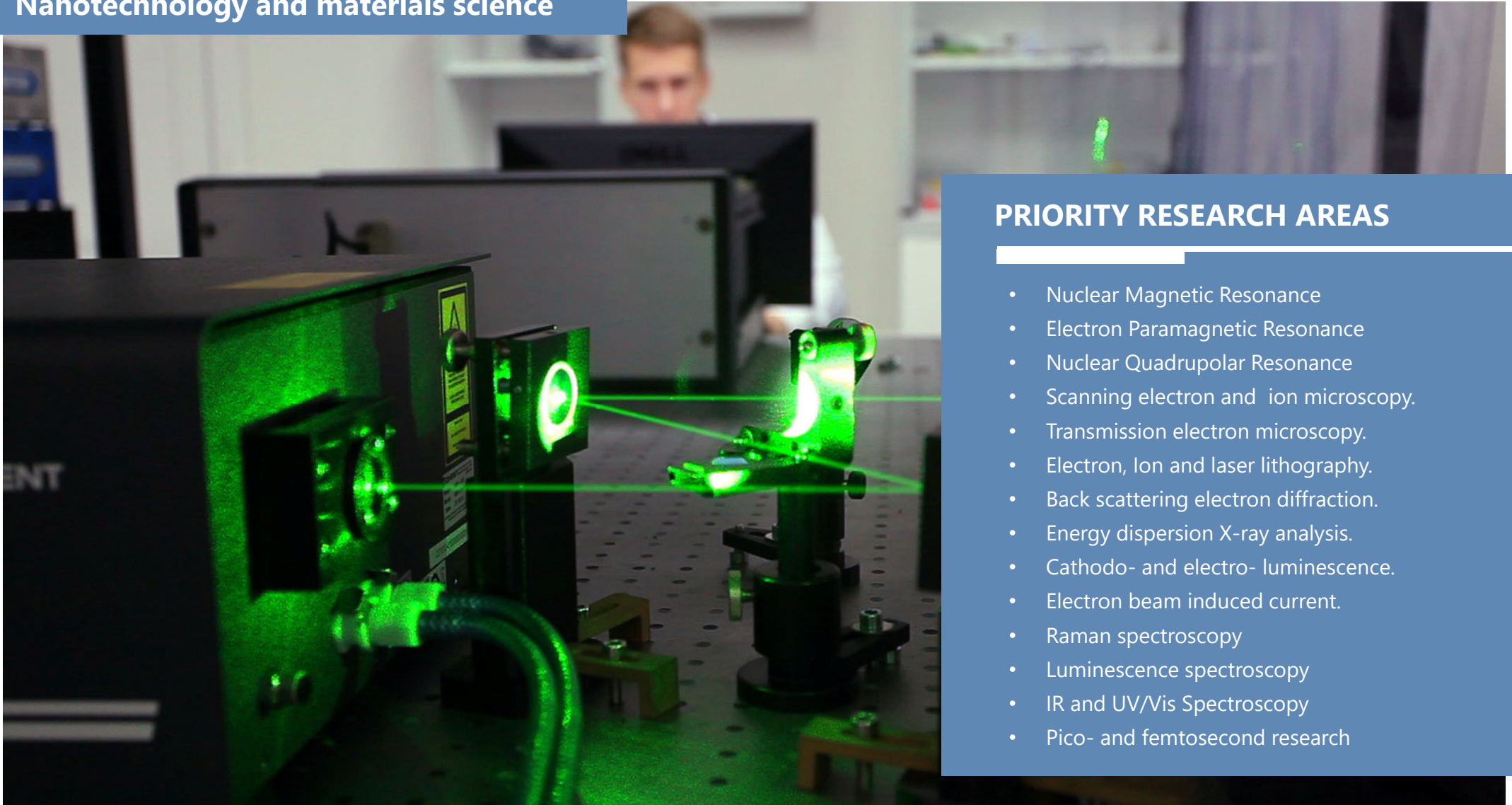
Number
of projects in 2015



736

Number
of projects in 2016

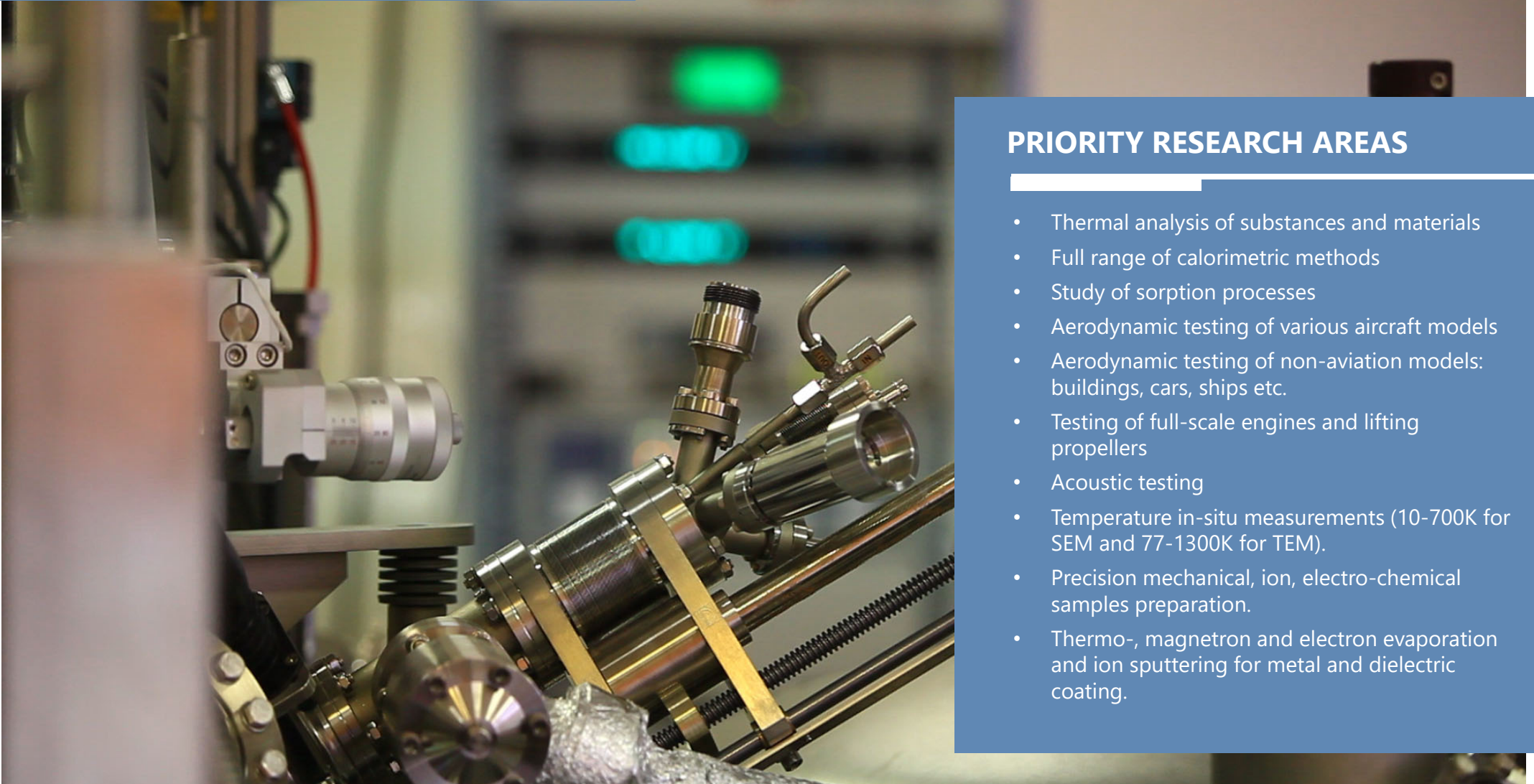
Nanotechnology and materials science



PRIORITY RESEARCH AREAS

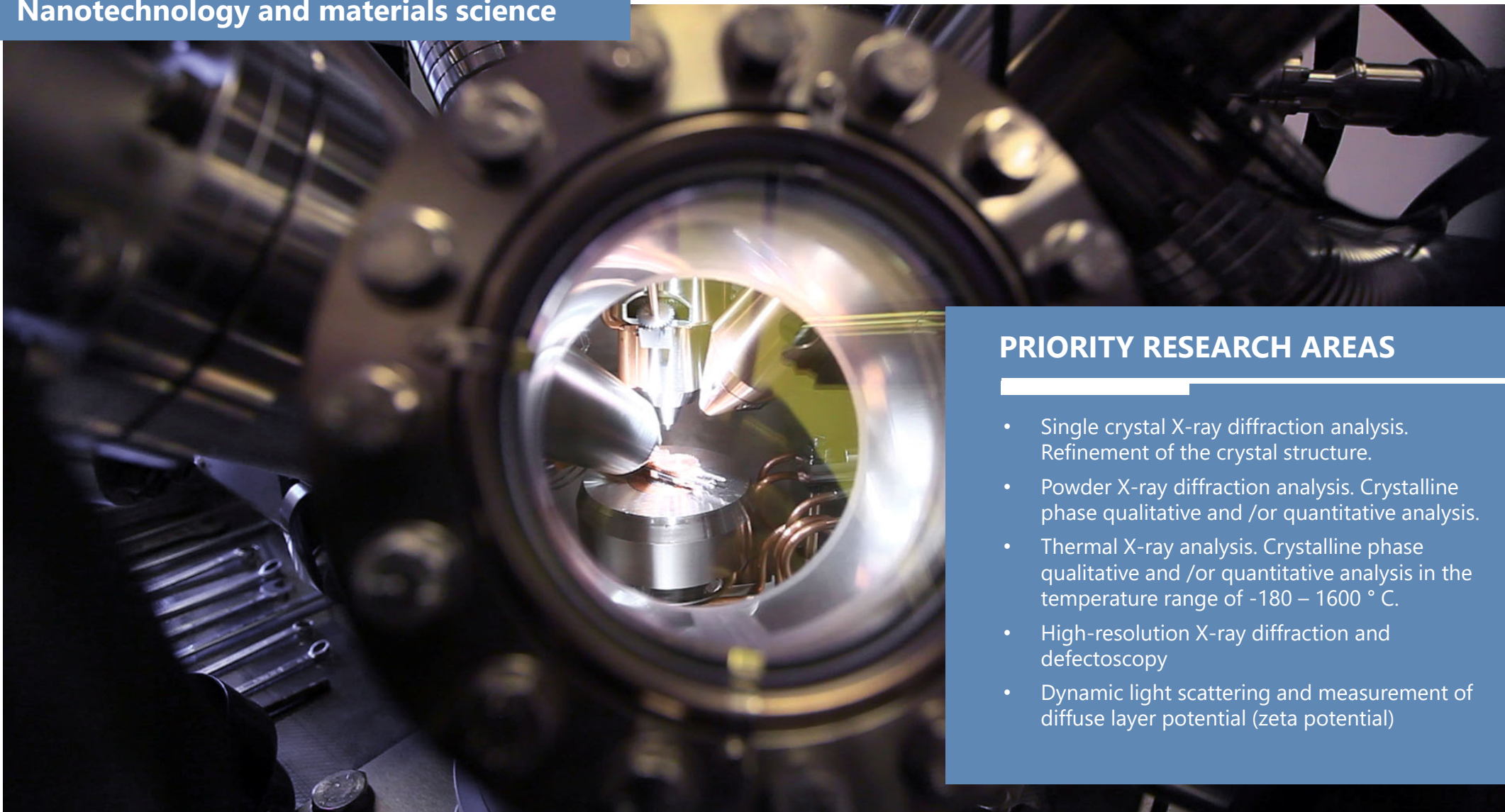
- Nuclear Magnetic Resonance
- Electron Paramagnetic Resonance
- Nuclear Quadrupolar Resonance
- Scanning electron and ion microscopy.
- Transmission electron microscopy.
- Electron, Ion and laser lithography.
- Back scattering electron diffraction.
- Energy dispersion X-ray analysis.
- Cathodo- and electro- luminescence.
- Electron beam induced current.
- Raman spectroscopy
- Luminescence spectroscopy
- IR and UV/Vis Spectroscopy
- Pico- and femtosecond research

Nanotechnology and materials science



PRIORITY RESEARCH AREAS

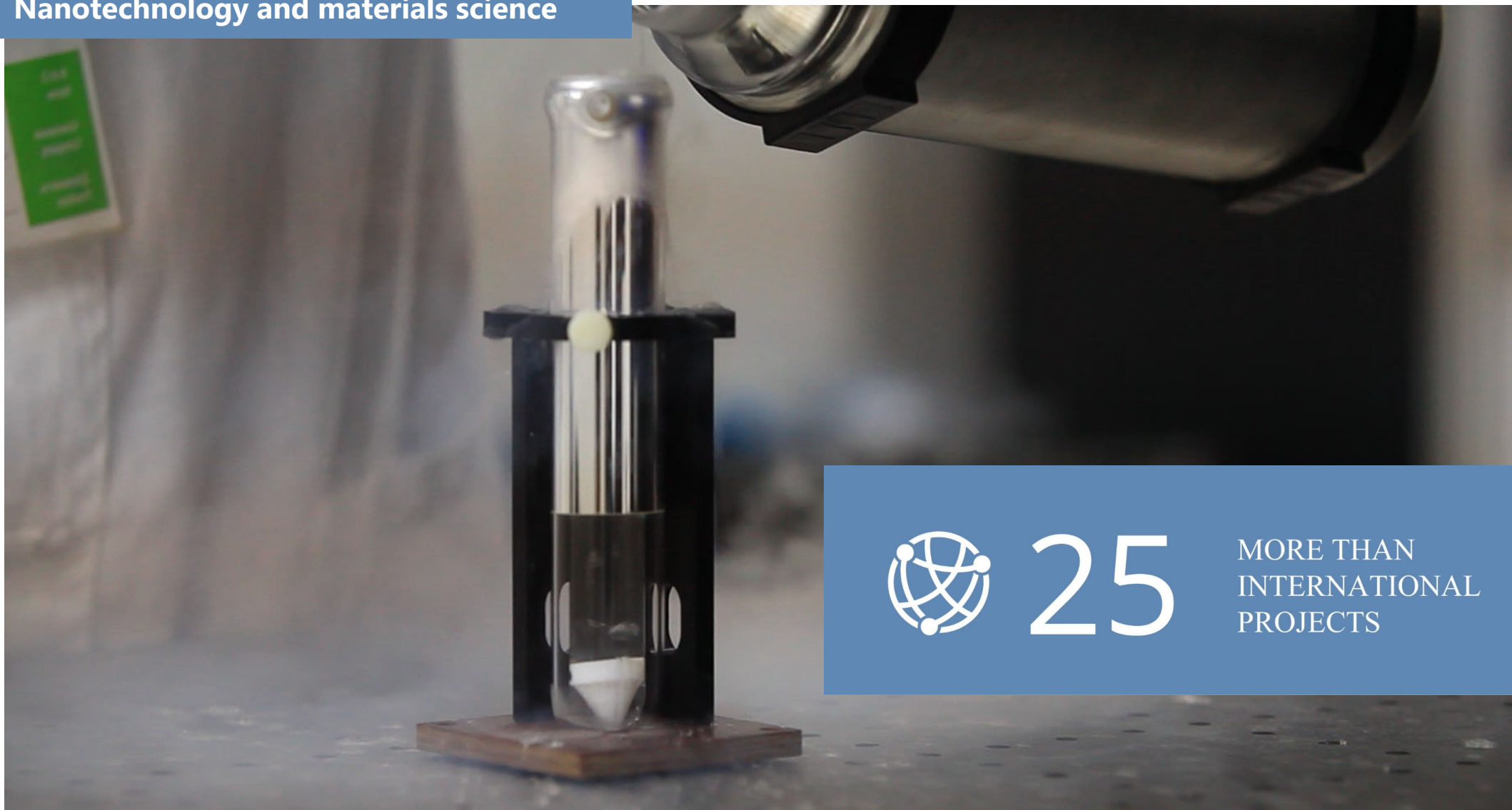
- Thermal analysis of substances and materials
- Full range of calorimetric methods
- Study of sorption processes
- Aerodynamic testing of various aircraft models
- Aerodynamic testing of non-aviation models: buildings, cars, ships etc.
- Testing of full-scale engines and lifting propellers
- Acoustic testing
- Temperature in-situ measurements (10-700K for SEM and 77-1300K for TEM).
- Precision mechanical, ion, electro-chemical samples preparation.
- Thermo-, magnetron and electron evaporation and ion sputtering for metal and dielectric coating.



PRIORITY RESEARCH AREAS

- Single crystal X-ray diffraction analysis. Refinement of the crystal structure.
- Powder X-ray diffraction analysis. Crystalline phase qualitative and /or quantitative analysis.
- Thermal X-ray analysis. Crystalline phase qualitative and /or quantitative analysis in the temperature range of $-180 - 1600$ ° C.
- High-resolution X-ray diffraction and defectoscopy
- Dynamic light scattering and measurement of diffuse layer potential (zeta potential)

Nanotechnology and materials science



25

MORE THAN
INTERNATIONAL
PROJECTS

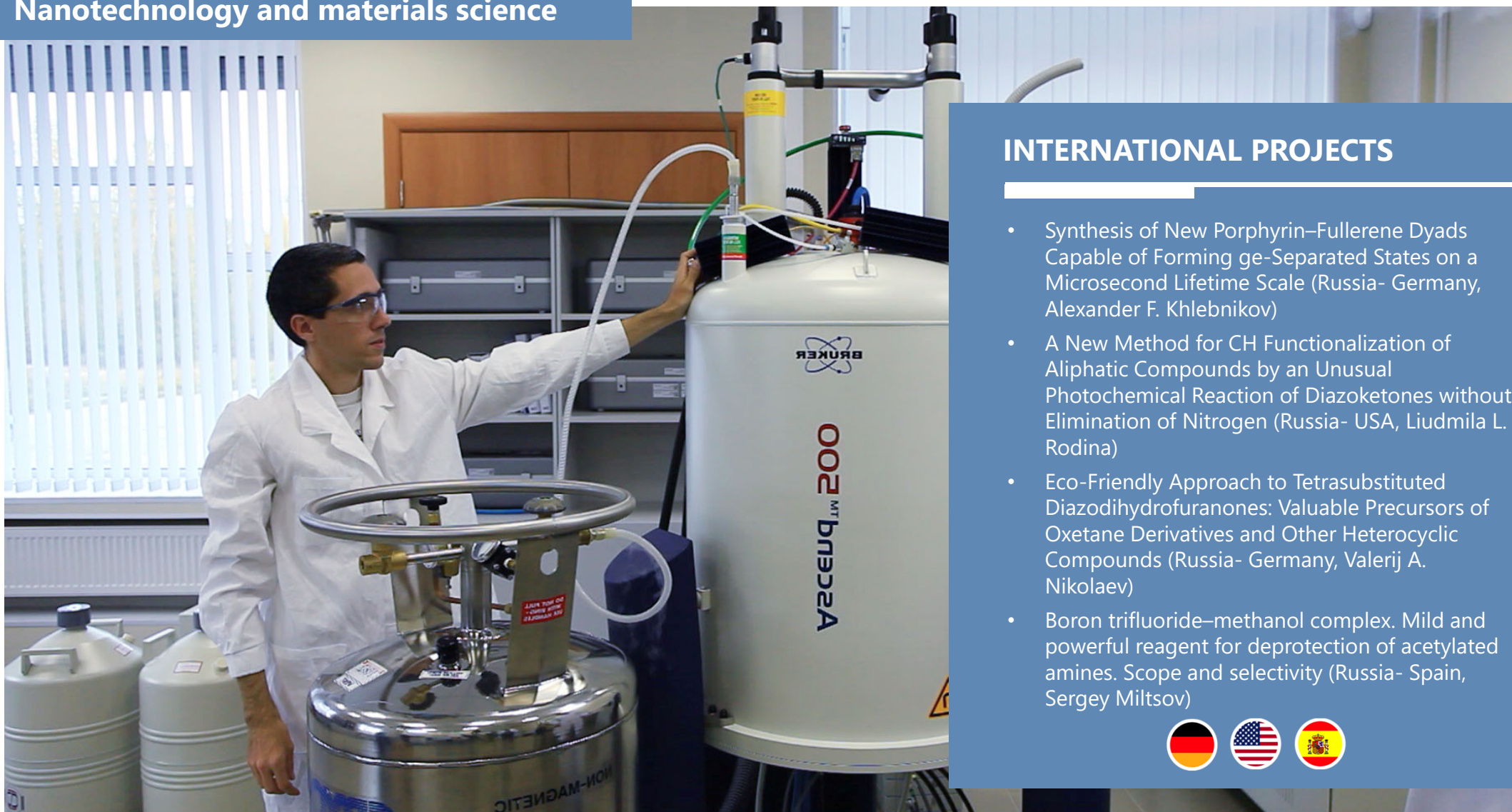


INTERNATIONAL PROJECTS

- «Study of H-bonded complexes of thiourea derivatives» (Prod. Dr. R. Gschwind, Germany)
- «Intramolecular NH₂/O=C hydrogen bonds in uracil derivatives» (Prof. Dr. M. Sigalov, Israel)
- «NMR study of aggregation of rhodium-containing compounds» (Prof. Dr. A. Roodt, South Africa)
- «¹H and ¹³C NMR spectra of pyrimidines» (Prof. Dr. G. Danagulyan, Armenia)
- «NQR measurements of lead halides and organic-inorganic metal halides» (Dr. S. Dvinskikh, Sweden)
- «Detection of intermolecular interaction in Pt(II) complexes» (Dr. I. Koshevoy, Finland)
- «NQR spectra of nitroacetophenone derivatives» (Prof. Dr. A. Filarowski, Poland)



Nanotechnology and materials science



INTERNATIONAL PROJECTS

- Synthesis of New Porphyrin–Fullerene Dyads Capable of Forming ge-Separated States on a Microsecond Lifetime Scale (Russia- Germany, Alexander F. Khlebnikov)
- A New Method for CH Functionalization of Aliphatic Compounds by an Unusual Photochemical Reaction of Diazoketones without Elimination of Nitrogen (Russia- USA, Liudmila L. Rodina)
- Eco-Friendly Approach to Tetrasubstituted Diazodihydrofuranones: Valuable Precursors of Oxetane Derivatives and Other Heterocyclic Compounds (Russia- Germany, Valerij A. Nikolaev)
- Boron trifluoride–methanol complex. Mild and powerful reagent for deprotection of acetylated amines. Scope and selectivity (Russia- Spain, Sergey Miltsov)

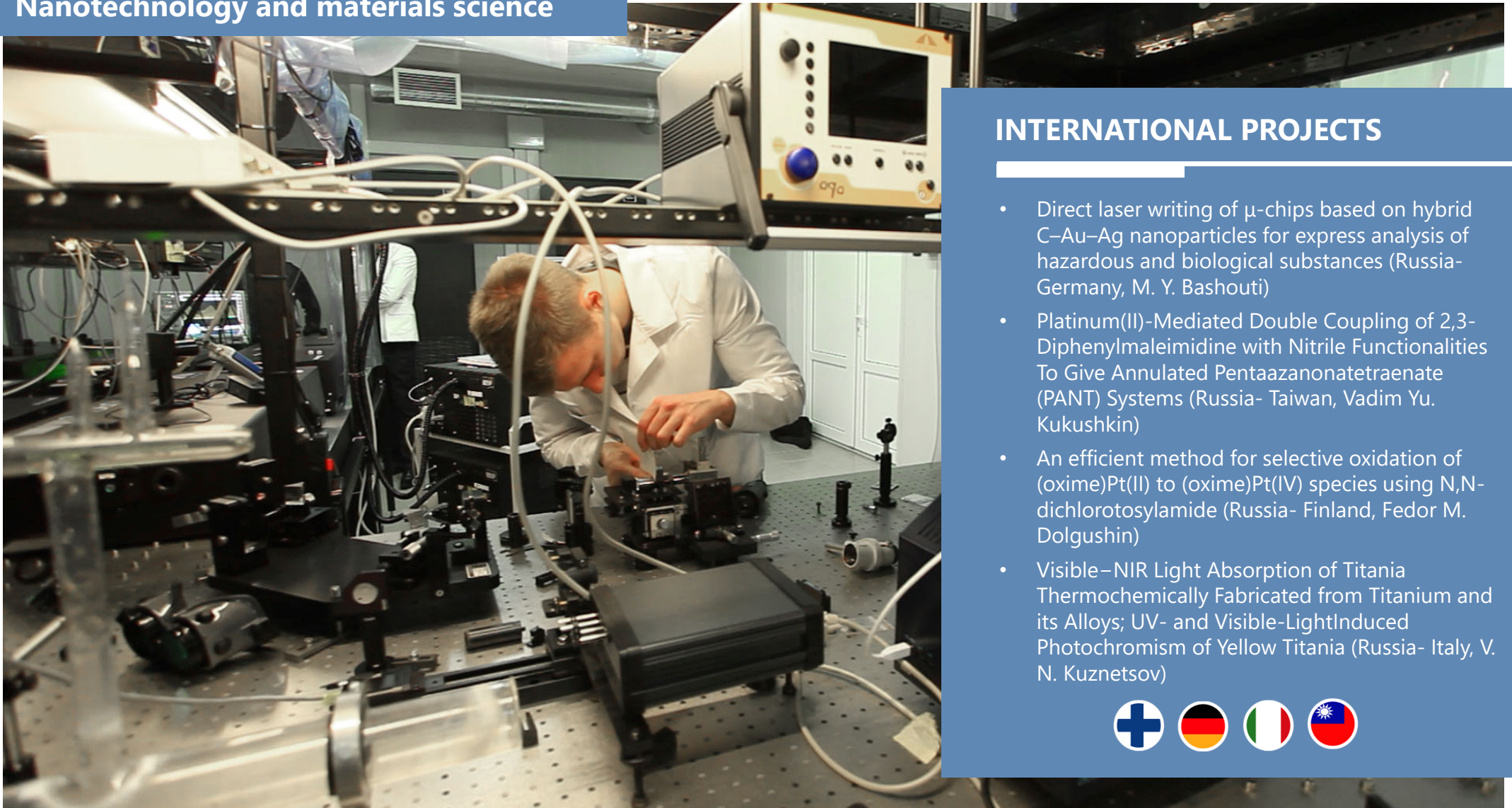




INTERNATIONAL PROJECTS

- Interaction of amines with electrodes modified by polymeric complexes of Ni with salen-type ligands (Russia- Sweden, Oleg V. Levin)
- PdII-mediated integration of isocyanides and azide ions might proceed via formal 1,3-dipolar cycloaddition between RNC ligands and uncomplexed azide (Russia-UK- Finland-Portugal, Vadim Yu. Kukushkin)
- Gold(I) thiotetrazolates as thioredoxin reductase inhibitors and antiproliferative agents (Russia-Germany- Belarus, Tatiyana V. Serebryanskaya)
- A novel aminotriazole-based NHC complex for the design of gold(III) anti-cancer agents: synthesis and biological evaluation (Russia-Germany, Tatiyana V. Serebryanskaya)





INTERNATIONAL PROJECTS

- Direct laser writing of μ -chips based on hybrid C–Au–Ag nanoparticles for express analysis of hazardous and biological substances (Russia-Germany, M. Y. Bashouti)
- Platinum(II)-Mediated Double Coupling of 2,3-Diphenylmaleimidine with Nitrile Functionalities To Give Annulated Pentaazanotetraenone (PANT) Systems (Russia- Taiwan, Vadim Yu. Kukushkin)
- An efficient method for selective oxidation of (oxime)Pt(II) to (oxime)Pt(IV) species using N,N-dichlorotosylamide (Russia- Finland, Fedor M. Dolgushin)
- Visible–NIR Light Absorption of Titania Thermochemically Fabricated from Titanium and its Alloys; UV- and Visible-Light-Induced Photochromism of Yellow Titania (Russia- Italy, V. N. Kuznetsov)





INTERNATIONAL PROJECTS

- 4-Halo-2-azabuta-1,3-dienes as intermediates in the rhodium carbenoid-initiated transformation of 2-halo-2H-azirines into 2,3-dihydroazetes and 2,5-dihydrooxazoles (Russia- UK, Mikhail S. Novikov)
- «NMR study of polyethyleneimine complexes with cisplatin and its derivatives» (Dr. T. Kozlecki, Poland)
- «NMR study of new potential MRI contrast agents» (Prof. Dr. G. Arizaga, Mexico)
- « ^{61}Ni NMR study of ferromagnetic Ni nanoparticles» (Prof. Dr. F. Perez, Mexico)





14 PROFESSIONAL DEVELOPMENT COURSES:

- "Qualitative powder X-ray diffraction analysis using the "Bruker" company software"
- "Qualitative powder X-ray diffraction analysis using the "Rigaku" corporation software"
- "Full profile analysis of powder patterns with the use of TOPAS program package (Bruker GmbH)"
- "Single-crystal X-ray structure analysis using the SHELX program package"
- Quality control methods of crude oil and petroleum products
- Chemical analysis of noble metals and their alloys
- Technique and practice of chromatographic analysis
- Atomic spectral analysis



14 PROFESSIONAL DEVELOPMENT COURSES:

- Physical methods of quantitative chemical analysis
- X-ray analysis
- «Practical Aspects of Modern Liquid State NMR Spectroscopy in Organic Chemistry» course
- «Practical Aspects of Modern Solid State NMR Spectroscopy» course
- «Implementation of educational research and project work at physics lessons as a part of the FSES»
- «Thermal analysis and calorimetry»