



**Latvian Council of  
Science**



**University of Latvia**

LATVIJAS  
REPUBLIKA



IZGLĪTĪBAS  
UN  
ZINĀTNES  
MINISTRIJA



 **MATERA**



**Institute of Solid State  
Physics**



**LATVIJAS MATERIĀLU  
PĒTĪŠANAS BIEDRĪBA**



# PROGRAMME

**FM&NT-2006**

**2<sup>nd</sup> Latvian conference “Functional materials and  
nanotechnologies”**

**Riga, March 27-28, 2006**

**2<sup>nd</sup> Latvian conference**  
**“Functional materials and nanotechnologies”**

**PROGRAMME**

**Monday, March 27**

**OPENING**

**Chairmen: I.Muzikante, A.Sternberg**

- |               |   |
|---------------|---|
| 9.00 – 9.10   | <b>I.Muiznieks</b> , Proector of the University of Latvia<br>Welcome  |
| 9.10 – 9.30   | OR – 1 <b>A.Sternberg, I.Muzikante</b><br>National research programme of Latvia in materialsciences                                       |
| 9.30 – 9.50   | OR – 2 <b>S. Sipila</b> , TEKES, Finland<br>ERA-NET Materials - MATERA: a new possibility for<br>European cooperation                     |
| 9.50 – 10.10  | OR – 3 <b>I. Thorbjornsson</b> , IceTec , Iceland<br>What can small nation do in nanotechnology – Icelandic<br>nanotechnology forum       |
| 10.10 – 10.25 | OR – 4 <b>A.Krumins</b><br>Nanomaterials in the new physics curriculum at University of<br>Latvia   |
| 10.25 – 10.40 | OR – 5 <b>M.Eriksson</b> , Spectral Solutions AB, Sweden<br>The potential of time-of-flight secondary ion mass spectrometry<br>(TOF-SIMS) |

*Coffee break 10.40 – 11.00*

## SESSION 1

### THEORY

**Chairmen: E.Kotomin, E.Klotins**

- 11.00 – 11.25 PL – 1 **E.Kotomin, Yu.Zhukovskii, Yu.Mastrikov**  
First-principles modeling of surfaces and reactivity of oxide-  
and ABO<sub>3</sub> perovskite surfaces
- 11.25 – 11.40 OR – 6 **E.Klotins, M.Springis**  
Critical dynamics in nanoscale
- 11.40 – 11.55 OR – 7 **Yu.F.Zhukovskii, E.Kotomin**  
Theoretical simulation on the enhanced Li storage in the inter-  
faces between transition metals and ionic lithium compounds  
used in Li batteries
- 11.55 – 12.10 OR – 8 **Yu. Shunin**  
Electronic properties of silicon-based nano-sized systems
- 12.10 – 12.25 OR – 9 **A.Kuzmin**  
Application of cluster computing in materials science
- 12.25 – 12.40 OR – 10 **D.Cepite, K.Dadzis, K.Erglis, A.Cebers**  
Thermal fluctuations of Brownian particles in the force field of  
the optical tweezer

*Lunch 12.40 – 14.00*

## SESSION 2

### NANOSTRUCTURES

**Chairmen: N.Mironova – Ulmane, J.Zicans**

- 14.00 – 14.25 PL – 2 **M.Kalnins**  
Polymer composites containing layered silicate nanoparticles
- 14.25 – 14.40 OR – 11 **A. Kovalovs, E. Barkanov, S. Gluhihs**  
Active vibration control of plate by piezoelectric actuators
- 14.40 – 14.55 OR – 12 **U.Vainio, K.Serimaa, J.Gravitis**  
X-ray scattering methods in the study of soft materials

- 14.55 – 15.10 OR – 13 **F.Muktepavela, G.Bakradze, S.Stolyarova, E.Tamanis**  
Thermal stability of mechanically alloyed Al-Cu-O nano-structured coating
- 15.10 – 15.25 OR – 14 **I.Vitina, V.Belmane, V.Rubene, M.Lubane, I.Jansone, A.Krumiņa**  
Electrodeposition and formation of structure of nanostructured composite thin layers of Co-W; Co-Mo/ hydroxylapatite on metal alloys for implants

*Coffee break 15.25 – 15.45*

### SESSION 3

#### NANOPARTICLES, FILMS

**Chairmen: D.Millers, D.Erts**

- 15.45 – 16.10 PL – 3 **J.Grabis, I.Steins, Dz.Jankovica, A.Dulmanis, G.Heidemane**  
Preparation of nanosized oxide powders by gas and liquid phase routes.
- 16.10 – 16.25 OR – 15 **J.Tiliks, G.Kizane, A.Vitins, E.Kolodinska, Br.Lascinskis, V.Tiliks**  
The application of nanostructured materials in the blanket of the thermonuclear reactors
- 16.25 – 16.40 OR – 16 **B.Berzina, L.Trinklere, A.Auzina, L.C.Chen, S.C.Shi, J.Grabis, I.Steins**  
Luminescence processes in AlN: macrosized and nanomaterials
- 16.40 – 16.55 OR – 17 **D.Millers, K.Šmits, L.Grigorjeva, V.Pankratovs**  
Investigation of oxides nanopowders: outlooks for sensors, scintillatos and lasers
- 16.55 – 17.10 OR – 18 **A.Kalinko, L.Grigorjeva, D.Millers, K.Šmits**  
Photoluminescence of nanostructured ZnO obtained by different techniques
- 17.10 – 17.25 OR – 19 **I.Aulika, J.Levoska, M.Tyunina, K.Kundzins, V.Zauls**  
Direct atomic force microscopy analysis of surface nanoscale roughness effects on optical properties of PMN thin ferroelectric film multilayers

**POSTER SESSION 17.25 – 19.00**

**Tuesday, March 28**

**SESSION 4**

**THIN FILMS**

**Chairmen: J.Teteris, A.Medvids**

- 9.00 – 9.25 PL – 4 **I.Sildos, J.Aarik, T.Tätte, A.Lõhmus and M.Kirm**  
Thin metal oxide films as functional materials
- 9.25 – 9.40 OR – 20 **J.Teteris**  
Nanostructural amorphous chalcogenide semiconductor films
- 9.40 – 9.55 OR – 21 **P.Kulis, G.Marcins, M.Springis, I.Tale, A.Veispals, A.Voitkans**  
Implementation of the MOCVD technique for growth of III group nitride nanostructures
- 9.55 – 10.10 OR – 22 **A.Medvids, P.Onufrijevs, D.Grabovskis, F.Muktepavela, G.Bakradze**  
Low-K SiO<sub>2</sub> layer formation on Si by YAG:Nd laser radiation
- 10.10 – 10.25 OR – 23 **J.Maniks, I.Manika**  
Evaluation of the mechanical properties in submicron volumes
- 10.25 – 10.40 OR – 24 **A.Kuzmin, R.Kalendarev, A.Kursitis, J.Purans**  
Confocal spectromicroscopy of micro- and nano- structured materials

*Coffee break 10.40 – 11.00*

**SESSION 5**

**ORGANIC MATERIALS AND POLYMERS**

**Chairmen: V.Kampars, I.Muzikante**

- 11.00 – 11.25 PL – 5 **M.Rutkis, V.Kampars, A.Vembris, A.Jurgis, A.Tokmakovs**  
Relation of the chromophore structure – second order non-linear optical properties in host – guest systems. Case of the DMABI derivatives/SPMMA
- 11.25 – 11.40 OR – 25 **I.Kaulach, I.Muzikante, L.Gerca, M.Plotniece, M.Roze, J.Kalnacs, G.Shlihta, P.Shipkovs, A.Tokmakov, E.Fonavs, V.Kampars**  
Photoconductivity and PV effect of fullerene and phthalocyanine doped poly(3-hexylthiophene)

- 11.40 – 11.55 OR – 26 **M.Knite, A.Hill, V.Bovtun, V.Teteris, A.Solovjovs, V.Tupureina, G.Shakale, J.Zavickis, I.Aulika, B.Polakovs, S.J.Pas, S.Veljko, I.Klemenoks, J.Zicans, D.Erts, J.Petzelt, A.Fuith**  
 Polymer-nanostructured carbon composite as multifunctional sensor materials – design, processing and properties
- 11.55 – 12.10 OR – 27 **A.Kalnacs, A.Murashovs**  
 The fullerites mixture separation problems and its solution
- 12.10 – 12.25 OR – 28 **A.Pastare, I.Pastare, K.Didriksone, K.Kundzinsh, J.Svirksts, A.Viksna, D.Erts**  
 Formation of nanoporous anodized aluminium oxide and pore filling
- 12.25 – 12.40 OR – 29 **J.Andzane, J.Prikulis, J.D.Holmes, D.Erts**  
 Conductivity, field emission and mechanical properties of carbon nanotubes

*Lunch 12.40 – 14.00*

## SESSION 6

### FUNCTIONAL MATERIALS

**Chairmen: M.Auzinsh, J.Grabis**

- 14.00 – 14.25 PL – 6 **M.Auzinsh**  
 Gases as perspective magneto – optical and electro – optical materials
- 14.25 – 11.40 OR – 30 **M.Auzinsh, K.Blushs, R.Ferber, F.Gahbauer, A.Jarmola, M.Tamanis**  
 Electric field induced zeeman sublevel crossing resonances within hyperfine ( $nD$ ) – manifold in cesium vapour
- 11.40 – 11.55 OR – 31 **L.Gringera, J.Kleperis, G.Vaivars, J.Klavins**  
 Hydrogen sorption and sorption characteristics in materials
- 11.55 - 12.10 OR – 32 **H.Brenning, D.Erts, P.Delsing, S.Kubatkin**  
 Scanning single electron transistor microscope for liquid He temperatures
- 12.10 - 12-25 OR – 33 **T.Puritis, A.Medvids**  
 Achievements on silicon nanocrystals optoelectronics and perspective of development in Latvia

*Coffee break 15.25 – 15.45*

## **SESSION 7**

### **BIOMASTER AND MEDICAL TECHNOLOGIES**

**Chairmen: E.Palcevskis, J.Spigulis**

- 15.45 – 16.10 PL – 7 **R.Cimdins, L.Berzina, A.Skagers, I.Salma, J.Kroica, I.Shestakova, J.Pelss**  
Biomaterial implants and response reactions of biological systems
- 16.10 – 16.25 OR – 34 **D.Zablotsky, M.M.Maiorov, E.Blums**  
Investigation of the ferrofluid nanostructure by a diffusional method
- 16.25 – 16.40 OR – 35 **E.Palcevskis, A.Dindune, Z.Kanepe, J.Krastins**  
Comparison and characteristics of the HAP powders by different methods
- 16.40 - 16.55 OR – 36 **M.Ozolins, G.Ikaunieks**  
Dynamics of eye aberration detected by high-speed Hartmann-Shack aberrometer
- 16.55 - 17-10 OR – 37 **A.Lihachev, J.Spigulis**  
Human skin fluorescence: intensity fading effects at 405 nm and 532 nm laser excitation
- 17.10 – 17.25 **Closing Remarks**

**POSTER SESSION 17.10 – 19.00**

## ***LIST OF POSTER PRESENTATION***

- PO-1 **A.Kuznetsov, A.Bely**  
Critical dynamics in nanoscale: toward the inverse problem of electric hysteresis
- PO-2 **E.Klotins Jr.**  
Critical dynamics in nanoscale: computing solutions
- PO-3 **I.Javaitis**  
Flexible magnetic swimmer
- PO-4 **A.Gulans, I.Tale**  
Ab initio calculation of GaN nanowires
- PO-5 **G.Veveris, V.Eglitis, A.Lusis, E.Pentjuss**  
Leaching as method for surface nanostructuring of sodium aluminosilicate glass fibres
- PO-6 **A.Skudra, E.Bogans, Z.Gavare, N.Zorina, M.Berzinsh**  
High- frequency electrodeless plasma interaction with the lamp bulb walls
- PO-7 **A.Medvids, I.Dmytruk, P.Onufrijevs, I.Pundyk**  
Optical properties of nanohills formed on a surface of Ge by laser radiation
- PO-8 **M.Piesins, I.Tale, C.C.Yang**  
Thermoactivation spectroscopy of charge localization states in InGaN/GaN quantum well
- PO-9 **U.Rogulis, A.Veispals, L.Dimitrocenko, M.Springis, P.Kulis, A.Fedotovs**  
Optical properties of Ce-doped oxy-fluoride composites
- PO-10 **G.Telysheva, N.Mironova-Ulmane, T.Dizhbite, L.Jashina, A.Andersone**  
Synthesis of liquid-based hybrid materials using  $\alpha$ -Keggin's type polyoxometalates as inorganic building blocks
- PO-11 **C.Balasubramanian, S.Bellucci, A.Ivanov, A.I.Popov, H.Schober, I.Karbovnik, N.Krutyak, V.Savchyn**  
Nano structures of aluminium nitride: synthesis, characterization and applications
- PO-12 **I.Zalite, N.Zilinska, P.Sajgalik, R.Kircher, G.Kladbr**  
Ceramics from  $\text{Si}_3\text{N}_4$  – SiC nanocomposites made by hot pressing and spark plasma sintering
- PO-13 **M.Dambekalne, M.Antonova, M.Livinsh, M.Kalnberga, A.Kalvane, K.Bormanis**  
Ceramics of lead containing heterovalent niobates – synthesis, sintering and microstructure
- PO-14 **P.Keburis, J.Banys, Z.Bortkevič, A.Kholkin**  
Dielectric properties of lead free ceramics BBT
- PO-15 **P.Keburis, J.Banys, A.Brilingas, A.Salak, V.M.Ferreira**  
Dielectric dispersion of LMT-BT ceramics
- PO-16 **R.Grigalaitis, J.Banys, A.Brilingas, A.Sternberg, V.Zauls, K.Bormanis**  
Polar nano regions in ferroelectric relaxors
- PO-17 **A.Orlov, G.Heidemane, J.Grabis, Dz.Jankovica**  
Synthesis of lithium silicates powders by plasma chemical method
- PO-18 **N.Zaporina, V.N.Timofeev, D.Bocharov, R.Krutohvastov and J.Grabis**  
Studies of multicomponent nanodisperse powders by electron microscopy's methods
- PO-19 **M.M.Nkosi, A.Nechaev, V.Linkovs, G.Vaivars, J.Kleperis**  
Template synthesis of nanomaterials – nickel nanowires
- PO-20 **Xin Wang, S.Naidoo, G.Vaivars, V.Linkov, L.Grinberga**  
Optimization of the synthesis of Pt – Ru/C fuel cell anode catalyst



- PO-21 **P.Ndungu, N.Onyegbule, A.Nechaev, V.Linkov, L.Grinberga**  
A simple route for synthesis of carbon nanotubes using LPG as a carbon source
- PO-22 **B.Polyakov, J.Prikulis, L.Grigorjeva, D.Millers, V.Zauls, J.Holms, D.Erts**  
High density arrays of germanium nanowire photoresistors
- PO-23 **P.Birjukovs, J.D.Holmes, D.Erts**  
Electrical characterisation of doped semiconductor nanowire arrays
- PO-24 **J.Andzane, A.Kobilecka, J.Ancane, J.Prikulis, J.D.Holmes, D.Erts**  
Mechanical properties of Ge nanowires
- PO-25 **K.Erta, K.Didriksone, B.Polyakov, J.D.Holmes, D.Erts**  
Two terminal nanoelectromechanical devices based on individual Ge nanowires and its arrays
- PO-26 **I.Muzikante, L.Gerca, D.Erts, E.Fonavs, A.Pastare, A.Tokmakov**  
Formation of self assembled monolayers on gold nanoparticles inside the nanoporous domains
- PO-27 **A.Vembris, M.Rutkis, A.Tokmakov**  
Study of polar order stability of the poled host – guest system (s-PMMA/ DMABI)
- PO-28 **A.Tokmakov, I.Muzikante**  
Investigation of photostability of indandione derivatives in polymer matrices in dependence on glass transition temperature and stereoregularity
- PO-29 **E.Laizane, L.Gerca, D.Gustina, E.Markava, I.Muzikante, A.Vembris, A.Tokmakov**  
Optically induced switching processes in thin films of donor and acceptor containing azobenzene derivatives
- PO-30 **Dm. Saharov, A.Ozols, V.Kampars, J.Kreicberga, S.Ratyeva**  
Effect of chromophore group concentration on the holographic properties of spin-coated azobenzene oligomers
- PO-31 **U. Malinovskis, A. Pastare, B. Polyakovs, D. Erts, I. Muiznieks**  
Controllable self – assembled DNA net – like structures on the mica surfaces
- PO-32 **G.Shakale, M.Knite, I.Klemenoks, V.Teteris**  
Electric resistance of nanostructured carbon-polyisoprene composites in vapours of different organic solvents as function of time
- PO-33 **J.Zavickis, M.Knite, V.Tupureina, V.Teteris, I.Klemenoks, A.Fuith**  
Time dependence of electrical resistance of polyisoprene-nanostructured carbon composites at various mechanical loading values
- PO-34 **J.Zicans, R.Maksimov**  
Acrylic copolymer/organically modified montmorillonite nanocomposite: mechanical, barrier, and thermal properties
- PO-35 **N.Mironova-Ulmane, A.Pavlenko, T.Kärner**  
Uncertainties of absorbed dose reconstruction on tooth enamel
- PO-36 **A.Mishnevs, E.Ivanovskis**  
X-ray line profile analysis of nanostructured oxytocin
- PO-37 **M.Rutkis, V.Zauls**  
Determination of second ordered non-linear coefficients – straightforward measurement or complex optical investigation?
- PO-38 **J.Andzane, J.Prikulis, S.Kubatkin, A.Lohmus, R.Lohmus, D.Erts**  
Nanocontact AFM for probing of nanocontacts inside transmission electron microscope
- PO-39 **R.Krutohvostovs, K.Kundzins, I.Shorubalko**  
Electron beam direct writing of 2D structures for optical devices