

**PLAN OF THE RESEARCH PROJECTS FOR 2013  
INSTITUTE OF SOLID STATE PHYSICS - BAS**

Number	Title of the project	Project leader Total number of participants, number of participants from ISSP	Funding provided by /institution, reg. № or code of the project/contract, etc.	Expected funds for 2013
1	2	3	4	5

**I. Projects, funded only by the budget subsidy of BAS**

1	2	3	4	5
1	Termomechanical and magnetic properties and nonlinear excitations in condensed media	Prof. H. Chamati, DSc Participants - 6	BAS	
2	Phases and phase transitions in superfluids, magnetic and superconducting materials	Prof. D.I. Uzunov, 2 ISSP-2	BAS	
3	Growth and characterization of crystals and thin layers with optical, X-ray structural and electron-microscopic methods; doping and investigation of carbon nanostructures	Prof. Dr. Sci. Marin Gospodinov 7 total number of participants 7 participants from ISSP		
4	Electronic properties of solid state systems	Assoc. Prof. Dr K. Christova 6 total number of participants 6 participants from ISSP		
5	Biomaterials and surfaces: modification of solid surfaces by nanodiamond as	Assoc. Prof. Dr L. Pramatarova		

	models for the growth of implant coating	5 total number of participants 4 participants from ISSP		
6	Preparation, characterization and applications of new chalcogenide materials and thin films containing nanosized semiconductors	Prof. DSc D. Nesheva 12 participants	Budget	
7	Characterization of nano-sized and nano-structured dielectric and semiconductor films and heterostructures on their basis	Assoc. Prof. Dr. A. Sekeresh, 7 participants	Budget	
8	Physics and technology of thin and ultrathin dielectric and semiconductor layers for the modern microelectronics	Assoc. Prof. Dr. A. Paskaleva, total -12 participants from ISSP - 12		
9	Mass-, gas- and thermosensitivity of sensor systems and devices using different acoustic wave modes Bulk, Lamb, Rayleigh and Transverse surface acoustic waves	Assoc. Prof. Dr. V. Georgieva total -11 participants from ISSP - 11	Budget	
10	Materials and multifunctional magnetic materials	Prof. N. Tonchev ISSP members :10	budget subsidy of BAS	no
11	Photonics, optic and spectroscopy of anisotropic and nonlinear media	Prof. S.Rashev, D.Sc. 19	budget subsidy	
12	Mechanical and flexoelectrical properties and phenomena in thermotropic and lyotropic liquid crystalline systems	Prof. Isak Bivas, D.Sc. (5 participants)	Budget subsidy	-
13	Nanostructured and bioactive liquid crystals	Assoc. Prof. Yordan Marinov (4 participants)	Budget subsidy	
14	Physics of atoms, molecules and plasma	Prof. DSc. K. Blagoev 10/10		

15	Lasers, laser technologies and applications	Assoc.Prof. Dr. M.Grozeva 14 participants	budget subsidy	
16	Identifying, registration and analysis of three-dimensional structure of biomacromolecules and cellular organelles based on bonding to sensors of a novel measuring equipment by conformal reactions	Leader: Assoc. Prof., PhD Gencho Minchev  total number of part-s: 3 number of part-s from ISSP: 2		

## II. Projects, additionally funded by contracts with the National Science Fund /NSF/

1	2	3	4	5
1	Structural characterization of novel crystalline materials	Assoc. Prof. Dr. Rosica Petrova Nikolova 20 total number of participants 3 participants from ISSP	DRNF 02/1	16 625 lv.
2	Role of substratum elasticity in osteoblast differentiation of mesenchymal stem cells	For ISSP- Assoc. Prof. Dr L. Pramatarova 16 total number of participants 5 participants from ISSP		24 000 lv.
3	Characterization of new chalcogenide materials by atomic force microscopy	Assis. Prof. I. Bineva From ISSP: 3 participants	NSF, MDU-03-91	18245 BGN
4	Trapping phenomena and their implication on long-term reliability of nano-scale metal gate/high-k dielectric-based devices	Assoc. Prof. Albena Paskaleva number of participants: 23 participants from ISSP: 4	National Science Fund, DTK02-50	
5	The deformability as a key feature of biomembranes and the influence of biologically relevant substances on it –	Assoc. Prof. V. V. Vitkova (4 participants)	DMU03-80/2011	

	experimental studies on model systems			
6	Standardization of laser techniques for investigation and restoration of cultural heritage	assoc.prof. M.Grozeva, total number – 11 from ISSP - 8	NSF HTC 02-21/2010 (Bulgarian-Romanian bilateral agreement)	<b>9 000</b>
7	New techniques of quantum control and applications	assist.prof. B.Torosov 4 participants	NSF MY-03-103/2011	<b>18 756</b>
8	LIF analysis for cultural heritage investigation and conservation (2012-2013)	assist.prof. P.Zahariev, total number – 5 from ISSP - 4	NSF MY 03-126/20.12.2011	<b>18 027</b>

### III. Projects, additionally financed by contracts with ministries, organizations and private companies from the country

1	2	3	4	5
1	Investigation of the interaction of high energy MeV electrons with nanosized silicon in silicon dioxide.	Prof. DSc S. Kaschieva From ISSP: 5 participants	Russia, Dubna International Institute of Nuclear Research	5000 USD
2	Structure and properties of topological insulators in the systems Bi-Se and Bi-Te doped with copper and manganese	For ISSP- Assoc. Prof. Dr M. Baeva; 6 total number of participants 3 participants from ISSP		5 000 lv.

### IV. Projects, additionally financed according to contracts and programs of EU, NATO, UNESCO and other international organizations

1	2	3	4	5
1	Device For Large Scale Fog Decontamination	José Luis Pérez-Díaz	The Seventh Framework Programme – Security	111 614.70 €

			Project Number: 312804	
2	Preparation of new Fe-based superconducting materials	INRNE: Prof. T. Troev; ISSP coordinator: Doc.Dr. E. Nazarova; ISSP members: 5	EURATOM FU07--CT-2007-	
3	European network for development of electroporation-based technologies and treatments	Acad. A. G. Petrov (coordinator for Bulgaria) ( > 300 participants from 30 countries)	COST Action TD1104 (EP4Bio2Med)	
4	Transport and behaviour of Tungsten atoms and ions ; spectroscopic diagnostics (LIF)	Prof. K.Blagoev ISSP - 2	EUROATOM 1.4.1	<b>2000</b>

### V. Projects funded under the Academy's bilateral agreements and in the framework of institute-to-institute cooperation

1	2	3	4	5
1	Growth and characterization of hydroxyapatite composites as scaffolds for hard tissue regeneration	Assoc. Prof. Dr E. Pecheva 9 total number of participants 4 participants from ISSP	Bilateral project with Hungarian Academy of Sciences	
2	Investigation of hydroxyapatite - nanodiamond composite coating	Assoc. Prof. Dr E. Pecheva 8 total number of participants 6 participants from ISSP	Bilateral project with Latvian Academy of Sciences	
3	Optical and photoelectrical characterization of thin films and nanostructured layers based on ZnSe (2010-2013)	Prof. DSc D. Nesheva, Total: 8 participants, 4 from Center for Solid State Physics and New	Serbia	

		Materials and 4 from ISSP		
4	Preparation and investigation of optical properties of semiconducting glasses for photonic applications (2011-2013)	Assoc. Prof. Dr. Z. Ivanova, Total: 4 participants, 2 from Institute of Photonics and Electronics, Prague, 2 from ISSP.	Czech Republic	
5	Multicomponent chalcogenide semiconductors thin films suitable for phase change memory (2012-2014)	Assoc. Prof. Dr. D. Arsova, Total: 8 participants, Ioffe Physico Technical Institute, St. Peterburg, from ISSP: 4 participants	Russia	
6	Studies of structure and optical properties of new semiconductor materials and dielectric thin films for advanced opto- and nanoelectronics applications (2013-2015)	Assoc. Prof. Dr. A.M. Szekeres, Total: 10 participants, from ISSP: 5 participants Centre for Energy Research, Hungarian Academy of Sciences	Hungary	Under consideration
7	Silicon oxide films with embedded silicon nano-inclusions for advanced opto- and nanoelectronics applications (2010-2013)	Assoc. Prof. Dr. A.M. Szekeres, Total: 11 participants, Institute of Semiconductor Physics, NANU from ISSP: 4 participants	Ukraine	
8	Pulsed laser deposited AlN nanostructures: tunable morphologies and properties (2013-2015)	Dr. S. Bakalova, Total: 11 participants, from ISSP: 5 participants Institute of Atomic Physics, RAN	Romania	Under consideration
9	Ion beam modification of	Assoc. Prof. Dr. A.M.	Romania	

	semiconductor surface layer for micro- and optoelectronics application purposes (2012-2014)	Szekeres, Total: 14 participants, from ISSP: 6 participants, Institute of Physical Chemistry, RAN		
10	Nanostructured and amorphous semiconductor films for sensors application (2013-2015)	Assoc. Prof. Dr. I. Bineva, Total 12 participants, 6 from National Institute for Research and Development in Microtechnology – IMT Bucharest and 6 participants from ISSP	Romania	Under consideration
11	Charge traps in nanoscale doped Ta <sub>2</sub> O <sub>5</sub> films (HfTaO; TiTaO; AlTaO) and the effect of microwave irradiation (2.45-24 GHz)	Prof.DSc. Elena Atanassova number of participants: 8 participants from ISSP: 4	Academy's bilateral agreements, Ukraine	
12	Time-dependent-dielectric breakdown of MIS capacitors with mixed high- <i>k</i> layers: TaAlO; TaHfO; TaTiO	Prof.DSc. Elena Atanassova number of participants: 8 participants from ISSP: 4	Academy's bilateral agreements, Republic of Macedonia	
13	Dynamic aspects of electrical breakdown of memory capacitors based on high- <i>k</i> Hf- and Al-doped Ta <sub>2</sub> O <sub>5</sub>	Prof.DSc. Elena Atanassova number of participants: 11 participants from ISSP: 5	Academy's bilateral agreements, Serbia	
14	Investigation of resistive switching effect in MIM structures with TaO <sub>x</sub> - and TiO <sub>x</sub> -based dielectrics for future memory applications	Assoc. Prof. Albena Paskaleva number of participants:9 participants from ISSP: 4	Academy's bilateral agreements, Slovakia	
15	Development of new sensitive layers (coatings) based on nano-sized semi-conductive structures for analytical application using mass-sensitive piezoresonance sensors	Assoc. Prof. Dr. V. Georgieva total -11 participants from ISSP – 6.	Academy's bilateral agreements,Russian	

16	Investigation of impurities in helium gases on the base of quartz crystal microbalance	Ts. Yordanov, total -11 participants from ISSP – 8.	Bilateral agreements, Russian	3000 \$
17	Electrical and magnetic properties of perovskite magnetic materials	Doc. Dr. V. Lovchinov; ISSP members: 4	Liege, Belgium. L'Universite de Liege, Depart, Physique, Group SUPRA.TECS	
18	Structural and physical investigations on nanostructural layers and bulk porous materials based on dielectric matrix	Doc. Dr. V. Lovchinov; ISSP members: 4	Ioffe Institute for physics and technics, St. Petersburg, Russia	
19	Synthesis and structure investigation of multifunctional materials	Doc. Dr. A. Stoianova-Ivanova 2 participants from ISSP	Institute of Low Temperature and Structure Research, Polish Academy of Sciences, Prof. Dr Andrzej J. Zaleski	
20	Preparation and investigation of organic-nanostructures for optoelectronics	Assoc. Prof. Y. G. Marinov (6 participants)	BAS – Russian Academy of Sciences	
21	Mechanical and electrostatic properties of lipid membranes	Prof. Isak Bivas (4 participants)	BAS – Russian Academy of Sciences	
22	Etude des propriétés mécaniques par holographie digitale	Assoc. Prof. V. Vitkova (2 participants)	BAS – Wallonie Bruxelles International (Belgique)	
23	Laser technologies and their application (2012 - 2014)	Prof. N. Sabotinov, D.Sci. 7 participants 4 from ISSP	Institute of Fluid Flow Machinery, PAN, Gdansk	
24	Space – time resolved structure of the low pressure hollow cathode discharge	Assoc. Prof. V. Mihailov 5 participants	Institute of Physics, Belgrade, Serbia	