

**PLAN OF THE RESEARCH PROJECTS FOR 2014
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 2014
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 - 7	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	Assoc. Prof. Peter Rafailov 8 total number of participants 8 participants from ISSP	BAS	
4	Electronic properties of solid state systems	Assoc. Prof. Dr K. Christova 6 participants 6 participants from ISSP	BAS	
5	Biomaterials and surfaces: modification of solid surfaces by nanodiamond as models for the growth of implant	Assoc. Prof. Dr L. Pramatarova 5 participants	BAS	

	coating	4 participants from ISSP		
6	Preparation, characterization and applications of new chalcogenide materials and thin films containing nanosized semiconductors	Prof. DSc D. Nesheva 9 participants	Budget	
7	Characterization of nano-sized and nano-structured dielectric and semiconductor films and heterostructures on their basis	Assoc. Prof. Dr. A. Sekeresh, 6 participants	Budget	
8	Physics and technology of thin and ultrathin dielectric and semiconductor layers for nanoelectronics applications	Assoc. Prof. Dr. A. Paskaleva, total -11 participants from ISSP - 11	BAS	
9	Investigations of devices based on different different acoustic wave modes: Bulk, Lamb, Rayleigh and Transverse surface acoustic waves for sensor application	Assoc. Prof. Dr. V. Georgieva total -12 participants from ISSP - 12	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 Liquid Crystals: Dielectric and Photoelectric Properties	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	BAS	
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II. Projects, additionally funded by contracts with the National Science Fund /NSF/

1	2	3	4	5
1	Role of substratum elasticity in osteoblast differentiation of mesenchymal stem cells	For ISSP- Assoc. Prof. Dr L. Pramatarova 16 participants 5 participants from ISSP	NSF – Б01/18/28.11.2012	10000 lv.
2	Characterization of new chalcogenide materials by atomic force microscopy	Assoc. Prof. I. Bineva, From ISSP: 3 participants	NSF, DMU-03-91	16 420.50 BGN
3	The deformability as a key feature of biomembranes and the influence of biologically relevant substances on it – experimental studies on model systems	Assoc. Prof. V. V. Vitkova (4 participants)	DMU03-80/2011	
4	Investigations of Photostimulation Effects in Nano-Structured Liquid Crystals	Assoc. Prof. Dr. Yordan G. Marinov total - 9 participants from ISSP - 5	MEYS, Bulgaria – DST, India № DNTS/India 01/4	20 000 lv.
5	N-particle interactions in a gas of cooled Rydberg atoms	Assoc. Prof. E. Dimova 2 participants	RILA (France)	
6	New techniques of quantum control and applications	Assist. Prof. B. Torosov 4 participants	NSF MY-03-103/2011	18 756 Lv.
7	LIF analysis for cultural heritage investigation and conservation (2012-2014)	Assist. Prof. P. Zahariev, total number – 5 from ISSP - 4	NSF MY 03-126/20.12.2011	18 941 Lv.

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	15 000 USD
2	Investigation of impurities in helium gases on the base of quartz crystal microbalance	Ts. Yordanov, total -11 participants from ISSP – 5.	Dubna, Russian	3000 \$
3	Обновявяне на технологично оборудване и апаратура за иновативни научно-приложни разработки на многослойни оптични структури	Prof. K. Blagoev, DSc	ОП "Развитие на конкуренто-способността на българската икономика" 2007-2013 г. BG161PO003-1.2.04-0027-C0001	
4	Transport and behaviour of Tungsten atoms and ions ; spectroscopic diagnostics (LIF)	Prof. K. Blagoev ISSP - 2	EUROATOM 1.4.1	2000

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 For ISSP – Assoc. Prof. O. Ivanov	The Seventh Framework Programme – Security Project Number: 312804	
2	EURATOM	ISSP coordinator: Asoc. Prof. Dr. E. Nazarova; ISSP members: 5	EURATOM FU07--CT-2007-00059	
3	CareRAMM (Carbon Resisitive	Dr. T. Tsvetkova	CareRAMM (NMP3-SL-2012-	EUR 53 100

	Random Access Memory Materials)	Total number of participants: 3	309980) , EC 7FP programme: SP1-Cooperation	
4	Research and Innovation Capacity Strengthening of ISSP-BAS in Multifunctional Nanostructures	Acad. A. G. Petrov Total – 20 From ISSP - 15	INERA/FP7-REGPOT-2012-2013-1	
5	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)	

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

1	2	3	4	5
1	New nanobiocomposites: model systems for bone engineering	Assoc. Prof. Dr L. Pramatarova 10 total number of participants 5 participants from ISSP	ABA and FIO Slovenia	
2	Obtaining of composite materials: nanodiamond particles embedded in polymer layers by the laser-liquid-substrate interaction method	Assoc. Prof. Dr L. Pramatarova 10 total number of participants 5 participants from ISSP	ABA and FIO Romania	
3	Investigation of the interaction of high energy electrons with SiO _x and nc(a)-Si-SiO _x thin films (2014-2016)	Prof. DSc D. Nesheva, Total: 9 participants, From ISSP 5 and 4 from Center for Solid State Physics and New Materials	Serbia	
4	Investigations of optical and structural	Assoc. Prof. Dr. Z.	Czech Republic	

	properties of special glasses for photonic applications (2014-2017)	Ivanova, Total: 4 participants, From ISSP 2 and 2 from Institute of Photonics and Electronics, Prague		
5	Multicomponent chalcogenide semiconductors thin films suitable for phase change memory (2012-2014)	Assoc. Prof. Dr. D. Arsova, Total: 8 participants, From ISSP 4 and 4 from Ioffe Physico Technical Institute, St. Peterburg	Russia	
6	Pulsed laser deposited AlN nanostructures: tunable morphologies and properties (2013-2015)	Assist. Dr. S. Bakalova, Total: 10 participants, From ISSP 4 and 5 from Institute of Atomic Physics, RAN	Romania	
7	Ion beam modification of semiconductor surface layer for micro- and optoelectronics application purposes (2012-2014)	Assoc. Prof. Dr. A.M. Szekeres, Total: 14 participants, From ISSP 6 and 8 from Institute of Physical Chemistry, RAN	Romania	
8	Nanostructured and amorphous semiconductor films for sensors application (2013-2015)	Assoc. Prof. Dr. I. Bineva, Total: 12 participants, From ISSP 6 and 6 from National Institute for Research and Development in Microtechnology – IMT Bucharest	Romania	Under consideration
9	Breakdown dynamics in high-k Al- and Hf-doped Ta ₂ O ₅ dielectrics	Prof. DSc Elena Atanassova	Academy's bilateral agreements, Serbia	
10	Investigation of resistive switching	Assoc. Prof., Dr. Albena	Academy's bilateral agreements,	

	effect in MIM structures with TaO _x - and TiO _x - based dielectrics for future memory applications.	Paskaleva, 3	Slovakia	
11	Charge trapping and retention in metal/oxide/high-k dielectric/oxide/Si (MOHOS) structures for non-volatile memory (NVM) application	Assoc. Prof., Dr. Albena Paskaleva, 2	Academy's bilateral agreements, Republic of Macedonia	
12	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 – 5	Academy's bilateral agreements, Russian	
13	Preparation of new Fe-based superconducting materials	Asoc. Prof. Dr. E. Nazarova Total - 6, ISSP - 4	Italy	
14	Electrical and magnetic properties of perovskite magnetic materials	Doc. Dr. P. Simeonova; 4, ISSP members: 3	Liege, Belgium. L'Universite de Liege, Depart, Physique, Group SUPRA.TECS	
15	Structural and physical investigations on nanostructural layers and bulk porous materials based on dielectric matrix	Doc. Dr. V. Lovchinov; 4, ISSP members: 3	Ioffe Institute for physics and technics, St. Petersburg, Russia	
16	Synthesis and structure investigation of multifunctional materials	Doc. Dr. A. Stoianova-Ivanova Total – 4, 2 participants from ISSP	Institute of Low Temperature and Structure Research, Polish Academy of Sciences, Prof. Dr Andrzej J. Zaleski	
17	Investigation, characterization and modeling of oxide/metal/oxide (M=Co, Pd) structures for multifunctional applications in biology and medicine	Asoc. Prof. Dr. E. Vlakhov 6 participants	Romania	
18	Influence of the annealing temperature on the critical parameters of Fe based	Assist. Prof. K. Buchkov, PhD	Poland	

	superconductors – FeSe, FeSeTe	Total – 7, ISSP - 3		
19	Preparation and Investigation of Organic-Nanostructures for Optoelectronics	Assoc. Prof. Dr. Yordan G. Marinov total number of participants - 8 participants from ISSP - 6	BAS – Russian Academy of Sciences	
20	Mechanical and electrostatic properties of lipid membranes	Prof. Isak Bivas (4 participants)	BAS – Russian Academy of Sciences	
21	Etude des propriétés mécaniques par holographie digitale	Assoc. Prof. V. Vitkova (2 participants)	BAS – Wallonie Bruxelles International (Belgique)	
22	Laser technologies and their application (2012 - 2014)	Prof. N. Sabotinov, D.Sci. 7 participants 4 from ISSP	Institute of Fluid Flow Machinery, PAN, Gdansk	