

PLAN OF THE RESEARCH PROJECTS FOR 2015 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 2015
1	2	3	4	5

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

1	2	3	4	5
1	Quantum effects in nanostructured magnetic materials	Prof. H. Chamati, DSc Participants - 8	BAS	
2	Thermodynamic properties of magnetic and superconducting systems	Prof. D.I. Uzunov, DSc Participants - 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 total number of participants: 8 7 participants from ISSP	BAS	
4	Electronic properties of solid state systems	Assoc. Prof. Dr. K. Christova 6 participants from ISSP	BAS	
5	Biomaterials and surfaces: modification of solid surfaces by nanodiamond as models for the growth of implant coating	Assoc. Prof. Dr. L. Pramatarova total number of participants: 5 4 participants from ISSP	BAS	

6	Preparation and properties of nanostructured and amorphous chalcogenide, oxide and nitride semiconductors and structures for applications in optoelectronics and sensors (2015-2017)	Prof. DSc D. Nesheva, Total: 10 ISSP staff members + 6 associated ISSP members	BAS budget	
7	Study of devices based on different acoustic wave mods bulk acoustic waves (BAW) Lamb's acoustic waves (LAW), Rayleigh surface acoustic waves (SAW) and Surface Transverse waves (STW) for sensor application	Asoss. Prof. Velichka Georgieva PhD, 12	BAS	
8	Physics and technology of tin and ultrathin dielectric and semiconductor films for nanoelectronic applications.	Assoc.Prof., Dr. Albena Paskaleva, 10	Budget	
9	Preparation and optimization of the properties of new materials, structures and multifunctional magnetic systems A) Preparation and investigation of high temperatures superconductors B) Environmental physics	Prof. DSc N. Tonchev Number of participants from ISSP - 14	Budget subsidy of BAS	
10	Photonics, optics and spectroscopy of nonlinear and anisotropic media	Project leader: S. Rashev Total number of participants: 19	budget subsidy	
11	Nanostructured and bioactive liquid crystals	Assoc. Prof. Dr. Yordan G. Marinov (4 participants)	BAS	-
12	Mechanical and flexoelectrical properties and phenomena in lyotropic and thermotropic liquid crystals	Prof. DSc. Isak Bivas (5 participants)	BAS	
13	Physics of atoms, molecules and plasma	Prof. DSc. K. Blagoev 10 participants		

14	Lasers, laser technologies and applications	Assoc.Prof. Dr. M.Grozeva 14 participants	budget subsidy	
15	Method and equipment for parameter determination of stereo-conform bio-chemical reactions	Leader: Assoc. Prof., PhD Gencho Minchev participants from ISSP: 1	BAS	

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

1	2	3	4	5
1	Low-dimensional Heisenberg spin system with three body interaction	Prof. Nedko Ivanov 5 participants	DNTS/Germany 01/2	15000 BGN
2	New hybrid structures based on photorefractive crystal – liquid crystal and graphene	For ISSP- Assoc. Prof. Dr Peter Rafilov total number of participants: 20 4 participants from ISSP	NSF – E01/18/28. 12. 2014	23100 BGN
3	Role of substratum elasticity in osteoblast differentiation of mesenchymal stem cells	For ISSP- Assoc. Prof. Dr L. Pramatarova total number of participants: 16 5 participants from ISSP	NSF – E01/18/28.11.2012	10000 BGN
4	Characterization of new chalcogenide materials by atomic force microscopy (2014-2016)	Assoc. Prof. Dr I. Bineva, From ISSP: 3 participants	NSF, DMU-03-91	16 420.50 BGN
5	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	
6	Nanostructured liquid crystals for tunable photonic devices	Assoc. Prof. Dr. Yordan G. Marinov (5 participants)	DFNI-TO2/18	

7	N-particle interactions in a gas of cooled Rydberg atoms (2014-2015)	Assoc. Prof. E. Dimova 3 participants	NSF - DRila 01/4 (France)	8 821 BGN
8	New techniques of quantum control and applications	Assist. Prof. B. Torosov 4 participants	NSF MY-03-103/2011	18 756 BGN
9	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 BGN

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. (2013-2015)	Prof. DSc S. Kaschieva Total: 6 participants From ISSP: 4	Russia, Dubna International Institute of Nuclear Research	5 000 USD
2	Investigation of surface morphology of thin nanostructured films using scanning probe microscopy (2014-2016)	Assoc. Prof. Dr. I. Bineva, Total: 6 participants From ISSP: 3 and 3 from Institute of Chemistry, Faculty of Science, Ss Cyril and Methodius University, Skopje	Agreement between BAS and MASA, Macedonia	5 000 BGN
3	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	Agreement between BAS and MASA, Macedonia	
4	Preparation and investigation of iron based high temperature superconductors	Assoc. Prof. Dr. E. Nazarova Number of participants from ISSP – 4	Bilateral agreement Italy	

		Total number of participants - 7		
5	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	
6	Upgrading technological equipment for innovative applied research on multilayer optical structures	Project leader: Prof. DSci. K. Blagoev Total number of participants: 4 (ISSP)	OPERATIONAL PROGRAMME “DEVELOPMENT OF THE COMPETITIVENESS OF THE BULGARIAN ECONOMY” 2007 – 2013 BG161PO003-1.2.04-0027-C0001	

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, participants - 6	The Seventh Framework Programme – Security Project Number: 312804	100 000 €
2	CareRAMM (Carbon Resisitive Random AccessMemory Materials) –	Assoc. Prof. Dr. T. Tsvetkova Total number of participants: 3 (ISSP)	CareRAMM (NMP3-SL-2012-309980) under 7FP program of EU: SP1-Cooperation	67 680 BGN
3	European network for development of electroporation-based technologies and treatments	Acad. A. G. Petrov (coordinator for Bulgaria) (> 500 participants from 41 contries)	COST Action TD1104 (EP4Bio2Med)	

4	Research and Innovation Capacity Strengthening of ISSP-BAS in Multifunctional Nanostructures	Acad. A. G. Petrov	INERA/FP7-REGPOT-2012-2013-1 NMP	
5	BAS / Tallin Technological University, Estonia	Assoc. Prof. Dr. A. Stoianova – Ivanova	Sector program “Erasmus”	

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

1	2	3	4	5
1	Field theoretical approach and numerical studies of macromolecular chains in confined geometries	Prof. H. Chamati, DSc Participants - 2	Poland	
2	New nanobiocomposites: model systems for bone engineering	Assoc. Prof. Dr L. Pramatarova 10 total number of participants 5 participants from ISSP	BAS - Slovenia	
3	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	BAS - Romania	
4	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: 8 participants, From ISSP 4 and 4 from Center for Solid State Physics and New Materials, Belgrade	Serbia	

5	Investigations of optical and structural properties of special glasses for photonic applications (2014-2017)	Assoc. Prof. Dr. Z. Ivanova, Total: 4 participants, From ISSP 2 and 2 from Institute of Photonics and Electronics, Prague	Czech Republic	
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	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	
8	Light-induced phenomena in chalcogenide glasses for optoelectronic applications (2015-2017)	Assoc. Prof. Dr. Z. Ivanova, Total: 4 participants, From ISSP 2 and 2 from ISSP, Riga	Latvia	
9	Studies of different transparent conductive oxide *TCO) films for solar energy and optoelectronics applications (2015-2017)	Prof. DSc D. Nesheva, Total: 16 participants, From ISSP 6 and 9 from the Institute of Physical Chemistry of the Romanian Academy of Sciences	Romania	
10	Optimization of resistive switching structures for memory applications	Assoc.Prof., Dr. Albena Paskaleva	Serbia	

11	Breakdown dynamics in high-k Al- and Hf-doped Ta ₂ O ₅ dielectrics	Assoc.Prof., Dr. Albena Paskaleva	Slovakia	
12	Electrical and magnetic properties of Perovskite magnetic materials	Assoc. Prof. Dr. P. Simeonova Number of participants from ISSP – 2 Total number of participants - 4	BAS - Belgium	
13	Structural and physical studies of nanostructured materials based on porous dielectric matrices	Assoc. Prof. Dr. V. Lovchinov Number of participants from ISSP – 2 Total number of participants - 5	BAS - Russia	
14	Synthesis and structural investigations of nanomaterials	Assoc. Prof. Dr. A. Stoianova – Ivanova Number of participants from ISSP – 4 Total number of participants - 5	BAS - Poland	
15	Investigation, characterization and modeling of Oxide/Metal/Oxide structures prepared by Magnetron sputtering and modified by laser technologies for multifunctional applications in biology and medicine	Assoc. Prof. Dr. E. Vlahov Number of participants from ISSP – 2 Total number of participants - 7	BAS - Romania	
16	Investigation of transport and mixed state properties of Iron-chalcogenide FeSe system modified by Ag-addition.	Dr. Krastyo Buchkov Number of participants from ISSP – 3 Total number of participants - 8	BAS - Poland	

17	La rheologie de suspension de vesicules et cellules sanguines: de la comprehension au diagnostic de pathologies hematologiques	Assoc. Prof. V. Vitkova (5 participants)	BAS – CNRS (France)	
18	Etude des propriétés mécaniques par holographie digitale	Assoc. Prof. V. Vitkova (3 participants)	BAS – Wallonie Bruxelles International (Belgique)	
19	Femtosecond laser applications (2015 - 2017)	Assoc. Prof. Todor Petrov 14 participants 9 from ISSP, BAS	Poland - Institute of Fluid Flow Machinery, PAN, Gdansk	
20	Experimental and theoretical study of physical proceses in glow discharges (2014 - 2016)	Prof. Dimo Zhechev 4 participants 4from ISSP, BAS	Serbia - Serbian Academy of Sciences and Arts	
21	Coherence effects in atomic gases (2015 - 2017)	Assoc Prof. Emilia Dimova 2 participants from ISSP, BAS	Poland – Institute of Physics, Jagiellonian University, Krakow	