

Роль проектов по обмену персоналом в развитии научной лаборатории

(опыт реализации проектов TerACap, Casotel, FAEMCAR, NAmiceMC, CANTOR)



Полина Кужир

Институт ядерных проблем БГУ

Laboratory of electrodynamics of nonhomogeneous mediums

~ 20 persons

2 ScD (Research professors)

4 PhD

6 PhD students

3 MS students

Undergraduate students

8 INTAS projects

2 NATO SfP

2 NATO linkage

1 ISTC

5 EU FP-7 IRSES

1 EU FP-7 INCO

3 IB BMBF (Germany)



Средний возраст – 36 лет

Реализуемые и завершенные проекты IRSES

Terahertz applications of carbon-based nanostructures, EU FP7 TerACaN project FP7-230778, 2009-2013, Principal Researcher: M. Portnoi (Univer Exeter, UK), team leaders S. Maksimenko, O. Kibis (Novosibirsk, NSTU), I. Luk'yanchuk (Amiens University, France).

Nano carbon based components and materials for high frequency electronics, EU FP7 CACOMEL project FP7-247007, Call ID "FP7-PEOPLE-2009-IRSES", 2010-2014, Coordinator: Prof. Ch. Thomsen (Institut fuer Festkoerperphysik, TUB, Berlin, Germany), partners: S. Maksimenko, Y. Svirko (University of Joensuu, Finland), Yu.N. Shunin (University of Latvia, Institute of Solid State Physics). E. Obrazcova (A.M. Prokhorov General Physics Institute of RAS), P. Dyachkov (Kurnakov Institute of General and Inorganic Chemistry, RAS) G. Miano (Università degli Studi di Napoli Federico II, Italy)

Fundamental and Applied Electromagnetics of Nano-Carbons, EU FP7 project FP7- 318617 FAEMCAR, Call ID FP7-PEOPLE-2012-IRSES, 2012-2017, Principal Researcher: Ph. Lambin (Facultes Universitaires Notre-Dame de la paix de Namur, Belgium), team leaders: Y. Banis (Vilniaus Universitetas, Lithuania), S. Bellucci (Istituto Nazionale di Fisica Nucleare, Frascati, Italia), L. P. Biró (Research Centre for Natural Sciences, Hungarian Academy of Sciences, Budapest, Hungary), L.A. Chernozatonskii (Institute for Biochemical Physics RAS, Moscow, Russia), G. I. Dovbeshko (Institute of Physics, NASU, Kiev, Ukraine), P. Kuzhir (INP BSU).

Carbon-nanotube-based terahertz-to-optics rectenna, EU FP7 project FP7-612285 CANTOR, Call ID FP7-PEOPLE-2013-IRSES, 2013-2017, Principal Researcher: M. Portnoi (University of Exeter, UK), team leaders S. Maksimenko (INP BSU), G. Slepian (Tel Aviv University, Israel)

Nano-Thin and Micro-Sized Carbons: Toward Electromagnetic Compatibility Application, project FP7-610875 NAMICEMC, Call ID FP7-PEOPLE-2013-IRSES, 2013-2017, Principal Researcher: A. Celzard (ENSTIB, Universite de Lorraine, Epinal, France), team leaders: S. Bellucci (Istituto Nazionale di Fisica Nucleare, Frascati, Italia), P. Kuzhir (INP BSU).

Nano carbon based components and materials for high frequency electronics, EU FP7 **CACOMEL** project FP7-247007, Call ID "FP7-PEOPLE-2009-IRSES", **2010-2014**

SEVENTH FRAMEWORK PROGRAMME
Marie Curie Actions
People
 International Research Staff Exchange Scheme

Annex I - "Description of Work"

3. Project summary

A strong expansion of the frequency range towards terahertz and infrared is the major trend in the modern electronics and optoelectronics. It relies on the incorporation of modern nanotechnology that has already given the birth to nanoelectronics, a rapidly developing discipline focused on both the dramatic increase of the component integration level and decrease in a power consumption. Performance of nanoelectronic devices is strongly influenced by quantum effects that often even determine properties of nano-sized components. The project aims at understanding of fundamentals of the electromagnetic processes in nanocircuits, theoretical and experimental investigation of underlying mechanisms responsible for their fascinating properties, and development of physical basis for use of these properties in novel nanoelectronic devices. The project focuses on resolving the problem of implementation of CNTs into nanoelectronics, and fabrication of nonlinear devices in fibers and waveguides for signal processing, all-optical switching, etc. The project has the following main objectives:

- to reveal the effects of spatial irregularities in the performance of CNT-based components and nanocircuits;
- to develop EMC theory of the circuits with nano-sized components;
- to perform experimental and theoretical investigation of high frequency and nonlinear optical properties of nano-carbon materials as potential materials for electromagnetic shielding and optical application.

Linear and nonlinear electromagnetic effects in nano-carbon structures, such as onion-like carbon and both single- and multi-wall carbon nanotubes, will be studied. Detail consideration to the performance of nanocircuits based on carbon nanotubes and other nanocarbon materials will be carried out, and fundamentals of the EMC theory as applied to circuits with nano-sized components will be developed. The role of intertube tunnelling in the performance of CNT-based high-frequency circuits will be studied. The second- and third order nonlinear optical effects in CNTs and other sp^2 nanocarbons to reveal their performance in nonlinear optical devices will be investigated. Different aspects of the design of materials based on sp^2 -nanocarbons for photonics and optoelectronics will be considered and the study of electromagnetic response of novel nano-carbon based composites to microwaves, THz, IR and optical frequencies will be undertaken in order to clarify their possible use for electromagnetic coating/shielding for a wide spectrum of technological applications.

The proposed multi-disciplinary research joins in a complimentary way differently experienced teams: electromagnetic theory and nanoelectromagnetism, solid state physics and quantum chemistry, characterization and optical spectroscopy of nano-carbons and nano-carbon materials, and nano-carbon fabrication technology. The composition of the research consortium provides for both successful realization of the project objectives and intensive knowledge exchange between teams. The challenging project relies on the complementary expertise of the consortium teams and is based on the original approach combining electrodynamics of mesoscopic inhomogeneous media and quantum theory of electronic ensembles with reduced dimensionality.

Full Title: Nano-carbon based components and materials for high frequency electronics

Acronym: CACOMEL

Proposal Number: 247007

Scientific Panel: PHY: Physics

Grant Agreement Number:

Duration of the project: 48 months

● Устойчивый научные связи

● Вновь образованные связи

2. List of partner organisations

Partner Number	Partner name	Partner short name	Country
1 coordinator (beneficiary)	Technische Universität Berlin, Institut für Festkörperphysik	TUB	Germany
2 beneficiary	University of Joensuu	UJOE	Finland
3 beneficiary	Università degli Studi di Napoli Federico II	UNF	Italy
4 beneficiary	University of Latvia, Institute of Solid State Physics	ISSP	Latvia
5 partner organisation	Belarus State University, Institute for Nuclear Problems	INP	Belarus
6 partner organisation	A.M. Prokhorov General Physics Institute of Russian Academy of Sciences	GPI	Russia
7 partner organisation	Kurnakov Institute of General and Inorganic Chemistry, Russian Academy of Sciences	IGIC	Russia

Fundamental and Applied Electromagnetics of Nano-Carbons, EU FP7 project FP7- 318617 **FAEMCAR**, Call ID FP7-PEOPLE-2012-IRSES, **2012-2016**

SEVENTH FRAMEWORK PROGRAMME
Marie Curie Actions
People
International Research Staff Exchange Scheme

Annex I - "Description of Work"

DESCRIPTION OF WORK

PART A

1. Grant agreement details

Full Title: Fundamental and Applied Electromagnetics of Nano-Carbons

Acronym: FAEMCAR

Proposal Number: 318617

Scientific Panel: Physics

Grant Agreement Number: PIRSES-GA-2012-

Duration of the project: 48 months

Project start date: October 1, 2012

2. List of participants (*beneficiaries and partner organisations*)

Participant Number	Participant name	Participant short name	Country
1 Beneficiary 1	Facultés universitaires Notre-Dame de la Paix	LPS	Belgium
2 Beneficiary 2	Muszaki Fizikai és Anyagtudományi Kutatóintézet - Magyar Tudományos Akadémia	MFA	Hungary
3 Beneficiary 3	Istituto nazionale di Fisica Nucleare	LNF	Italy
4 Beneficiary 4	Vilnius Universitetas	LPTDS	Lithuania
5 Partner 5	Belarusian State University	INP	Belarus
6 Partner 6	Emanuel Institute of Biochemical Physics - Russian Academy of Science	IBCP-RAS	Russia
7 Partner 7	Institute of Physics of National Academy of Science of Ukraine	IP-NASU	Ukraine

3. Project summary

Owing to very small dimensions of nanostructures in one or more directions, spatial confinement of charge carriers is fully achieved, providing thereby a discrete spectrum of their energy states. In addition, intrinsic spatial inhomogeneity of nanostructures dictates nanoscale inhomogeneity of the surrounding electromagnetic fields. Therefore, understanding the properties of nanostructures requires to deal with the intricate characters of their atomic structure, electronic structure and electromagnetic environment. Coming within the scope of this new field of "nano-electromagnetics", the present project aims at understanding how and why carbon nanostructures might have interesting electromagnetic properties. The core of the project is the development, the experimental validation and the exploitation of a consistent theory of the electromagnetic response in radio, microwave and THz frequency ranges of regular carbon nanostructures and polymer composites based on nanocarbons. In particular, the project intends:

- to provide a forum for scientists specialized in different areas of the nanocarbon, and nanocarbon materials synthesis and applications;
- to interpret experimental electromagnetic data collected;
- to define physical grounds and to perform experiments for the design of a new generation of ultra-light materials with controlled electromagnetic properties;
- to explore the possibility of using chemically-modified nanocarbons in "thin" bio-medical and nanophotonics applications.

At this aim, seven teams belonging to three different scientific areas will joint efforts. The partners will equally contribute to the achievements of the objective of this multi-disciplinary project by bringing their expertise in condensed-matter physics, electromagnetic theory, and applied electromagnetism. The research efforts, both theoretical and experimental, are articulated around four work packages all involving strong collaborative links and knowledge transfer across the consortium.



● Устойчивый научные связи

● Вновь образованные связи

Carbon-nanotube-based terahertz-to-optics rectenna, EU FP7 project FP7-612285 **CANTOR**, Call ID FP7-PEOPLE-2013-IRSES, **2013-2017**

SEVENTH FRAMEWORK PROGRAMME THE PEOPLE PROGRAMME

International Research Staff Exchange Scheme

Annex I - "Description of Work"

PART A

1. Grant agreement details

Full Title: Carbon-nanotube-based terahertz-to-optics rectenna

Acronym: CANTOR

Proposal Number: 612285

Scientific Panel: Physics

Grant Agreement Number: PIRSES-GA-2013-612285

Duration of the project: 48 months

● Устойчивый научные связи

● Вновь образованные связи

2. List of participants (*beneficiaries* and partner organisations)

Participant Number	Participant name	Participant short name	Country
1 Beneficiary 1 (coordinator)	University of Exeter	UNEXE	United Kingdom
2 Beneficiary 2	Tel Aviv University, School of Electrical Engineering, Faculty of Engineering, Department of Physical Electronics,	TAU	Israel
3 Partner* 3	Belarusian State University, Institute for Nuclear Problems	Belorussian State Uni	Belarus

**in Part B of Annex I, the abbreviation INP is used as participant short name instead Belorussian State Uni*

3. Project summary

The efficiency of traditional semiconductor solar cells is the subject of a fundamental limitation known as the Shockley-Queisser recombination limit, and is found to be near 30%. The invention in the early eighties of solar cell rectifying antennas (rectennas) – a combination of an optical antenna and a rectifying diode to efficiently absorb the incident solar radiation and directly convert the ac field across the antenna into the dc power - provides a way to overcome the limitation. Recent rapid technological progress in the design of different nano-dimensional structures gives rise to a new promising possibility in designing nanorectennas. A solar cell will incorporate a large array of such elements, which provide high conversion efficiency, and can be produced cheaply in a roll-to-roll process. However, practical realization of such devices requires precise theoretical modeling and experimental study to provide optimization of the antenna and nanocontact configuration. The project focuses on the physics and theoretical modelling of nanorectenna performance. The rectification effect comes from the photo-assisted charge carrier tunneling through a nanogap. For the efficiency enhancement, we propose using the coherent effect of the photon dressing of the electron-hole pairs. Theoretical modeling will be carried out on the basis of the Landauer- Büttiker formalism extended to the case of photon-dressed electrons. The fundamental thermodynamic limitation of the rectenna efficiency and prospective applications of the device are to be studied. This multidisciplinary and challenging project relies on the complementary expertise of the consortium teams and is based on the original approach - nanoelectromagnetics - combining electrodynamics of mesoscopic inhomogeneous media and the quantum theory of electronic ensembles with reduced dimensionality.

Nano-Thin and Micro-Sized Carbons: Toward Electromagnetic Compatibility Application, project FP7-610875 **NAMICEMC**, Call ID FP7-PEOPLE- 2013-IRSES, **2013-2017**

- Устойчивый научные связи
- Вновь образованные связи

SEVENTH FRAMEWORK PROGRAMME
THE PEOPLE PROGRAMME

International Research Staff Exchange Scheme

Annex I - "Description of Work"

PART A

1. Grant agreement details

Full Title: Nano-thin and micro-sized carbons: Toward electromagnetic compatibility application

Acronym: NAMICEMC

Proposal Number: 610875

Scientific Panel: physics

Grant Agreement Number: PIRSES-GA-2013-610875

Duration of the project: 48 months

2. List of participants (*beneficiaries* and partner organisations)

Participant Number	Participant name	Participant short name	Country
1 Beneficiary* 1 (coordinator)	University of Lorraine	UL	France
2 Beneficiary 2	Frascati National Laboratory at the National Institute of Nuclear Physics	LNF INFN	Italy
4 Partner** 3	Belarus State University, Institute for Nuclear Problems	INP BSU	Belarus

* Beneficiary: EU/AC Institution

** Partner: Other Third Country Institution

3. Project summary

The remarkable properties of high-surface area carbons, compatible in that with carbon nanotubes, provide a tremendous opportunity for fabrication, even at very low filler concentrations, of composites with outstanding electrical and electromagnetic properties. Due to their multifunctional properties, carbon/polymer composites can be widely used as relatively low weight and ultra-thin effective electric and optical components, as well as electromagnetic (EM) shielding and absorbing coatings. At the same time, ultra-lightweight carbon foams, being highly conductive, are expected to have very high EM shielding ability due to their cellular structure. Moreover, carbon foams have extremely low cost, and demonstrate outstanding thermal insulation / fire resistant and good mechanical properties. Along with polymer/carbon composites and highly conducting porous carbon monoliths, one more very attractive object for investigation its electromagnetic properties is ultrathin carbonaceous film - pyrolytic carbon or a few layer graphene. We expect that they could absorb up to 50% of the incident microwave power despite the fact that their thickness is only a small fraction of the skin depth. The idea of the project is to provide comparative study of EM shielding effectiveness of carbon foams, carbon ultra-thin films and epoxy/carbon composites with low filler concentration in microwave frequency range and to support the experimental data with an adequate theoretical model of materials' electromagnetics. On the basis of our theoretical simulations and experimental database collected within the project implementation, we intend to contribute into solution of one of the most challenging problem in material science: to develop EM coating through design-oriented-approach.

Institutional Development of Applied Nanoelectromagnetics: Belarus in ERA Widening, EU FP7 **BY-NanoERA** project FP7-266529, Call ID FP7-**INCO**-2010-6, **2010-2013** Coordinator Prof. S. Maksimenko

The Belarusian State University Award named by Academician A.N. Sevchenko - for the work "Electromagnetics of nanostructures".



A Special Session "Nanoelectromagnetics" at the International conference on Physics, Chemistry and Applications of Nanostructures "Nanomeeting 2011", May 24-29, 2011.

Nanoscience and Nanotechnology 2011 INFN, Frascati, 26-30 September 2011. A special school-type one-day session devoted to topics of interest of the EU project BY-NanoERA.

A Special Session "Electrodynamics of nanowires and nanotubes" headed by Dr. G. Slepyan (INP) at the Int. Conference on Electromagnetics in Advanced Applications, September 12-17 2011, Torino, Italy.



A special tutorial "Emerging Nanoscientific Developments" has been presented by 6 key lectures and 11 invited talks.



www.nano.bsu.by

Lead partner:
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BY-NanoERA is funded by the European Union's 7th Framework Programme. The call identifier: FP7-INCO-2010-6. Grant no: 266529. The duration of the project is 36 months: from November, 1, 2010 until October, 31, 2013.



BY-NanoERA

Institutional Development of Applied Nanoelectromagnetics: Belarus in ERA Widening

Fp7 INCO.2010-6.1 Grant no: 266529



www.nano.bsu.by



oped for INP BSU will be proposed and disseminated as a model for the integration of the other Belarus teams into European Research Area.

The project partners work together on three work packages:
1. Framing and supporting the INP BSU's research activities and institutional development of NEM.
2. Facilitating INP BSU's research potential, information exchange and identifying partners.
3. Training for INP BSU's competence building and facilitating its participation in FP7.



In the last decade a new research discipline – nanoelectromagnetics – has been introduced as a synthesis of classical microwave electrodynamics and present-day concepts of the condensed matter physics.

As a principal goal, the proposed project implies: **Reinforcement of the cooperation capacities of INP BSU in ERA through the institutional development of the new research discipline – applied nanoelectromagnetics.**

- On this way, a set of coupled tasks must be solved:**
- To prove necessity and promising capability of NEM in the core objective of FP7 Theme 4 'NMP' and to develop a concept of nanoelectromagnetics as a perspective direction in NMP;
 - To develop the strategy of INP BSU as a focus institution for the applied NEM evolution on the national and European levels;
 - To establish network with research centers in MS or AC in applied NEM aimed with the progress in solving concrete research problems and submission of joint INCO proposals;
 - To develop training modules to build competency and facilitate the participation in FP7 of INP BSU;
 - To organize a set of workshops and seminars on NEM;
 - To propose the reinforcement scheme developed for INP BSU as a model for the Belarus teams' incorporation into ERA.

- Key directions of the work:**
- Electromagnetic waves and signal propagation in nano-sized components and integrated nano-structured systems; electromagnetic compatibility problem on the nano scale.
 - Electromagnetic response properties of composite materials with nano inclusions; electromagnetic shielding materials; nanocarbon in electromagnetic applications; nanocarbon based metamaterials.
 - Ionizing radiation shielding materials; boron, boron nitride and chemically modified (doped) carbon nanotube-based composite materials.
 - Heat transfer on nano scale and in nanocomposites exposed to high-frequency fields.
 - Nanocarbon in medical applications; far-infrared and terahertz range thermolysis of cancer cells.

BY-NanoERA Consortium

Project Coordinator:
INP BSU
Research Institute for Nuclear Problems BSU, Belarus

Project Partners:
TUB
Institut für Festkörperphysik TUB, Germany

OLEM, Institute of Mechanics-BAS, Bulgaria

INFN
National Institute Nuclear Physics, Italy

IOSL
Institute of Electronic Structure and Laser, Greece

ISIA
Institute of System Analysis and Information Support, Belarus

BNTU
Scientific & Technological Park of BNTU "Polytechnic", Belarus

Scientific links in Consortium



- Устойчивый научные связи
- Вновь образованные связи

Graphene-Based Revolutions in ICT And Beyond
 GRAPHENE
 Grant agreement number 604391
 CP-CSA

Поданные на конкурсы европейские проекты: **Graphene Flagship**

Основой стали текущие проекты
IRSES

*FP7 IRSES Cacamel,
 FP7 IRSES FAEMCAR,
 FP7 IRSES NAMICEMC*

и проект **INCO By-NanoERA**

February 2, 2014

Multi-layered sandwich graphene devices
(MILESAGE)

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Table 2.2a. Recent and ongoing scientific projects involving at least two of the present partners P1 to P8.

Project	Period	P1	P2	P3	P4	P5	P6	P7	P8
FP7-ICT-2007.8.1 FET Proactive 1: Nano-scale ICT devices and systems "Carbon nanotube technology for high-speed nano-interconnects" CATHERINE	2009-2011					x	x		
FP7-INCO-2010-6 Institutional Development of Applied Nanoelectromagnetics: Belarus in ERA Widening" BY-NanoERA	2010-2013				x		x	x	x
FP7-PEOPLE-2009-IRSES "Nano carbon based components and materials for high frequency electronics" CACOMEL	2010-2014			x	x				
FP7-PEOPLE-2012-IRSES "Fundamental and Applied Electromagnetics of Nano-Carbons" FAEMCAR	2012-2016	x	x		x		x		
FP7-PEOPLE-2013-IRSES "Nano-Thin and Micro-Sized Carbons: Toward Electromagnetic Compatibility Application" NAMICEMC	2013-2017				x		x		

Received

SPS:



Emerging Security Challenges Division
Science for Peace and Security Programme

PROJECT Application

NATO Emerging Security Challenges Division, SPS Programme, Bd. Léopold III, B-1110 Brussels, Belgium
Send applications to spc.applications@hq.nato.int

Project Title *80 characters maximum, including spaces. Please select a title that is comprehensible to the non-specialist*
Electromagnetic Interference Shield based on High Surface Area Carbon

SPS Key Priority/Priorities *please use the numbering and nomenclature from the guidelines*
1) Facilitate mutually beneficial cooperation on issues of common interest, including international efforts to meet emerging security challenges
a) Counter-Terrorism
i) Methods for the protection of critical infrastructure, supplies and personnel

Project Duration *maximum 36 months*
36

NATO and Partner Country Project Directors

NATO Country Project Director (NPD)

Family Name	First Name	Title	Job Title	Country
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Partner Country Project Director (PPD)

Family Name	First Name	Title	Job Title	Country
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Поданные на
конкурсы
европейские
проекты:
NATO SFP

Основой стали
текущие проекты
IRSES
FP7 IRSES FAEMCAR,
FP7 IRSES NAmiceMC

и проект **INCO By-
NanoERA**

Планируемые к подаче на конкурс H2020 RISE Research and Innovation Staff Exchange Call: H2020-MSCA-RISE-2014 проекты

Terahertz and Microwave Applications of Novel Carbon/Inorganic hybrid Nanostructures

Partnership Member	Legal Entity Short Name	Academic (Y/N)	Country
Beneficiaries			
Center of Physical Science and technology	CPST	Y	Lithuania
WEIZMANN INSTITUTE OF SCIENCE	WIS	Y	Israel
Institute of Mechanics, Bulgarian Academy of Sciences	IM-BAS	N	Bulgaria
Partner Organisations			
Belarusian State University, Research Institute for Nuclear Problems	INP BSU	Y	Belarus

Основой станут проекты IRSES
FP7 IRSES FAEMCAR
FP7 IRSES CANTOR

и проект INCO By-NanoERA

Collective Excitations in Advanced Nanostructures

Partnership Member	Legal Entity Short Name	Academic (Y/N)	Country
Beneficiaries			
Mediterranean Institute of Fundamental Physics	MIFP	Y	Italy
University of Exseter	EU	Y	UK
University of Eastern Finland	UEF	Y	Finland
University of Iceland	UI	Y	Iceland
Partner Organisations			
Belarus State University, Institute for Nuclear Problems	INP BSU	Y	Belarus
Erevan State University	ESU	Y	Armenia
De La Salle University	DLSU	Y	Philippines

Основой станут проекты IRSES
FP7 IRSES TerACaN
FP7 IRSES CacomeI
FP7 IRSES CANTOR



Устойчивый научные связи



Вновь образованные связи

Поданные на конкурсы европейские проекты: **COST**

Основой стали проекты **IRSES**

*FP7 IRSES TerACaN,
FP7 IRSES CacomeI,
FP7 IRSES FAEMCAR,
FP7 IRSES NAmiceMC
FP7 IRSES CANTOR*

и проект **INCO By-NanoERA**

Title: **N**anoelectromagnetics facing **s**ocietal challenges

Acronym: NEMASO

Abstract:

The potential of nanosized elements and nanostructured materials for the manipulation of electromagnetic fields motivates the recent introduction of a new research discipline – nanoelectromagnetics (NEM) – which conceptually is a fusion of classical electrodynamics with novel methods and approaches of condensed matter physics. To move towards societal challenges for further ERA development, NEM needs an intensive interdisciplinary knowledge exchange between different scientific communities. As the crucial issue for success is involvement of industry along with academic research, actions targeting industry will be taken. We have letters of interest by several industries. The platform yielded by the project will be made available. Close contact with users will be kept through workshops, a web forum dealing with NEM fundamentals; NEM for electromagnetic, Biomedical and ICT applications; nanophotonics, photovoltaics and metamaterials, by a network of research groups as contact points.

PARTICIPANTS

Dr. Stefano Bellucci, coordinator, INFN, Italy

Dr. Maria Kafesaki, FORTH, Greece

Prof. Raluca Muller, IMT Bucharest, Romania

Prof. Rumiana Kostilkova, IMech-BAS (OLEM), Bulgaria

Prof. Alain Celzard, CNRS Institut Jean Lamour, France

Prof. Yuri Shunin, ISSP, Latvia

Prof. Irina Hussainova, University of Tartu, Estonia

Prof. Juras Banys, VU, Lithuania

Prof. Gregory Slepyan, TU, Tel Aviv, Israel

Prof. Yuri Svirko, UEF, Finland

Dr. Mikhail Portnoi, University of Exeter, UK

Prof. Sergey Maksimenko, INP BSU, Belarus

Prof. Akhlesh Lakhtakia, Penn. State Univ., USA

Dr. Geza Mark, MFA, Budapest, Hungary

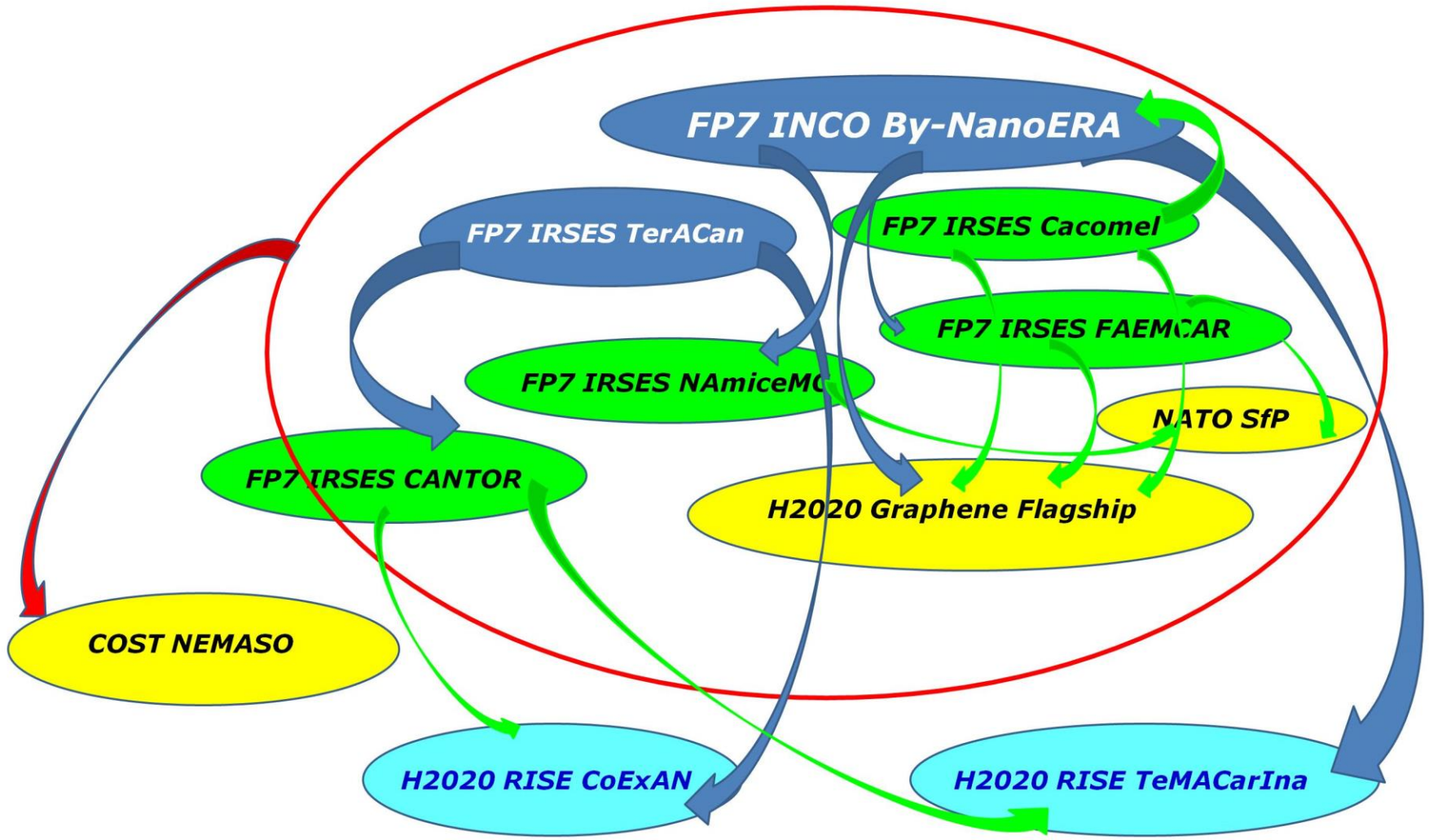
Prof. Philippe Lambin, U Namur, Belgium

Prof. Axel Hoffmann, TUB, Berlin, Germany

Средний **h-фактор** = **23**



Взаимные связи между проектами



Experimental evidence of localized plasmon resonance in composite materials containing single-wall carbon nanotubes

M. V. Shuba, A. G. Paddubskaya, A. O. Plyushch, P. P. Kuzhir, G. Ya. Slepyan, and S. A. Maksimenko
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A. Lakhtakia
Nanoengineered Metamaterials Group, Department of Engineering Science and Mechanics, Pennsylvania State University, University Park, Pennsylvania 16802-6812, USA

Terahertz conductivity peak in composite materials containing carbon nanotubes: Theory and interpretation of experiment

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C. Thomsen
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A. Lakhtakia

Thin Solid Films 519 (2011) 4114–4118



Contents lists available at ScienceDirect

Thin Solid Films

journal homepage: www.elsevier.com/locate/tsf



Projects visibility (2010-2013)

Invited talks: 10 (INP)

e.g. 2013 International Symposium on Electromagnetic Theory (Berlin)

Talks: 73 in total, most of them are oral presentations

Papers published: 114 in total in PRB, APL, JAP, Nanotechnology, etc

Microwave probing of nanocarbon based epoxy resin composite films: Toward electromagnetic shielding

P. Kuzhir^{a,*}, A. Paddubskaya^a, D. Bychanok^a, A. Nemilentsau^a, M. Shuba^a, A. Plusch^a, S. Maksimenko^a, S. Bellucci^b, L. Coderoni^b, F. Micciulla^b, I. Sacco^b, G. Rinaldi^c, J. Macutkevici^d, D. Seliuta^d, G. Valusis^d, J. Banys^e

Diamond & Related Materials 19 (2010) 91–99



Contents lists available at ScienceDirect

Diamond & Related Materials

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Dielectric properties of a novel high absorbing onion-like-carbon based polymer composite

J. Macutkevici^{a,*}, P. Kuzhir^{b,2}, D. Seliuta^{a,1}, G. Valusis^{a,1}, J. Banys^{c,3}, A. Paddubskaya^{b,2}, D. Bychanok^{b,2}, G. Slepyan^{b,2}, S. Maksimenko^{b,2}, V. Kuznetsov^{d,4}, S. Moseenkov^{d,4}, O. Shenderova^{e,5}, A. Mayer^{f,6}, Ph. Lambin^{f,6}

APPLIED PHYSICS LETTERS 97, 073116 (2010)

Terahertz sensing with carbon nanotube layers coated on silica fibers: Carrier transport versus nanoantenna effects

Dalius Seliuta,^{1,2,a)} Irmantas Kašalynas,¹ Jan Macutkevici,¹ Gintaras Valušis,¹ Mikhail V. Shuba,³ Polina P. Kuzhir,³ Gregory Ya. Slepyan,³ Sergey A. Maksimenko,³ Vitaly K. Ksenevich,⁴ Vladimir Samuilov,⁵ and Qi Lu⁵

Fundamental and Applied NanoElectroMagnetics

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Гранты международной федерации ученых (World Federation of Scientists, National Scholarship Programme in the frame of the topic "Science and Technologies for Developing Countries")

Nonlinear optical properties of carbon nanotube composites, World Federation of Scientists, National Scholarship Programme in the frame of the topic "Science and Technologies for Developing Countries", 2004. Grant holder A. Nemilentsau under supervision of S.A. Maksimenko

Optical properties of carbon nanotube based composite medium, World Federation of Scientists, National Scholarship Programme in the frame of the topic "Science and Technologies for Developing Countries", 2008. Grant holder M. Shuba under supervision of S.A. Maksimenko

Грант международной федерации ученых (World Federation of Scientists, National Scholarship Programme in the frame of the topic "Science and Technologies for Developing Countries"). «Диэлектрические свойства полимерных композитных материалов на основе нанопуглерода», 2010/2011, Получатель гранта: аспирант Д.С. Быченко, научный руководитель: С. А. Максименко

Грант международной федерации ученых (World Federation of Scientists, National Scholarship Programme in the frame of the topic "Science and Technologies for Developing Countries"). «Rabi waves in quantum dot-based nanostructures», 2011/2012, Получатель гранта: аспирант Е.Ерчак, научный руководитель: Г.Я.Слепян

Грант международной федерации ученых (World Federation of Scientists, National Scholarship Programme in the frame of the topic "Science and Technologies for Developing Countries"). 2012/2013, Получатель гранта: аспирант О.Г. Поддубская, научный руководитель: С. А. Максименко.

Грант международной федерации ученых WFS Belarus National Scholarship Programme "Experimental study and theoretical simulations of electromagnetic response of carbon foams and polymer/nanocarbon composites", Получатель гранта Плющ А.О. Научный руководитель - Максименко С.А.

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Грант РФФИ, конкурс "Научная работа молодых ученых из стран СНГ в российских научных организациях" МОБ_СНГ_СТ 2010 Г. и МОБ_СНГ_СТ 2011 Г. "Научная работа молодого ученого Быченка Дмитрия Сергеевича из Белоруссии в Институте Неорганической химии СО РАН"., Новосибирск, Грантополучатель Быченков Д.С.

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..., GY Slepyan, AM Nemilentsau, **MV Shuba** - Physica E: Low- ..., 2008 - Elsevier

A theory of the metallic achiral carbon nanotube (CNT) as a vibrator antenna is presented. The Leontovich–Levin integral equations method has been extended to the case of CNTs. Integral equations for the finite-length CNT and CNT bundles have been solved ...

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MV Shuba, GY Slepyan, SA Maksimenko... - Journal of Applied ..., 2010 - ieeexplore.ieee.org

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[Absorption cross-section and near-field enhancement in finite-length carbon nanotubes i terahertz-to-optical range](#)

MV Shuba, SA Maksimenko, GY Slepyan - arXiv preprint arXiv:0806.2954, 2008 - arxiv.org

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Terahertz time domain spectroscopy of epoxy resin composites with various carbon inclusions
(2012) *Chemical Physics*

Shiba, M.V., Maksimenko, S.A., Stepan, G.Y., Hanson, G.W.
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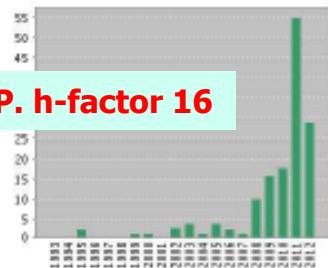
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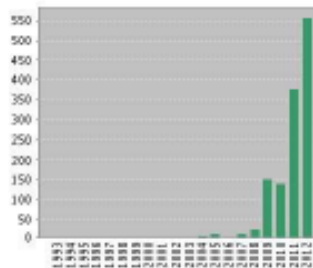
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Bychanok, D.S., Paddubskaya, A.G., Kuzhir, P.P., Maksimenko, S.A., Brosseau, C., Macutkevicius, J., Bellucci, S. A study of random resistor-capacitor-diode networks to assess the electromagnetic properties of carbon nanotube filled polymers (2013) Applied Physics Letters 103 (24) doi: 10.1063/1.4847335

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Broadband dielectric properties of ordered-like carbon/polyurethane composites Macutkevicius, J., Banys, J., Kazakevicius, V., Mosevicius, S., Svederone, G. (2013) Physics Status Solid (A) Applications and Materials

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