

Scientific Program

2nd International School on Spin-Optronics

July 10-14, 2012, St. Petersburg, Russia

ORAL SESSIONS

Tuesday, July 10

<u>Registration</u>	8:00 - 18:00
Opening remarks	8:45 - 9:00
Lecture session 1: Fundamentals of modern physics Chair: T. Amand	9:00 - 12:30
Tu-1L 9:00 - 10:00 Fundamentals of spin physics in semiconductors <u>M.I. Dyakonov</u> <i>Laboratoire Charles Coulomb, Université Montpellier 2, CNRS, France</i>	
<u>Coffee Break</u>	10:00 - 10:30
Tu-2L 10:30 - 11:30 Quantum optics in photonic wires: Basics and application to “ultrabright” single-photon sources <u>J.M. Gérard</u> <i>Institute for Nanosciences and Cryogeny CEA Grenoble, France</i>	
Tu-3L 11:30 - 12:30 Resonant photonic crystals and quasicrystals <u>E.L. Ivchenko</u> <i>Ioffe Physical Technical Institute, St. Petersburg, Russia</i>	
<u>Lunch</u>	12:30 - 14:00
Seminar session 1: Spectroscopy today Chair: X. Marie	14:00 - 15:30
Tu-1s 14:00 - 14:30 Coherent nonlinear optical spectroscopy of spin effects in semiconductors and magnetic materials <u>R.V. Pisarev</u> <i>Ioffe Physical-Technical Institute, Saint-Petersburg, Russia</i>	
Tu-2s 14:30 - 15:00 Delay and distortion of light pulses by excitons studied by time-of-flight spectroscopy <u>T.V. Shubina</u> <i>Ioffe Physical-Technical Institute, St Petersburg, Russia</i>	
Tu-3s 15:00 - 15:30 Slow light: An instructive story	

V. Zapasskii

Saint-Petersburg State University, Physics Department, Spin Optics Laboratory, Saint Petersburg, Russia

Coffee Break 15:30 - 16:00

Seminar session 2: Polaritonics 16:00 - 17:30

Chair: E. Ivchenko

Tu-4s 16:00 - 16:30

1D polaritonics

I.A. Shelykh

Science Institute, University of Iceland, Reykjavik, Iceland; Division of Physics and Applied Physics, Nanyang Technological University, Singapore

Tu-5s 16:30 - 17:00

Half-Integer Topological Defects as Magnetic Monopoles in Polariton Condensates

H. Flayac, D.D. Solnyshkov, and G. Malpuech

Institut Pascal, PHOTON-N2, Clermont Université, Blaise Pascal University, CNRS, Aubière Cedex, France

Tu-6s 17:00 - 17:30

Photo-induced Faraday rotation in n-GaAs microcavities

D. Scalbert, R. Giri, S. Cronenberger, M. Vladimirova, K.V. Kavokin, M. Glazov, A. Lemaître, and J. Bloch

Laboratoire Charles Coulomb, CNRS-Université Montpellier 2, France; A.F. Ioffe Physico-Technical Institute, St-Petersburg, Russia; Laboratoire de Photonique et Nanostructures, CNRS, Marcoussis, France

Welcome Party 18:00 - 20:30

Wednesday, July 11

Registration 8:00 - 18:00

Lecture session 2: Collective effects in low dimensional systems 9:00 - 12:30

Chair: N. Gippius

We-1L 9:00 - 10:00

Bose-condensation of dipolar excitons in lateral traps in heterostructures

V.B. Timofeev

Institute of Solid State Physics RAS, Chernogolovka, Moscow Region, Russia

Coffee Break 10:00 - 10:30

We-2L 10:30 - 11:30

Condensate and Quasiparticle Transport in a Bilayer Quantum Hall Excitonic Superfluid

J.P. Eisenstein, D. Nandi, A.D.K. Finck, L.N. Pfeiffer, and K.W. West

California Institute of Technology, Pasadena, USA; Princeton University, Princeton, USA

We-3L 11:30 - 12:30

Indirect Excitons

A.A. High, J.R. Leonard, M. Remeika, A.T. Hammack, Sen Yang, M.M. Fogler, L.V. Butov, T. Ostatnický, A.V. Kavokin, K.L. Campman, M. Hanson, and A.C. Gossard

Department of Physics, University of California at San Diego, La Jolla, USA; Faculty of Mathematics and Physics, Charles University in Prague, Prague, Czech Republic; Spin Optics Laboratory, St-Petersburg State University, St-Petersburg, Russia and School of Physics and Astronomy, University of Southampton, Southampton, United Kingdom; Materials Department, University of California at Santa Barbara, Santa Barbara, USA

Lunch 12:30 - 14:00

Seminar session 3: Indirect excitons 14:00 - 15:30

Chair: V. Timofeev

We-1s 14:00 - 14:30

Josephson oscillations between exciton condensates in electrostatic traps

M. Rontani

CNR-NANO Research Center S3, Modena, Italy

We-2s 14:30 - 15:00

Dynamics of ultra-cold indirect excitons in a trap

F. Dubin

Institute of Photonic Sciences, Spain

We-3s 15:00 - 15:30

Experimental progress towards probing the ground state of an electron-hole bilayer by low-temperature transport

A.F.Croxall, K. Das Gupta, B. Zheng, F. Sfigakis, C.A. Nicoll, H.E. Beere, I. Farrer, and D.A. Ritchie

Cavendish Laboratory, University of Cambridge, Cambridge, UK; Dept. of Physics, Indian Institute of Technology Mumbai, India

Coffee Break 15:30 - 16:00

Seminar session 4: Excitonics 16:00 - 17:30

Chair: L. Besombes

We-4s 16:00 - 16:30

Spin coherence of electrons and holes in ZnSe-based quantum wells

D.R. Yakovlev, E.A. Zhukov, A. Schwan, M.M. Glazov, and M. Bayer

Experimental Physics 2, TU Dortmund University, Dortmund, Germany; Ioffe Physical Technical Institute, RAS, St. Petersburg, Russia; Faculty of Physics, M.V. Lomonosov Moscow State University, Moscow, Russia

We-5s 16:30 - 17:00

Spin-flip Raman scattering in type-I quantum dots with direct and indirect band structure

J. Debus, D. Dunker, V.F. Sapega, T.S. Shamirzaev, E.L. Ivchenko, R.A. Suris, D.R. Yakovlev, and M. Bayer

Experimental Physics 2, TU Dortmund University, Dortmund, Germany; Ioffe Physical-Technical Institute, St. Petersburg, Russia; A.V. Rzhanov Institute of Semiconductor Physics, Novosibirsk, Russia

We-6s 17:00 - 17:30

Tunable transition energies, entangled photon pairs and coherent control of the exciton using quantum dots in diodes

A.J. Bennett, R.M. Stevenson, M.B. Ward, J. Nilsson, N. Sköld, M. Pooley,

C.L. Salter, R.B. Patel, A. Boyer de la Giroday, I. Farrer, C.A. Nicoll, D.A. Ritchie, and A.J. Shields

Toshiba Research Europe Limited, Cambridge Research Laboratory, Cambridge, UK;

Poster session

17:30 - 19:30

Thursday, July 12

Registration

8:00 - 12:00

Lecture session 3: New approaches in spinoptronics & photonics

9:00 - 12:30

Chair: H. Mariette

Th-1L 9:00 - 10:00

Spin manipulation in III-V/II-VI heterovalent structures

A.A. Toropov

Ioffe Physical-Technical Institute, St. Petersburg, Russia

Coffee Break

10:00 - 10:30

Th-2L 10:30 - 11:30

A highly efficient single photon - single quantum dot interface

O. Gazzano, C. Arnold, V. Loo, S. Michaelis de Vasconcellos, A. Nowak, A. Dousse, A. Lemaître, I. Sagnes, J. Bloch, P. Voisin, L. Lanco, and P. Senellart

CNRS, Laboratoire de Photonique et de Nanostructures, UPR20, Marcoussis, France

Th-3L 11:30 - 12:30

Quantum entanglement mediated by plasmon-polaritons

C. Tejedor, A. Gonzalez-Tudela, D. Martin-Cano, P.A. Huidobro, E. Moreno, L. Martin-Moreno, and F.J. Garcia-Vidal

Departamento de Fisica Teorica Materia Condensada, Universidad Autonoma de Madrid, Madrid, Spain; Instituto de Ciencia de Materiales de Aragón (ICMA) CSIC-Universidad de Zaragoza, Zaragoza, Spain

Lunch

12:30 - 13:30

Conference excursion

13:30 - 18:30

Friday, July 13

Registration

8:00 - 18:00

Lecture session 4: Single spin manipulation

9:00 - 12:30

Chair: D. Yakovlev

Fr-1L 9:00 - 10:00

Optical pumping of carrier and nuclear spins in quantum dots

B. Urbaszek

Université de Toulouse, INSA-CNRS-UPS, LPCNO, Toulouse, France

Coffee Break

10:00 - 10:30

Fr-2L 10:30 - 11:30

Optical control of individual magnetic atoms in a semiconductor quantum dot

L. Besombes, C. Le Gall, C.L. Cao, A. Brunetti, H. Boukari, and J. Fernandez-Rossier
CEA-CNRS group "Nanophysique et semiconducteurs", Institut Néel, CNRS & Université Joseph Fourier, Grenoble, France; Departamento de Física, Universidad de Alicante, San Vicente del Raspeig, Spain; International Iberian Nanotechnology Laboratory, Braga, Portugal

Fr-3L 11:30 - 12:30

Quantum dot spins: an optical investigation

M. Kroner
Quantum photonic group, ETH Zurich, Switzerland

Lunch

12:30 - 14:00

Seminar session 5: Spin dynamics

14:00 - 15:30

Chair: I. Shelykh

Fr-1s 14:00 - 14:30

Electrical Control of the Spin Relaxation in Quantum Wells

X. Marie, A. Balocchi, P. Renucci, T. Amand, Q.H. Duong, D. Lagarde, C. Fontaine, G. Wang, H. Ye, and B. Liu
Université de Toulouse, INSA-CNRS-UPS, LPCNO, Toulouse, France; LAAS, CNRS, Université de Toulouse, Toulouse, France; Beijing National Laboratory for Condensed Matter Physics, Institute of Physics, CAS, China

Fr-2s 14:30 - 15:00

Electron and exciton spin dynamics in quantum dots

M.M. Glazov
Ioffe Physical Technical Institute, St. Petersburg, Russia

Fr-3s 15:00 - 15:30

Coherent optical control of a single hole spin

A.J. Ramsay, T.M. Godden, J.H. Quilter, Yanwen Wu, P. Brereton, I.J. Luxmoore, J. Puebla, A.M. Fox, and M.S. Skolnick
Dept. Physics and Astronomy, University of Sheffield, Sheffield, UK; Cavendish Laboratory, University of Cambridge, Cambridge, UK

Coffee Break

15:30 - 16:00

Seminar session 6: Nuclei and bilayer spins

16:00 - 17:30

Chair: M. Glazov

Fr-4s 16:00 - 16:30

Nuclear magnetic resonance in single quantum dots

E.A. Chekhovich
Department of Physics and Astronomy, University of Sheffield, Sheffield, UK

Fr-5s 16:30 - 17:00

Optical control of Mn²⁺ ions in GaAs

I.A. Akimov, R.I. Dzhioev, V.L. Korenev, Yu.G. Kusrayev, V.F. Sapega, D.R. Yakovlev, and M. Bayer

Experimentelle Physik 2, Technische Universität Dortmund, Dortmund, Germany; Ioffe Physical Technical Institute, St. Petersburg, Russia

Fr-6s 17:00 - 17:30

Spin states and spin excitations in quantum Hall bilayers

V. Pellegrini, B. Karmakar, A. Gamucci, I. Aliaj, A. Pinczuk, L.N. Pfeiffer, and K.W. West

NEST CNR-Istituto Nanoscienze and Scuola Normale Superiore, Pisa, Italy; Depts of Appl. Phys & Appl. Math. and of Physics, Columbia University, New York, USA; Department of Electrical Engineering, Princeton University, Princeton, NJ, USA

Conference dinner

18:30 - 22:30

Saturday, July 14

Registration

8:00 - 18:00

Lecture session 5 : New physics & application frontiers

9:00 - 12:30

Chair: L. Viña

Sa-1L 9:00 - 10:00

Advanced spectroscopy investigations in ZnO-based heterostructures

B. Gil

Laboratoire Charles Coulomb, Université Montpellier 2- Centre National de la recherche Scientifique- UMR 5221, Montpellier CEDEX 5, France

Coffee Break

10:00 - 10:30

Sa-2L 10:30 - 11:30

Manipulating polariton condensates on a chip

P. Savvidis

University of Crete - FORTH, Greece

Sa-1s 11:30 - 12:00

GaAs single quantum dot embedded into AlGaAs nanowire

A.V. Platonov, V.P. Kochereshko, V.N. Kats, G.E. Cirlin, A.D. Bouravleuv, L. Besombes, and H. Mariette

Ioffe Physical-Technical Institute, St. Petersburg, Russia; Spin Optics Laboratory, St. Petersburg State University, St. Petersburg, Russia; St. Petersburg Academic University of the RAS, St. Petersburg, Russia; CEA-CNRS group "Nanophysique et Semiconducteurs", CEA, INAC, SP2M, and Institut Néel, Grenoble, France

Sa-2s 12:00 - 12:30

Single photon emission and cavity-coupling in semiconductor quantum dots

J.M. Calleja, M. Maragkou, A.K. Nowak, H.P. van der Meulen, I. Prieto, D. Granados, A.G. Taboada, J.M. García, and P.A. Postigo

Departamento de Física de Materiales, Universidad Autónoma de Madrid, Madrid, Spain; Instituto de Microelectrónica de Madrid, Centro Nacional de Microelectrónica, C.S.I.C., Madrid, Spain

Closing remarks

12:30 - 13:00

POSTER SESSION

Wednesday, July 11

17:30 - 19:30

- We-1p **Aharonov-Bohm quantum rings in microcavities**
A. Alexeev, I.A. Shelykh, and M.E. Portnoi
School of Physics, University of Exeter, Exeter, United Kingdom; Science Institute, University of Iceland, Reykjavik, Iceland; International Institute of Physics, Natal - RN, Brazil
- We-2p **Polariton OPO ignition and decay on a microcavity pillar**
C. Antón, G. Tosi, M.D. Martin, L. Viña, T. Gao, Z. Hatzopoulos, G. Stavrinidis, P.G. Savvidis, and J.J. Baumberg
Dpto. Física de Materiales and Instituto de Ciencia de Materiales "Nicolás Cabrera". Universidad Autónoma de Madrid, Madrid, Spain; Dep. of Materials Science and Technology, Univ. of Crete, Crete, Greece; FORTH-IESL, Crete, Greece; NanoPhotonics Centre, Dep. of Physics, University of Cambridge, UK
- We-3p **Exchange bias in Co/MnF₂ heterostructures**
D. Baranov, S. Gastev, V.Fedorov, S.Suturin, and N. Sokolov
Ioffe Physical Technical Institute, St. Petersburg, Russia
- We-4p **Drag in a resonantly driven polariton fluid**
A. Berceanu, E. Cancellieri, and F. M. Marchetti
Departamento de Física Teórica de la Materia Condensada, Universidad Autónoma de Madrid, Madrid, Spain
- We-5p **Interacting 2D exciton-polariton condensate with a 1D line-defect: coherence and polarization issues**
J. Cuadra, R. Spano, G. Tosi, C. Antón, C.A. Lingg, D. Sanvitto, M.D. Martín, L. Viña, P.R. Eastham, M. van der Poel, and J.M. Hvam
Dept. Física Materiales, Universidad Autónoma de Madrid, Madrid, Spain; Instituto de Ciencia de Materiales "Nicolás Cabrera", Universidad Autónoma de Madrid, Madrid, Spain; School of Physics, Trinity College Dublin, Dublin 2. Ireland; DTU Fotonik, Tech. Univ. Denmark, , Denmark
- We-6p **Microscopic mechanism of the magnetic-field-induced heavy-hole mixing in symmetric [111] quantum dots**
M. Durnev, M. Glazov, E. Ivchenko, G. Sallen, B. Urbaszek, S. Kunz, X. Marie, and T. Amand
Ioffe Physical Technical Institute, St. Petersburg, Russia; Universite de Toulouse, INSA-CNRS-UPS, LPCNO, Toulouse, France
- We-7p **Faraday rotation induced by spin polarized electrons and nuclei in n-GaAs microcavity**
R. Giri, S. Cronenberger, M. Vladimirova, D. Scalbert, K.V. Kavokin, A. Lemaître, and J. Bloch
Laboratoire Charles Coulomb, Département Semiconducteurs, Matériaux et Capteurs, Université Montpellier 2, France; Ioffe Institute, St-Petersburg, Russia; Laboratoire de Photonique et Nanostructures, LPN/CNRS, Marcoussis, France
- We-8p **Built-in electric field determination for δ -Mn doped low-temperature GaAs**
O.S. Komkov, R.V. Dokichev, and A.V. Kudrin
Saint Petersburg Electrotechnical University "LETI", St. Petersburg, Russia; University of Nizhni Novgorod, Nizhni Novgorod, Russia
- We-9p **Nuclear spin-lattice relaxation in metallic phase of n-GaAs**
M. Kotur, R.I. Dzhioev, K.V. Kavokin, V.L. Korenev, B.R. Namozov, and P.E. Pak

A.F. Ioffe Physico-Technical Institute, St. Petersburg, Russia

- We-10p **Effect of external strain on the effective magnetic field of Mn in gallium arsenide**
I.V. Kraynov, V.F. Sapega, K.H. Ploog, and N.S. Averkiev
Ioffe Physico-Technical Institute, Saint-Petersburg, Russia; Spin Optics laboratory, V.A. Fock Institute of Physics of Saint-Petersburg State University, Saint-Petersburg,, Russia; Paul-Drude-Institut für Festkörperelektronik, Berlin, Germany
- We-11p **Micro magneto luminescence of single charge tunable GaAs droplet dots: Coulomb interactions and optical selection rules**
S. Kunz, G. Sallen, T. Amand, T. Kuroda, T. Mano, K. Sakoda, A. Kunold, X. Marie, and B. Urbaszek
Toulouse University, LPCNO-CNRS, France; National Institute for Material Science, Tsukuba, Japan; Departamento de Ciencias Basicas, UAM-A, Mexico D.F., Mexico
- We-12p **Effect of nuclear spin fluctuations and dynamic nuclear polarization on shape of Hanle curves in (In,Ga)As/GaAs quantum dots**
I.Ya. Gerlovin, R.V. Cherbunin, I.V. Ignatiev, M.S. Kuznetsova, S.Yu. Verbin, K. Flisinski, D. Reuter, A.D. Wieck, D.R. Yakovlev, and M. Bayer
Spin Optics Laboratory, Saint-Petersburg State University, Peterhof, Russia; Experimentelle Physik II, Technische Universität Dortmund, Germany; Angewandte Festkörperphysik, Ruhr-Universität Bochum, Germany; Ioffe Physico-Technical Institute RAS, Saint-Petersburg, Russia
- We-13p **ZnO polariton laser**
F. Li, S. Bouchoule, C. Brimont, P. Disseix, T. Guillet, X. Lafosse, J. Leymarie, G. Malpuech, M. Mexis, M. Mihailovic, L. Orosz, F. Réveret, D. Solnyshkov, and J. Zuniga-Perez
CRHEA-CNRS, Valbonne, France; LPN-CNRS, Marcoussis, France; Université de Montpellier 2, Laboratoire Charles Coulomb, UMR 5221, Montpellier, France; LASMEA, Université Blaise Pascal, Clermont-Ferrand, France; CNRS, UMR 6602, Aubière CEDEX, France
- We-14p **Magneto-optical study of spin injection in heterovalent III-V / (II,Mn)-VI structures with asymmetric double quantum well**
F. Liaci, V.Kh. Kaibyshev, A.A. Toropov, G.V. Klimko, S.V. Gronin, I.V. Sedova, S.V. Sorokin, and S.V. Ivanov
Ioffe Physical Technical Institute, St. Petersburg Russian Federation
- We-15p **Spin Dynamics in CdSe/CdS Colloidal Nanocrystals**
F. Liu, D.R. Yakovlev, M. Bayer, L. Biadala, C. Javaux, and B. Dubertret
Experimental Physics 2, TU Dortmund University, Germany; Laboratoire Photons Et Matière, CNRS UPR5, Paris, France
- We-16p **Ratchet effects in graphene and quantum wells with lateral periodic potential**
A.V. Nalitov, L.E. Golub, and E.L. Ivchenko
Ioffe Physical-Technical Institute of the RAS, St. Petersburg, Russia
- We-17p **Indistinguishable and entangled photons generated by a light-emitting diode**
J. Nilsson, R.M. Stevenson, C.L. Salter, A.J. Bennett, M.B. Ward, I. Farrer, D.A. Ritchie, and A.J. Shields
Toshiba Research Europe Limited, Cambridge, UK; Cavendish Laboratory, University of Cambridge, Cambridge, UK
- We-18p **Theoretical aspects of magnetic resonance spectroscopy monitored via optical detection of single negatively charged nitrogen-vacancy defects centers in diamond**
A. Nistoreanu and C. Tejedor
Física Teórica de la Materia Condensada, Universidad Autónoma De Madrid, Madrid, Spain

- We-19p **Semi-classical and quantum mechanical analysis of electron-nuclear spin dynamics in quantum dots**
M. Yu Petrov and S.V. Yakovlev
Spin Optics Laboratory, Saint-Petersburg State University, St. Petersburg 198504, Russia
- We-20p **Suppression of spin dephasing by spin-orbit coupling in (110)-grown quantum wells**
A.V. Poshakinskiy and S.A. Tarasenko
Ioffe Physical Technical Institute, St. Petersburg, Russia
- We-21p **Investigation of the anisotropic optical response of non-polar III-nitride microcavities aimed for strong coupling regime**
G. Rossbach, J. Levrat, R. Butté, and N. Grandjean
Institute of Condensed Matter Physics (ICMP), École Polytechnique Fédérale de Lausanne (EPFL), Lausanne, Switzerland
- We-22p **Optical characterization and dynamics of single ZnO tetrapods**
L.C. Fernandes-Silva, M.D. Martín, H.P. Van der Meulen, Ł.Kłopotowski, J.M. Calleja, and L. Viña
Departamento de Física de Materiales, Universidad Autónoma de Madrid, Madrid, Spain; Polish Academy of Sciences, Institute of Physics, Warsaw, Poland
- We-23p **Optical spin control in spherical charged semiconductor nanocrystals**
D. Smirnov and M. Glazov
Ioffe Physical Technical Institute, St. Petersburg, Russia
- We-24p **Magnetic polarons in (Cd,Mn)Te magnetic quantum dots**
P. Stepanov, D. Ferrand, P. Rueda, H. Boukari, E. Bellet-Amalric, S. Tatarenko, and J. Cibert
Joint group CNRS-CEA "Nanophysique et semiconducteurs", Institut Néel-CNRS, Université Joseph Fourier, Grenoble, France; CEA Grenoble CEA-INAC/UJF-Grenoble1 UMR-E, SP2M, Grenoble Cedex 9, France
- We-25p **Magnetorefractive effect in manganites**
A. Telegin, Yu. Sukhorukov, and V. Bessonov
Institute of Metal Physics, UD of RAS, Ekaterinburg, Russia
- We-26p **Polariton-like excitations and classical rotons in weak light-matter interactions in cold atomic traps**
H. Terças
Institut Pascal, PHOTON-N2, Clermont Université, Blaise Pascal University, CNRS, Aubière Cedex, France
- We-27p **Single-photon III-V quantum dot emitters and photonic crystal cavities monolithically grown on a Si substrate**
R.L. Toro, N.A. Wasley, I.J. Luxmoore, H.-Y. Liu, M.S. Skolnick, and A.I. Tartakovskii
Department of Physics and Astronomy, University of Sheffield, Sheffield, UK; Department of Electronic and Electrical Engineering, University College London, London, UK
- We-28p **Multistability of cavity exciton-polaritons affected by the thermally generated exciton reservoir**
D.V. Vishnevsky, D.D. Solnyshkov, N.A. Gippius, and G. Malpuech
LASMEA, Nanostructure and Nanophotonics group, Clermont Université, Université Blaise Pascal, CNRS, Aubière Cedex, France; A. M. Prokhorov General Physics Institute, RAS, Moscow, Russia