

9th WEEK OF THE YOUNG RESEARCHER

QUANTUM SCIENCE: LIGHT-MATTER INTERACTION

Lomonosov Moscow State University
Faculty of Physics
Moscow, September 23–26, 2019

PROGRAMME



DEUTSCH-RUSSISCHE JAHRE
DER HOCHSCHULKOOPERATION
UND WISSENSCHAFT
RUSSISCHEN-DEUTSCHER
HÖCHSTBILDUNGSJAHRE
2019 / 2020



Conference Hotel

Hotel Grafskiy – Moscow
 Moscow, Lva Tolstogo st. 23, bld 5
 +7 499 669 57 27
www.grafskiyhotel.ru/en/

Conference Location

Lomonosov Moscow State University (MSU)
 Faculty of Physics
 Moscow, Leninskie gory 1, bld 2

Funded by the Federal Foreign Office



WELCOME TO THE "9TH GERMAN-RUSSIAN WEEK OF THE YOUNG RESEARCHER"!

Dear colleagues from Russia and Germany,

We are very delighted to welcome you to our Ninth Week of the Young Researcher! When we convened the "German-Russian Year of Science", in 2011, the idea was born to invite young researchers from both countries to come together to discuss current topics of mutual interest. Since then it has grown from strength to strength. The success of the first week in Kazan encouraged us to turn it into an annual event. The following years we met in Ekaterinburg (2012), Novosibirsk (2013), St. Petersburg (2014) and Moscow (2015–2017). The main goal of these meetings is to foster collaboration among young scientists and researchers who will be setting the agenda of scientific cooperation between Russia and Germany in the near future.

Research organizations and institutions of higher education of both our countries will be presenting their funding programmes and describing the platforms that they can offer to both Russian and German PhD students and Postdoctoral researchers. The overarching principle behind these presentations is to facilitate collaboration and to establish and broaden research networks. The week will illustrate how young and experienced scientists can work across borders with local authorities, associations and industry in order to develop new approaches to global challenges.

Experts and young scientists will discuss particular topics of interest for quantum science and technology including aspects from solid-state physics, optics, and photonics. Special emphasis will be given to the challenges of the interaction of light with nano-scale solid-state systems as one of the key problems in nano-electronics and the integration of quantum devices. The organizers strive for a good mix of participants at different career stages and different fields of expertise including solid-state physics, modern photonics, optics of metamaterials, and quantum optics.

We would like to express our deepest gratitude to the Faculty of Physics of Lomonosov Moscow State University for its academic hospitality and kind support. And, of course, we thank all of you, the participants, for your involvement and cooperation in this conference.

Dr Andreas Hoeschen
 German Academic Exchange Service
 Head of DAAD Office Moscow
 Director of DWIH Moscow

Professor Dr Sergey Kulik
 Lomonosov Moscow
 State University
 Faculty of Physics

Dr Wilma Rethage
 Deutsche Forschungsgemeinschaft
 Head of DFG Office Russia

PROGRAMME

September 23, Monday

Arrival of Participants, Transfer to the Hotel, Check-in

-
- | | |
|-------|---|
| 17:00 | Panel Discussion of Freie Universität Berlin
"Science Diplomacy through Representation?" (by invitation) |
| 18:30 | Evening Reception by DWIH Moscow (by invitation) |
| 21:00 | Transfer to the Hotel |

September 24, Tuesday

-
- | | |
|--------------------------------|--|
| 09:50 | Transfer from the Hotel to Lomonosov University (by bus) |
| 10:30
2 nd Floor | Registration of Participants |

-
- | | |
|-------------------|---|
| 11:00 | OFFICIAL OPENING OF THE WEEK |
| Room
Severnaya | with welcome addresses by
Professor Dr Victor Sadovnichy ,
Rector of the Lomonosov Moscow State University (MSU)
Beate Grzeski ,
Deputy Head of Mission, German Embassy in Moscow
Professor Dr Frank Allgöwer ,
Professor, University of Stuttgart;
Vice-President of the German Research Foundation (DFG)
Dr Michael Harms ,
Director Communications of the German Academic Exchange Service (DAAD) |

-
- | | |
|----------------|--|
| 11:45–13:15 | OPENING LECTURE |
| Room Severnaya | Chair:
Professor Dr Sergey Kulik , Lomonosov Moscow State University |
| 11:45 | Dr Maria Chekhova ,
Max Planck Institute for the Science of Light, Erlangen
"Generation of Entangled Photons without Momentum Conservation" |
| 12:30 | Professor Dr Andrey Fedyanin ,
Lomonosov Moscow State University
"Nonlinear and Tunable All-Dielectric Metasurfaces" |

-
- | | |
|--------------------------------|--------------------|
| 13:30
2 nd Floor | Lunch Break |
|--------------------------------|--------------------|

-
- | | |
|-------------|--|
| 14:30–17:30 | LECTURES: METAMATERIALS |
| Room 519 | Chair:
Professor Dr Isabelle Staude , University of Jena
Professor Dr Evgeni Ilichev , Novosibirsk State Technical University;
Leibniz Institute of Photonic Technology, Jena |
| 14:30 | Professor Dr Isabelle Staude ,
University of Jena
"Light-Emitting Dielectric Metasurfaces" |

- 15:00 **Room 519** **Ilya Fradkin**,
Skolkovo Institute for Science and Technology
"Light Scattering by Lattices of Resonant Nanoparticles
in Dipole Approximation"
- 15:15 **Anna Fedotova**,
University of Jena
"Towards Spontaneous Parametric Down-Conversion in Lithium Niobate
Metasurfaces"
- 15:30 Dr **Michael Stefszky**,
University of Paderborn
"Optical Squeezing from Lithium Niobate Waveguide Resonators"
- 15:45 Dr **Maria Kroychuk**,
Lomonosov Moscow State University
"Nonlinear Optical Effects in Isolated Oligomers of Mie-Resonant
Nanoparticles Excited by Gaussian and Vector Beams"

16:00 **Room 518** **Coffee Break**

16:30–17:30 **Room 519** **Quantum Technologies: Reality and Prospective**
Professor Dr **Sergey Kulik**, Lomonosov Moscow State University
Dr **Maria Chekhova**, Max Planck Institute for the Science of Light, Erlangen

17:30 **Conference Group Photo**

17:40–18:40 **Visit to the Quantum Technology Centre
of Lomonosov Moscow State University** *(by foot)*
Professor Dr **Sergey Kulik**, Lomonosov Moscow State University

18:40 Transfer / Stopover at the Hotel

19:30–22:30 **Social Programme (Boat Tour and Dinner – by invitation)**

22:30 Transfer to the Hotel

September 25, Wednesday

08:45 Transfer from the Hotel to Lomonosov University *(by bus)*

09:30–10:30 **LECTURES: SEMICONDUCTOR NANOSTRUCTURES**
Room 519 Chair:

Professor Dr **Sergey Kulik**, Lomonosov Moscow State University

09:30 Professor Dr **Dieter Weiss**,
University of Regensburg

"HgTe Nanowires as Platform to Search for Majorana States"

10:00 Professor Dr **Vladimir Gavrilenko**,
Institute for Physics of Microstructures of the RAS, Nizhny Novgorod
"Far and Mid IR Stimulated Emission in HgCdTe Quantum Well
Heterostructures"

10:30–11:30 **Short Lectures of Young Researchers**
Room 519 Chair:

Professor Dr **Dieter Weiss**, University of Regensburg

Professor Dr **Vladimir Gavrilenko**, Institute for Physics of Microstructures,
Nizhny Novgorod

10:30 Dr **Mikhail Durnev**,
Ioffe Physical-Technical Institute, St. Petersburg
"Photoinduced Edge Current in Systems with Two-Dimensional Electron Gas"

10:45 **Aleksey Kazakov**,
Lomonosov Moscow State University
"Photoinduced Nonlocal Electron Transport in HgCdTe Solid Solutions
with Inverted Energy Band Order"

11:00 **Lukas Maczewsky**,
University of Rostock
"Realization of Photonic Anomalous Floquet Topological Insulator"

11:15 **Jonas Zipfel**,
University of Regensburg
"Exciton Propagation in Monolayer Semiconductors"

11:30 **Coffee Break**
Room 518

12:00–12:30 **LECTURES: PHOTONICS**

Room 519 Chair:
Dr **Cosima Schuster**, DFG Bonn
Professor Dr **Aleksey Kalachev**,
Kazan Physical-Technical Institute
“Single Photons from Photonic Molecules”

12:30–13:30 **Short Lectures of Young Researchers**

Room 519 Chair:
Professor Dr **Dieter Weiss**, University of Regensburg
Professor Dr **Aleksey Kalachev**, Kazan Physical-Technical Institute

12:30 Dr **Aleksandra Galeeva**,
Lomonosov Moscow State University
“Terahertz Probing of Electron States in 3D Topological Insulator Materials”

12:45 **Markus Plankl**,
University of Regensburg
“Tracing Light-Matter Coupling on the Nanometer Length-
and the Femtosecond Timescale”

13:00 Dr **Assegid Flatae**,
University of Siegen
“Plasmon-Assisted Ultrafast Photodynamics in Quantum Dots”

13:15 **Florian Sledz**,
University of Siegen
“Optical Studies of SiV Color Centers in Phosphorous-Doped Diamond”

13:30 **Lunch Break**
Canteen

14:30–15:30 **DISCUSSION ROUNDS**

14:30–15:00 **Progress towards Microwave Quantum Engineering**
Room 519 Chair:

Professor Dr **Evgeni Ilichev**, Novosibirsk State Technical University;
Leibniz Institute of Photonic Technology, Jena

14:30–15:00 **Spintronics**

Room 518 Chair:
Professor Dr **Dieter Weiss**, University of Regensburg

15:00–15:30 **Light-Matter Interaction in Nanostructures**

Room 519 Chair:
Professor Dr **Isabelle Staude**, University of Jena

15:00–15:30 **Quantum Memory**

Room 518 Chair:
Professor Dr **Aleksey Kalachev**, Kazan Physical-Technical Institute

16:10–16:40 **Short Lectures of Young Researches**

Room 518 Chair:
Professor Dr **Aleksey Kalachev**, Kazan Physical-Technical Institute

16:10 **Nikolai Skryabin**,
Lomonosov Moscow State University
“Femtosecond Laser Writing Technology for Intergrated Quantum Photonics”

16:25 **Dmitry Akatyev**,
Kazan Physical-Technical Institute
“Generation of Time-Bin Qudit Based on Spontaneous Parametric
Down-Conversion”

16:40 **Presentations of the Supporting Organisations**
Room 519 **of the DWIH** (Deutsches Wissenschafts- und Innovationshaus /
German Centre for Research and Innovation, DWIH Moscow)
Dr **Andreas Hoeschen**, DWIH Moscow

17:10–18:00 **Coffee Break and Science Café**
Room 518 Presentation of the Funding Programmes of German and Russian Funding and Research Organisations:
 German Research Foundation (DFG)
 German Academic Exchange Service (DAAD)
 German Russian Chamber of Commerce (AHK)
 Freie Universität Berlin (FU Berlin)
 The Helmholtz Association
 Representative Office of Ministry of Culture and Science of the German State of North Rhine-Westphalia and of NRW.INVEST
 Representative Office of the State Thuringia
 Fraunhofer-Gesellschaft
 Representative Office of the State Lower Saxony
 Alexander von Humboldt Foundation
 University Alliance Ruhr (UA Ruhr)
 Centre of Quantum Technologies
 Russian Science Foundation (RSF)
 Russian Foundation for Basic Research (RFBR)

18:00 Transfer to the Hotel

September 26, Thursday

08:45 Transfer from the Hotel to Lomonosov University (*by bus*)

09:15 Posters Mounting

09:30–10:30 **LECTURES: PHOTONICS**

Room 519 Chair:
 Professor Dr **Nicolas Joly**, University of Erlangen-Nürnberg

09:30 Professor Dr **Mario Agio**,
 University of Siegen
“Ultrafast Coupling of Light with Quantum Emitters”

10:00 Professor Dr **Evgeni Ilichev**,
 Novosibirsk State Technical University; Leibniz Institute of Photonic Technology, Jena
“Quantum Metamaterials Composed of Superconducting Flux Qubits”

10:30 **Coffee Break**
Room 518

10:30–12:30 **Market Place / Posters for further discussions**

Room 518 Chair:
 Professor Dr **Mario Agio**, University of Siegen
Maksim Rakhlin,
 Ioffe Physical-Technical Institute, St. Petersburg
“Single-Photon Sources at 200 K Based on a CdSe Quantum Dot in a Photonic Nanowire”
 Dr **Aleksandra Gartman**,
 Lomonosov Moscow State University
“Optical Metasurfaces and Integral Photonic Structures for Control of Nonclassical Light on Subwave-Scale”

Susanne Candussio,
University of Regensburg
"Terahertz Radiation Induced Edge Currents in Graphene in the Quantum Hall Regime"

Aleksandr Vaskin,
University of Jena
"Manipulation of Quantum Dots Photoluminescence with Resonant Dielectric Nanostructures"

Alessandro Ferreri,
University of Paderborn
"Multimode Four-Photon Hong-Ou-Mandel Interference"

Gregor Oelsner,
Leibniz Institute of Photonic Technology, Jena
"Optically Pumped Magnetometers – Quantum Sensors for a Variety of Applications"

And All Young Researchers with Presentations

12:30 **Funding Opportunities for Early Career Researchers**
Room 519
Chair:
Dr **Cosima Schuster**, DFG Bonn
Dr **Astrid Evers**, DFG, Bonn
Nadezhda Krasikova, DAAD, Moscow

13:00–13:30 **Short Lectures of Young Researches**

Chair:
Professor Dr **Evgeni Ilichev**, Novosibirsk State Technical University;
University of Jena

13:00 **Sergey Samoylenko,**
Lomonosov Moscow State University
"Evaluation of the Possibility of Dynamic Phase Holograms Usage for Single Atom Arrays Reconfiguration"

13:15 **Max Ehrhard,**
University of Rostock
"Realizing 3D Random Walks of Correlated Photon Pairs"

13:30 **Lunch Break**
Canteen

14:30–17:00 **LECTURES: QUANTUM OPTICS**

Room 519
Chair:
Dr **Cosima Schuster**, DFG, Bonn

14:30 Professor Dr **Nicolas Joly**,
University of Erlangen-Nürnberg
"Racing to Triplet States. The Fibres Are under Pressure"

15:00 Professor Dr **Sergey Kulik**,
Lomonosov Moscow State University
"Quantum Computation Based on Photonic Chips and Trapped Neutral Atoms"

15:30 **Coffee Break**
Room 518

16:00–17:00 **Short Lectures of Young Researchers**

Room 519

Chair:

Professor Dr **Nicolas Joly**, University of Erlangen-Nürnberg

Professor Dr **Sergey Kulik**, Lomonosov Moscow State University

16:00

Anatoly Shukhin,

Kazan Physical-Technical Institute

“Single Photon and Entangled Photon Pair Generation Using Tapered Optical Fibers”

16:15

Dr **Sascha Agne,**

Max Planck Institute for the Science of Light, Erlangen

“Nonlinear Polarimetry with Parametric Down-Conversion”

16:30

Sebastian Weidemann,

University of Rostock

“Non-Hermitian Quantum Walks in Coupled Optical Fiber Loops”

16:45

Jano Gil Lopez,

University of Paderborn

“Orchestrating PDC Temporal Modes”

17:00

Coffee Break and Cooperation Workshop

Room 518

18:00

Closing Remarks

Professor Dr **Sergey Kulik**

September 27, Friday

Departure

