

# CURRICULUM VITAE: MARIA V. CHEKHOVA

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Google Scholar: <https://scholar.google.com/citations?user=yXSoU44AAAAAJ&hl=en>

## 1. Personal

Date of Birth: June 8, 1963  
Place of Birth: Moscow, USSR  
Status: 2 adult children  
Address: Max-Planck Institute for the Science of Light, Staudtstrasse 2  
Erlangen, 91058, Germany. Email: maria.chekhova@mpl.mpg.de

## 2. Employment

2010 – present: Max-Planck Institute for the Science of Light,  
Independent research group leader.  
2020 – present: secondary 20% appointment at Friedrich-Alexander University of  
Erlangen - Nürnberg  
2010 - 2020: secondary 15% appointment at Lomonosov Moscow State University  
2000 - 2010: Moscow State University, Senior Researcher, Physics  
1997 - 2000: Moscow State University, Researcher, Physics.  
1989 - 1997: Moscow State University, Junior Researcher, Physics  
1986 - 1989: Moscow State University, Ph.D. student, Physics.

## 3. Education and academic qualifications

2012 Privat-Dozent at Friedrich-Alexander University  
2004 Habilitation degree at the Lomonosov Moscow State University, thesis:  
“Polarization and Spectral Properties of Biphotons”  
1989 Ph.D. at the Lomonosov Moscow State University, thesis: “K-  
spectroscopy of Polaritons in the Vicinity of Lattice Resonances”  
1986 M. Sc. at the Lomonosov Moscow State University, Physics Department

## 4. Fellowships and awards

2019 Eugen Lommel prize of Friedrich-Alexander University (Germany)  
2009 - 2010 Piedmont fellowship for Outstanding Visiting Scientists (Italy)  
2009 Lagrange fellowship of the CRT Foundation (Italy)  
2007 – 2009 Mercator guest professor fellowship of the DFG Foundation (Germany) at  
the Friedrich-Alexander University (Erlangen, Germany)  
2006 Award of the Physics Department of Lomonosov University (Russia)  
2005 Distinguished Visiting Professor at the University of Bari (Italy)  
2002 Appointed as a Distinguished Visiting Scientist in Jet Propulsion  
Laboratory (USA)  
1998 – 2001 Visiting professor at the University of Maryland Baltimore County (USA).

## 5. International collaboration

The University of Olomouc, Czech Republic; Friedrich-Schiller University Jena; the University of Ottawa, Canada; Data Storage Institute of Singapore; Istituto Nazionale di Ricerca

Metrologica (INRiM), Italy (2003-2015); University of Bari, Italy (2005); University of Maryland, Baltimore County, USA (1998-2001).

## 6. Teaching activities

Lecture courses:

- 2017 - present ‘Polarization of light in classical, quantum, and nonlinear optics’; ‘Nonlinear Optics’, ‘Quantum Optics’, University of Erlangen-Nürnberg, 1-semester courses;
- 2017 ‘From nonlinear optics to entanglement and squeezing’, University of Erlangen-Nürnberg, 1-semester course;
- 2009 – 2017 ‘Optics of Nonclassical Light’, Lomonosov Moscow State University, 1 semester per year;
- 2000 - 2008 ‘Polarization Quantum Optics’, Lomonosov Moscow State University, 1 semester per year;
- 1997 – 1999, ‘Quantum Optics’, Lomonosov Moscow State University, one semester per year.

Students:

Present: 3 PhD students and 2 master students at the University of Erlangen-Nürnberg.

Previously: 3 Ph.D. students and 10 master students graduated from the Lomonosov Moscow State University; 3 PhD students, 7 master students and 3 bachelor students graduated from the University of Erlangen-Nürnberg.

Fellow of International Max-Planck Research School and Max-Planck School of Photonics

International teaching:

- Quantum Coherence school in Okinawa (Japan), September 2019;
- Parametric Nonlinear Optics school in Les Houches (France), April 2015;
- Extreme Photonics and Quantum Photonics summer schools in Ottawa (Canada), May 2013 and 2014;
- Laser-STELLA experimental school in Como (Italy), June 2011.

## 7. Professional Societies

Member of OSA and DPG

### a. Meetings

Membership in organizing and program committees for the last 5 years:

1. CLEO USA 2018, 2019: member of the Program Committee.
2. D.N.Klyshko All-Russia Workshop on Nonlinear and Quantum Optics and Quantum Information. Moscow 2000, 2001, 2002, 2003, 2005, 2007, 2009, 2011, 2013, 2015, 2017, Member of the Organizing Committee.
3. 605. WE-Heraeus Seminar on Macroscopic Entanglement, Bad Honnef, January 17-22, 2016, organizer.
4. XIVth International Conference on Squeezed States and Uncertainty Relations, Gdansk, 29 June – 3 July 2015, member of the International Program Committee.

Selected invited and plenary talks at conferences during the last 5 years:

1. CLEO'2020, May 11-15 2020 – San Jose, USA
2. PQE 2019, January 5-10 2019 – Snowbird, USA.
3. Laser Physics 2018, July 11-15 2018 – Nottingham, UK.
4. Quantum optics IX, October 22-26 2018, Cartagena, Colombia
5. Quantum'2017, May 8-12 2017 – Turin, Italy.
6. CLEO'2017, May 15-19 2017 – San Jose, USA.
7. Laser Physics 2016, July 11-15 2016 – Yerevan, Armenia.
8. Laser Physics 2015, August 20-26 2015 – Shanghai, China.
9. ICSSUR 2015, June 29-July 3 – Gdansk, Poland.
10. PQE 2015, January 4-8 2015 – Snowbird, USA (plenary).

#### **b. Editorial**

Member of the Editorial Board of Russian Physics – Uspekhi;  
Associate Editor in Optics Express

#### **c. Reviewing**

Referee at Physical Review A and Physical Review Letters (Outstanding Referee), Nature journals, Optica, Optics Letters, New Journal of Physics. Reviewer of European and national grant programs.

### **9. Research achievements**

More than 200 papers in refereed journals. Most valuable scientific results:

- development of ‘polarization optics of single-mode biphotons’: methods for producing and characterizing arbitrary states of single-mode biphotons and ternary quantum information encoding based on such states (1998-2004);
- discovery of the effect of group-velocity dispersion on two-photon light and its application to single-photon spectroscopy (2000-2009);
- generation and direct detection of bright broadband squeezed vacuum (2006-2009) and experimental preparation of its entangled states (2011-2014);
- nonlinear interferometry of high-gain parametric down-conversion (2014-2019).

### **10. Grants (during the last 5 years)**

Project coordinator in EU FP7 project (BRISQ2, 2013-2015)

PI in German projects:

DFG projects CH 1591/2-1 (2016-2019), CH 1591/3-1(2016-2020), CH 1591/9-1 (started 2020); part of SFB (2020-2025); 2 DAAD projects.

### **11. List of 20 most important publications**

1. C. Okoth, A. Cavanna, T. Santiago-Cruz, M. Chekhova, “Microscale Generation of Entangled Photons without Momentum Conservation”. *Phys. Rev. Lett.* **123**, 263602 (2019).
2. Samuel Lemieux, Enno Giese, Robert Fickler, Maria V. Chekhova, and Robert W. Boyd, “A Primary Radiation Standard Based on Quantum Nonlinear Optics.” *Nature Physics*, s41567-019-0447-2 (2019).
3. K. Yu. Spasibko, D. A. Kopylov, V. L. Krutyanskiy, T. V. Murzina, G. Leuchs, and M. V. Chekhova, “Multiphoton effects enhanced due to ultrafast photon-number fluctuations.” *Phys. Rev. Lett.* **119**, 223603 (2017).
4. M. Manceau, G. Leuchs, F. Khalili, and M. Chekhova, “Detection loss tolerant supersensitive phase measurement with an SU(1,1) interferometer.” *Phys. Rev. Lett.* **119**, 223604 (2017).

5. Samuel Lemieux, Mathieu Manceau, Polina R. Sharapova, Olga V. Tikhonova, Robert W. Boyd, Gerd Leuchs, and Maria V. Chekhova, "Engineering the Frequency Spectrum of Bright Squeezed Vacuum via Group Velocity Dispersion in an SU(1,1) Interferometer." *Phys. Rev. Letters* **117**, 183601 (2016).
6. Andrea Cavanna, Felix Just, Xin Jiang, Gerd Leuchs, Maria V. Chekhova, Philip St.J. Russell, and Nicolas Y. Joly, "Hybrid photonic-crystal fiber for single-mode phase matched generation of third harmonic and photon triplets," *Optica* **3**, 952-955 (2016).
7. M. A. Finger, T. Sh. Iskhakov, N. Y. Joly, M. V. Chekhova, and Ph. St.J. Russell, "Raman-free, noble-gas-filled PCF source for ultrafast, very bright twin-beam squeezed vacuum." *Phys. Rev. Lett.* **115**, 143602 (2015).
8. A. M. Pérez, K. Yu. Spasibko, P. Sharapova, O. V. Tikhonova, G. Leuchs, and M. V. Chekhova, "Giant narrowband twin-beam generation along the pump-energy propagation direction." *Nature Comm.* **6**, 7707 (2015).
9. F. Just, A. Cavanna, M. V. Chekhova, and G. Leuchs, "Transverse entanglement of biphotons." *New Journal of Physics* **15**, 083015 (2013).
10. Timur Sh. Iskhakov, Ivan N. Agafonov, Maria Chekhova, and Gerd Leuchs, "Polarization-Entangled Light Pulses of  $10^5$  Photons." *Phys. Rev. Lett.* **109**, 150502 (2012).
11. I. N. Agafonov, M. V. Chekhova, and G. Leuchs, "Two-color bright squeezed vacuum" *Phys. Rev. A.* **82**, 011801(R) (2010).
12. G. Brida, I. P. Degiovanni, M. V. Chekhova, M. Genovese, G.Kh. Kitaeva, A. Meda, and O.A. Shumilkina, "Chirped Biphotons and their Compression in Optical Fibers". *Phys. Rev. Lett.* **103**, 193602 (2009).
13. T. Sh. Iskhakov, M. V. Chekhova, and G. Leuchs, "Generation and Direct Detection of Broadband Mesoscopic Polarization-Squeezed Vacuum". *Phys. Rev. Lett.* **102**, 183602 (2009).
14. A. N. Agafonov, M. V. Chekhova, T. Sh. Iskhakov, A. N. Penin, "High-visibility multiphoton interference of Hanbury Brown–Twiss type for classical light". *Phys. Rev. A* **77**, 053801, 2008.
15. Yu. Bogdanov, M. V. Chekhova, S. Kulik, G. Maslennikov, M. K. Tey. C. Ch. Oh, "Quantum State Engineering with qutrits". *Phys. Rev. Lett.* **93**, 230503, 2004.
16. M. V. Chekhova, O. A. Ivanova, V. Berardi, A. Garuccio, "Spectral properties of three-photon entangled states generated via three-photon parametric down-conversion in a chi-3 medium". *Phys. Rev. A* **72**, 023818 (2005).
17. A. Valencia, A. S. Trifonov, M. V. Chekhova, and Y. H. Shih, "Entangled Two-Photon Wave Packet in a Dispersive Medium". *Phys. Rev. Lett.* **88**, 18601 (2002).
18. M. D'Angelo, M. V. Chekhova, and Y. H. Shih, "Two-Photon Diffraction and Quantum Lithography". *Phys. Rev. Lett.* **87**, 013602 (2001).
19. A. V. Burlakov, M. V. Chekhova, O. A. Karabutova, D. N. Klyshko, and S. P. Kulik, "Polarization State of a Biphoton: Quantum Ternary Logic". *Phys. Rev. A* **60**, R4209 (1999).
20. A. V. Burlakov, M. V. Chekhova, D. N. Klyshko, S. P. Kulik, A. N. Penin, Y. H. Shih, and D. V. Strekalov, "Interference Effects in Spontaneous Two-Photon Parametric Scattering from Two Macroscopic Regions". *Phys. Rev. A* **55**, 3214 (1997).