Georgios M. Nikolopoulos
Research Director

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Education

1997-2001	**PhD** in Physics, University of Crete, Greece Dissertation title: "Multiple Excitations in Structured Radiation Reservoirs"
1996-1997	**MSc** in Optoelectronics, University of Crete, Greece
1992-1996	**Diploma** in Physics, University of Patras, Greece (Grade: 8 4/10)

Employment

2026-today	**Research Director** Institute of Electronic Structure & Laser/FORTH, Heraklion, Greece
2014-2025	**Principal Researcher** Institute of Electronic Structure & Laser/FORTH, Heraklion, Greece
2011-2014	**Assistant Researcher** Institute of Electronic Structure & Laser/FORTH, Heraklion, Greece
2007-2011	**Junior Researcher** Institute of Electronic Structure & Laser/FORTH, Heraklion, Greece
2003-2006	**Research Associate** Technische Universität Darmstadt, Darmstadt, Germany
1997-1999	**Max-Planck Research Fellow** Max-Planck Institut für Quantenoptik, Garching, Germany

Distinctions and Awards

2019-2023	**Mercator Fellow** in SFB Crossing program for Cryptography-Based Security Solutions. Funded by DFG.
2007	**2nd Prize** for distinguished scientific achievements. Awarded by TU Prague.
2006	**3nd Prize** in Summer School on Physics. Awarded by University of Crete.

Academic Visits

2022	**Mercator Fellow**, TU Darmstadt, Darmstadt, Germany. Duration: 3 months.
2019	**Mercator Fellow**, TU Darmstadt, Darmstadt, Germany. Duration: 12 months.
2015	**Visiting Scientist**, Laboratoire Traitement et Communication de l'Information, Télécom ParisTech, Paris, France. Duration: 3 months.
2015	**Visiting Scientist**, University of Glasgow, Glasgow, UK. Duration: 3 months.
2014	**Visiting Scientist***,* TU in Prague, Prague, Czech Republic. Duration: 1 month.
2012	**Visiting Professor***,* TU in Prague, Prague, Czech Republic. Duration: 2 months.
2011	**Visiting Scientist** in the framework of "X-Ray Frontiers" *program,* Kavli Institute for Theoretical Physics, UCSB, Santa Barbara, California. Duration: 2 weeks.
2010	**Visiting Scientist***,* TU Darmstadt, Germany. Duration: 1 month.

Teaching Experience

2015-today	«Quantum Optics and Quantum Information». Physics Department, University of Crete, Greece.
2003-2004	Teaching Assistant in «Quantum Theory». Physics Department, TU Darmstadt, Germany.
2003	Teaching Assistant in «Theory of Quantum Information». Physics Department, TU Darmstadt, Germany.

Graduate Student Supervision

- George Mouloudakis, *PhD student*. Physics Department, University of Crete (2019-2024)[3].
- Eleni Karydi, *Internship*. FORTH (2022).
- Evangelia Aspropotamiti, *Diploma student*. Physics Department, University of Crete (2020).
- Yannick Deller, *MSc student*. TU Darmstadt, Germany (2019)[1].
- Lukas Fladung, *MSc student*. TU Darmstadt, Germany (2019)[2].
- Sascha Hauck, *Diploma student*. TU Darmstadt, Germany (2019)[2].
- Aikaterini Gratsea, *Diploma student*. Physics Department, University of Crete (2017-18)[2].
- Alexandros Pavlis, *MSc student*. Physics Department, University of Crete (2014-15)[3].
- Lukas F. Buchmann, *PhD student*. Physics Department, University of Crete (2007-2010)[3].
- Kedar S. Ranade, *PhD student*. TU Darmstadt, Germany (2005-2006)[2].
- Aeysha Khalique, *PhD student*. TU Darmstadt, Germany (2004-2006)[2].
- Falko Strenzke, *MSc student*. TU Darmstadt, Germany (2005)[2].

[1] Supervised together with Prof. G. Alber.
[2] Supervised together with Prof. P. Lambropoulos.

Research Programs and Funding

2023-2026	*Hellas-QCI for the Deployment of National Infrastructure for Quantum Communication, which will be part of the European networks in the framework of* «EuroQCI». *Scientific responsible of the local network in Heraklion.*
2019-2023	*«Merkator Fellow»* in SFB CROSSING "Cryptography-Based Security Solutions: Enabling Trust in New and Next Generation Computing Environments".
2014–2018	*Member of* COST Action "NQO, Nanoscale Quantum Optics".
2013–2017	*Member of the Management Committee and member of the IESL/FORTH team* for COST Action XLIC "XUV/X-ray Light and fast Ions for ultrafast Chemistry".
2008–2012	*Member of* COST Action CUSPFEL "Chemistry with Ultrashort Pulses and Free-Electron Lasers: Looking for Control Strategies Through Exact Computations".
2007–2010	*Member* of FP6 Marie Curie RTN EMALI "Engineering, Manipulation and Characterization of Quantum States of Matter and Light".
2003–2006	*Member* of FP6 IP SECOQC "Development of a Global Network for Secure Communication based on Quantum Cryptography".

Refereeing and Editorship

- **Referee** for various scientific journals including: Physical Review Letters, Physical Review X, Physical Review A, Nature Communications, npj Quantum Information, Quantum Science and Technology, Journal of the Optical Society of America B, Journal of Physics B, Physica Scripta, Physics Letters A., Quantum Information Processing, etc.
- **Editor of** "Quantum State Transfer and Network Engineering" (Springer-Verlag 2014).
- **Member of the editorial board** for Applied Sciences (MDPI).

Publications

[1] Minimum-error state discrimination and Fano's inequality, G. M. Nikolopoulos, Am. J. Phys. 93, 566 (2025). DOI: doi.org/10.1119/5.0268023

[2] Quantum Diffie-Hellman key exchange, G. M. Nikolopoulos, APL Quantum **2**, 016107 (2025). DOI: doi.org/10.1063/5.0242473

[3] Quantum key distribution with post-processing driven by physical unclonable functions, G. M. Nikolopoulos and M. Fischlin, Applied Sciences **14**, 464 (2024). DOI: doi.org/10.3390/app14010464

[4] *Computational Indistinguishability and Boson Sampling,* G. M. Nikolopoulos, Physica Scripta **98**, 014001 (2023). DOI: doi.org/10.1088/1402-4896/aca1ed

[5] *Effects of Kerr Nonlinearity in Physical Unclonable Functions*, G. M. Nikolopoulos, Applied Sciences **12**, 11985 (2022). DOI: doi.org/ 10.3390/app122311985

[6] *Remote Quantum-Safe Authentication of Entities with Physical Unclonable Functions,* G. M. Nikolopoulos, Photonics **8**, 289 (2021). DOI: doi.org/10.3390/photonics8070289

[7] *Information-Theoretically Secure Data Origin Authentication with Quantum and Classical Resources,* G. M. Nikolopoulos and M. Fischlin, Cryptography **4**, 31 (2020). DOI:doi.org/10.3390/cryptography4040031

[8] *Coherent population oscillations and an effective spin-exchange interaction in a PT symmetric polariton mixture,* P. A. Kalozoumis, G. M. Nikolopoulos and D. Petrosyan, Europhys. Lett. **129**, 37003 (2020). DOI:doi.org/10.1209/0295-5075/129/37003

[9] *Intercept-Resend Emulation Attacks against a Continuous-Variable Quantum Authentication Protocol with Physical Unclonable Keys,* L. Fladung, G. M. Nikolopoulos, G. Alber and M. Fischlin, Cryptography **3**, 25 (2019). DOI:doi.org/10.3390/cryptography3040025

[10] *Optical scheme for cryptographic commitments with physical unclonable keys,* G. M. Nikolopoulos, Optics Express **27**, 29367 (2019). DOI:doi.org/10.1364/OE.27.029367

[11] *Cryptographic one-way function based on boson sampling,* G. M. Nikolopoulos, Quantum Inf. Process. **18**, 259 (2019). DOI:doi.org/10.1007/s11128-019-2372-9

[12] *Photon-assisted quantum state transfer and entanglement generation in spin chains,* A. Gratsea, G. M. Nikolopoulos and P. Lambropoulos, Phys. Rev. A **98**, 012304 (2018). DOI:doi.org/10.1103/PhysRevA.98.012304

[13] *Continuous-variable quantum authentication of physical unclonable keys: Security against an emulation attack,* G. M. Nikolopoulos, Phys. Rev. A **97**, 012324 (2018). DOI:doi.org/10.1103/PhysRevA.97.012324

[14] *Continuous-variable quantum authentication of physical unclonable keys,* G. M. Nikolopoulos and E. Diamanti, Sci. Rep. **7**, 46047 (2017). DOI:doi.org/10.1038/srep46047

[15] *Decision and function problems based on boson sampling,* G. M. Nikolopoulos and T. Brougham, Phys. Rev. A **94**, 012315 (2016). DOI:doi.org/10.1103/PhysRevA.94.012315

[16] *Evaluation the performance of two state-transfer Hamiltonians in the presence of static disorder,* A. K. Pavlis, G. M. Nikolopoulos and P. Lambropoulos, Quantum Inf. Processing **15**, 2553 (2016). DOI:doi.org/10.1007/s11128-016-1287-y

[17] *Resonantly enhanced multiphoton ionization under XUV FEL radiation : a case study of the role of harmonics,* G. M. Nikolopoulos and P. Lambropoulos, J. Phys. B **48**, 244006 (2015). DOI:doi.org/10.1088/0953-4075/48/24/244006

[18] *Transfer of optical signals around bends in two-dimensional linear photonic networks,* G. M. Nikolopoulos, J. Phys. B **47**, 035505 (2015). DOI:doi.org/10.1088/0953-4075/48/3/035505

[19] *Time-dependent density-functional theory of strong-field ionization of atoms by soft x rays, A.* Crawford-Uranga, U. De Giovannini, E. Räsänen, M. J. T. Oliveira, D. J. Mowbray, G. M. Nikolopoulos, E. T. Karamatskos, D. Markellos, P. Lambropoulos, S. Kurth and A. Rubio, Phys. Rev. A **90**, 033412 (2014). DOI:doi.org/10.1103/PhysRevA.90.033412

[20] *Multiple Ionization of Neon under soft x-rays: Theory vs Experiment,* G. M. Nikolopoulos and P. Lambropoulos, J. Phys. B **47**, 115001 (2014). DOI:doi.org/10.1088/0953-4075/47/11/115001

[21] *Assessing the number of atoms in a Rydberg-blockaded mesoscopic ensemble,* D. Petrosyan and G. M. Nikolopoulos, Phys. Rev. A **89**, 013419 (2014). DOI:doi.org/10.1103/PhysRevA.89.013419

[22] *Multiple Ionization under Strong XUV to X-ray Radiation,* P. Lambropoulos and G. M. Nikolopoulos, Eur. Phys. J. Special Topics **222**, 2067 (2013). DOI:doi.org/10.1140/epjst/e2013-01987-7

[23] *Frequency response of an atomic resonance driven by weak free-electron-laser fluctuating pulses,* G. M. Nikolopoulos and P. Lambropoulos, J. Phys. B **46**, 164010 (2013). DOI:doi.org/10.1088/0953-4075/46/16/164010

[24] *Statistics of a quantum-state-transfer Hamiltonian in the presence of disorder,* G.M. Nikolopoulos, Phys. Rev. A **87**, 042311 (2013). DOI:doi.org/10.1103/PhysRevA.87.042311

[25] *Faithful communication Hamiltonian in photonic lattices,* M. Bellec, G. M. Nikolopoulos and S. Tzortzakis, Opt. Lett. **37**, 4504 (2012). DOI:doi.org/10.1364/OL.37.004504

[26] *Effects of free-electron-laser field fluctuations on the frequency response of driven atomic resonances,* G.M. Nikolopoulos and P. Lambropoulos, Phys. Rev. A **86**, 033420 (2012). DOI:doi.org/10.1103/PhysRevA.86.033420

[27] *Analysis and minimization of bending losses in discrete quantum networks,* G. M. Nikolopoulos, A. Hoskovec and I. Jex, Phys. Rev. A **85**, 062319 (2012). DOI:doi.org/10.1103/PhysRevA.85.062319

[28] *Symmetries and security of a quantum-public-key encryption based on single-qubit rotations,* U. Seyfarth, G. M. Nikolopoulos and G. Alber, Phys. Rev. A **85**, 022342 (2012).

DOI:doi.org/10.1103/PhysRevA.85.022342

[29] *Route to direct multiphoton multiple ionization,* P. Lambropoulos, G. M. Nikolopoulos and K. G. Papamihail, Phys. Rev. A **83**, 021407 (2011). DOI:doi.org/10.1103/PhysRevA.83.021407

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[31] *Passage-time statistics of superradiant light pulses from Bose–Einstein condensates,* L. F. Buchmann, G.M. Nikolopoulos, O. Zobay and P. Lambropoulos, J. Phys. B **44**, 025301 (2011). DOI:doi.org/10.1088/0953-4075/44/2/025301

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[33] *Atom-number filter in an optical lattice,* G. M. Nikolopoulos and D. Petrosyan, J. Phys.B **43**, 131001 (2010). DOI:doi.org/10.1088/0953-4075/43/13/131001

[34] *State transfer in static and dynamic spin chains with disorder,* D. Petrosyan, G. M. Nikolopoulos, P. Lambropoulos. Phys. Rev. A **81**, 042307 (2010). DOI:doi.org/10.1103/PhysRevA.81.042307

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[39] *Directional Coupling for Quantum Computing and Communication,* G. M. Nikolopoulos, Phys. Rev. Lett. **101**, 200502 (2008). DOI:doi.org/10.1103/PhysRevLett.101.200502

[40] *Applications of single-qubit rotations in quantum public-key cryptography,* G. M. Nikolopoulos, Phys. Rev. A **77**, 032348 (2008). DOI:doi.org/10.1103/PhysRevA.77.032348

[41] *Effects of relative phase and interactions on atom-laser outcoupling from a double-well Bose–Einstein condensate: Markovian and non-Markovian dynamics,* G. M. Nikolopoulos, C. Lazarou and P. Lambropoulos, J. Phys. B **41**, 025301 (2008). DOI:doi.org/10.1088/0953-4075/41/2/025301

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[44] *Sequential superradiant scattering from atomic Bose-Einstein condensates,* O. Zobay, G. M. Nikolopoulos, Laser Physics **17**, 180 (2007). DOI:doi.org/10.1134/S1054660X07020235

[45] *Error tolerance of two-basis quantum-key-distribution protocols using qudits and two-way classical communication,* G. M. Nikolopoulos, K. S. Ranade and G. Alber, Phys. Rev. A **73**, 032325 (2006). DOI:doi.org/10.1103/PhysRevA.73.032325

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[52] *Coherent electron wavepacket propagation and entanglement in array of coupled quantum dots,* G. M. Nikolopoulos, D. Petrosyan, P. Lambropoulos, Europhys. Lett. **65**, 297 (2004). DOI:doi.org/10.1209/epl/i2003-10100-9

[53] *Effects of interatomic collisions on atom laser outcoupling,* G. M Nikolopoulos, P. Lambropoulos, and N. P. Proukakis, J. Phys. B **36**, 2797 (2003). DOI:doi.org/10.1088/0953-4075/36/13/310

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Books

[1] *Quantum State Transfer and Network Engineering*, *Edited by* G. M. Nikolopoulos, and I. Jex (Springer 2014). ISBN:978-3-642-39937-4

Chapters in Books

[1] *Communication in Engineered Quantum Networks*, G. M. Nikolopoulos, T. Brougham, A. Hoskovec and I. Jex, in "Quantum State Transfer and Network Engineering", edited by G. M. Nikolopoulos & I. Jex (Springer-Verlag, 2014).

[2] *State transfer Hamiltonians in photonic lattices*, M. Bellec, G. M. Nikolopoulos and S. Tzortzakis, in "Quantum State Transfer and Network Engineering", edited by G. M. Nikolopoulos & I. Jex (Springer-Verlag, 2014).

[3] *Quantum electrodynamics of a qubit,* G. Alber and G. M. Nikolopoulos, "Lectures on Quantum Information" edited by D. Bruss & G. Leuchs (Wiley-VCH, Weinheim, 2007).

Selected Presentations

"Quantum-safe entity authentication with physical unclonable keys", *Invited Talk* at CROSSING Summer School, Darmstadt, Germany (September 2019).

Invited Talk at XVI International Conference on Quantum Optics and Quantum Information 2019, Minsk, Belarus (May 2010). Declined.

"Photon-assisted quantum state transfer and entanglement generation in spin chains", *Invited Talk* at TU Dortmund, Dortmund, Germany (May 2019).

"Quantum-safe entity authentication with physical unclonable keys", *Invited Talk*, University of Twente, Enschede, Netherlands (February 2019).

Invited Talk at the XV International Conference on Quantum Optics and Quantum Information, Minsk, Belarus (November 2017). Declined.

"Continuous-variable authentication of Physical Unclonable Keys". Invited Talk at the Institut für Angewandte Physik, TU Darmastadt, Darmstadt, Germany (May 2017).

"Boson Sampling: The dawn of a new era for cryptography and communication?". *Invited Talk* at the 23rd Central European Conference on Quantum Optics, Kolymbari, Crete, Greece (June 2016).

"Quantum Public-key Cryptography". *Invited Talk* at Laboratoire Traitement et Communication de l'Information, Télécom ParisTech, Paris, France (September 2015).

Invited Talk at the 24th annual International Laser Physics Workshop, Shanghai, China (August 2015). Declined.

"Quantum Public-key Cryptography". Invited Talk at the Joint Meeting of Theory groups from Glasgow \& Strathclyde Universities. Strathclyde University, Glasgow, UK (July 2015).

"Transfer of Quantum States and Network Engineering in the Quest for Quantum Processors", Invited Talk at Heriot-Watt University, Edinburgh, UK (June 2015).

"Modeling the Effect of FEL Field Fluctuations on Multiphoton Multiple Ionization", *Invited talk* at 2nd annual XLIC meeting, Gdansk, Polland (September 2014).

"Engineering of Quantum Networks in the Quest for the Quantum Computer", *Colloquium* at the Physics Department, University of Crete (October 2012).

"Modelling the fluctuations of Free-Electron-Laser radiation and their effect on the interaction with atoms", *Seminar* at the Doppler Institute, Prague, Czech Republic (March 2012).

"Faithful state transfer", Four lectures at the Czech Technical University, Prague, Czech Republic (March 2012)

"Modelling the fluctuations of Free-Electron-Laser radiation and their effect on the interaction with atoms", Kavli Institute for Theoretical Physics, UCSB, Santa Barbara, California (September 2010).

"Quantum communication and Quantum public-key cryptography", Laboratoire Traitement et Communication de l'Information CNRS, Paris, France (June 2010).

"Modelling the fluctuations of Free-Electron-Laser radiation and their effect on the interaction with atoms", *Two lectures* at the WG1 COST meeting, Han- sur-Lesse, Belgium. Principles of quantum cryptography, Two lectures in the framework of FASTQUAST '09, Rethymnon, Greece (September 2009).

"Role of the relative phase in the merging of two independent Bose-Einstein condensates", Laser Physics '09, Barcelona, Spain (July 2009).

"Quantum public-key cryptography, Modern trends in Quantum Optics and Quantum Information", Prague, Czech Republic (May 2008).

"Quantum cryptography: Quantum physics at the service of secrecy", *Colloquium* at the Physics Department, University of Crete, Greece (February 2006).

"Superradiant Rayleigh Scattering from Atomic Bose-Einstein Condensates: Dynamics of Matter-Wave and Optical Fields", Seminar at IESL/FORTH, Heraklion, Greece (February 2006).

"Quantum Cryptography", *Seminar* at the Physics Department, University of Patras, Greece (December 2004).

"Quantum Cryptography", *Two lectures* in the 16th Summer School in Advanced Physics, Heraklion, Greece (June 2004).

"Electron wavepacket propagation and entanglement in a chain of coupled quantum dots", MPI-PKS Seminar on Quantum Dynamics, Dresden, Germany (July 2004).

"Robustness of the BB84 quantum-key-distribution protocol against coherent attacks", DFG Workshop, Hirschegg, Austria (April 2004).

"Multiple excitations in Structured Reservoirs, Ringberg Meeting on Finite Systems", Ringberg, Germany (February 2000).