

**List of scientific or artistic achievements which present a major contribution
to the development of a specific discipline**

I. INFORMATION ON SCIENTIFIC OR ARTISTIC ACHIEVEMENTS SET OUT IN ART.
219 PARA 1. POINT 2 OF THE ACT

- 1) Scientific monograph, pursuant to art. 219 para 1. point 2a of the Act
n/a
- 2) Cycle of scientific articles related thematically, pursuant to art. 219 para 1. point 2b of the Act:
 1. **[H1]** Kolenderska, **P. Kolenderski**
Intensity correlation OCT is a classical mimic of quantum OCT providing up to twofold resolution improvement,
Sci Rep **11**, 11403 (2021)
IF: 3.998
 2. **[H2]** Artur Czerwinski, Karolina Sedziak-Kacprowicz, **Piotr Kolenderski**,
Phase estimation of time-bin qudits by time-resolved single-photon counting
Phys. Rev. A, **103**, 042402 (2021)
IF: 2.777
 3. **[H3]** S. Kolenderska, F. Vanholsbeeck & **P. Kolenderski**
Quantum-inspired detection for spectral domain optical coherence tomography
Opt. Lett., **45**, 3443 (2020)
IF: 3.714
 4. **[H4]** M. Lasota & **P. Kolenderski**
Optimal photon pairs for quantum communication protocols,
Sci. Rep. **10**, 20810 (2020)
IF: 3.998
 5. **[H5]** S. Kolenderska, F. Vanholsbeeck & **P. Kolenderski**
Fourier domain Quantum Optical Coherence Tomography
Opt. Express., **28**, 29576 (2020)
IF: 3.669
 6. **[H6]** M. Lasota & **P. Kolenderski**
Quantum communication improved by spectral entanglement and supplementary chromatic dispersion
Phys. Rev. A, **98**, 062310 (2018)
IF: 2.777
 7. **[H7]** K. Sedziak, M. Lasota & **P. Kolenderski**
Reducing detection noise of a photon pair in a dispersive medium by controlling its spectral entanglement
Optica, **4**, 84 (2017)
IF: 7.536
 8. **[H8]** **P. Kolenderski**, C. Scarcella, K. D. Johnsen, D. R. Hamel, C. Holloway, L. K. Shalm, S. Tisa, A. Tosi, K. J. Resch & T. Jennewein
Time-resolved double-slit interference pattern measurement with entangled photons

Sci. Rep., **4**, 4685 (2014)

IF: 3.998

- 3) List of completed original project, engineering and design, technological or artistic achievements, pursuant to art. 219 para 1. point 2c of the Act
n/a

II. INFORMATION ON SCIENTIFIC OR ARTISTIC ACTIVITY

- 1) List of published scientific monographs (including the monographs not mentioned in section I.1).

n/a

- 2) List of published chapters in scientific monographs.

n/a

- 3) Information about membership in editorial boards preparing scientific monographs for publication.

n/a

- 4) List of articles published in scientific journals (including the articles not mentioned in section I.2):

a) period after the conferment of the PhD degree:

1. **(achievement)** S. Kolenderska, **P. Kolenderski**

Intensity correlation OCT is a classical mimic of quantum OCT providing up to twofold resolution improvement,

Sci Rep **11**, 11403 (2021)

IF: 3.998

2. Maria Gieysztor, Marta Misiaszek, Joscelyn van der Veen, Wojciech Gawlik, Fedor Jelezko, **Piotr Kolenderski** Interaction of a heralded single photon with nitrogen-vacancy centers in a diamond

Optics Express, **29**, 564 (2021)

IF:3.669

3. **(achievement)** Artur Czerwinski, Karolina Sedziak-Kacprowicz, **Piotr Kolenderski**,

Phase estimation of time-bin qudits by time-resolved single-photon counting

Phys. Rev. A, **103**, 042402 (2021)

IF: 2.777

4. Karolina Sedziak-Kacprowicz, Artur Czerwinski, **Piotr Kolenderski**

Tomography of time-bin quantum states using time-resolved detection,

Phys. Rev. A., **102**, 052420 (2020)

IF: 2.777

5. **(achievement)** S. Kolenderska, F. Vanholsbeeck & **P. Kolenderski**

Quantum-inspired detection for spectral domain optical coherence tomography
Opt. Lett., **45**, 3443 (2020)

IF: 3.714

6. A. Gajewski, D. Gustaw, N. R. Yusof, N. Ali, K. Słowik & **P. Kolenderski**

Waveguide platform for quantum anticentrifugal force

- Opt. Lett., **45**, 3373 (2020),
IF: 3.714
7. Karolina Sedziak-Kacprowicz, Artur Czerwinski, **Piotr Kolenderski**
Tomography of time-bin quantum states using time-resolved detection,
Phys. Rev. A., **102**, 052420 (2020)
IF: 2.777
 8. S. Kamaruddin, J. Shamsul Shaari & **P. Kolenderski** Counterfactual protocol within
device independent framework and its insecurity
Sci. Rep. **10** , 1 (2020)
IF: 3.998
 9. Andrzej Kruk and Jakub Sorocki and Ilona Piekarcz and Dominika Madej and **Piotr
Kolenderski**, A novel method for ceramic characterisation by high frequency
microwave energy absorption,
Measurement, **167**, 108160 (2020)
IF:3.364
 10. **(achievement)** S. Kolenderska, F. Vanholsbeeck & **P. Kolenderski** Fourier domain
Quantum Optical Coherence Tomography Opt. Express., **28**, 29576 (2020)
IF: 3.669
 11. **(achievement)** M. Lasota & **P. Kolenderski**
Optimal photon pairs for quantum communication protocols,
Sci. Rep. **10**, 20810 (2020)
IF: 3.998
 12. K. Sedziak, M. Lasota & **P. Kolenderski**
Remote temporal wavepacket narrowing
Sci. Rep, **9**, 3111 (2019)
IF: 3.998
 13. **P. Kolenderski**, A. Raczynski, J. Zaremba & S. Zielinska-Raczynka
Three-photon interference with stored light
Phys. Rev. A, **96**, 063809 (2017)
IF: 2.909
 14. A. Divochiy, M. Misiaszek, Y. Vakhtomin, P. Morozov, K. Smirnov, P. Zolotov, **P.
Kolenderski**
Single photon detection system for visible and infrared spectrum range
Opt. Lett. **43**, 6085 (2018)
IF: 3.866
 15. D. Ghosh, T. Jennewein, **P. Kolenderski**, and U. Sinha
Spatially correlated photonic qutrit pairs using pump beam modulation technique
OSA Continuum **1**, 996 (2018)
IF: 0
 16. M. Misiaszek, A. Gajewski & **P. Kolenderski**
Dispersion measurement method with down conversion process
J. Phys. Commun., **2**, 065014 (2018)
IF: 0

17. **(achievement)** M. Lasota & **P. Kolenderski**
Quantum communication improved by spectral entanglement and supplementary chromatic dispersion
Phys. Rev. A, **98**, 062310 (2018)
IF: 2.777
18. **(achievement)** K. Sedziak, M. Lasota & **P. Kolenderski**
Reducing detection noise of a photon pair in a dispersive medium by controlling its spectral entanglement
Optica, **4**, 84 (2017)
IF: 7.536
19. A. Gajewski & **P. Kolenderski**
Spectral correlation control in down-converted photon pairs
Phys. Rev. A, **94**, 013838 (2016)
IF: 2.925
20. C. J. Pugh, **P. Kolenderski**, C. Scarcella, A. Tosi & T. Jennewein Towards correcting atmospheric beam wander via pump beam control in a down conversion process
Opt Express, **24**, 20947 (2016)
IF: 3.307
21. K. D. Johnsen, **P. Kolenderski**, C. Scarcella, M. Thibault, A. Tosi & T. Jennewein Time and spectrum-resolving multiphoton correlator for 300-900 nm
J. Appl. Phys., **116**, 143101 (2014)
IF: 2.183
22. T. Lutz, **P. Kolenderski** & T. Jennewein Demonstration of spectral correlation control in a source of polarization entangled photon pairs at telecom wavelength
Opt. Lett., **39**, 1481 (2014)
IF: 3.292
23. **(achievement)** **P. Kolenderski**, C. Scarcella, K. D. Johnsen, D. R. Hamel, C. Holloway, L. K. Shalm, S. Tisa, A. Tosi, K. J. Resch & T. Jennewein Time-resolved double-slit interference pattern measurement with entangled photons
Sci. Rep., **4**, 4685 (2014)
IF: 3.998
24. R. T. Horn, **P. Kolenderski**, D. Kang, C. Scarcella, A. D. Frera, A. Tosi, L. G. Helt, S. V. Zhukovsky, J. E. Sipe, G. Weihs, A. S. Helmy & T. Jennewein Inherent polarization entanglement generated from a monolithic semiconductor chip
Sci. Rep., **3**, 2314 (2013)
IF: 5.078
25. T. Lutz, **P. Kolenderski** & T. Jennewein Toward a downconversion source of positively spectrally correlated and decorrelated telecom photon pairs
Opt. Lett., **38**, 697-699 (2013)
IF: 3.179
26. **P. Kolenderski**, U. Sinha, L. Youning, T. Zhao, M. Volpini, A. Cabello, R. Laflamme & T. Jennewein Playing the Aharon-Vaidman quantum game with a Young type photonic qutrit

Phys. Rev. A, **86**, 012321 (2012)
IF: 3.042

b) period prior to the award of the PhD degree

1. **P. Kolenderski**, Geometry of pure states of N spin-J system, OSID, **17**, 107 (2010)
2. **P. Kolenderski**, W. Wasilewski and K. Banaszek, Modelling and optimization of photon pair sources based on spontaneous parametric down-conversion, Phys. Rev. A **80**, 013811 (2009)
3. **P. Kolenderski** and W. Wasilewski, Density matrix of a single photon produced in parametric down conversion derived, Phys. Rev. A **80**, 015801 (2009)
4. W. Wasilewski, **P. Kolenderski**, R. Frankowski Spectral density matrix of a single photon measured, Phys Rev. Lett, **99**, 123601 (2007)
5. R. Demkowicz-Dobrzanski, **P. Kolenderski**, K. Banaszek, Effects of imperfect noise correlations on decoherence-free subsystems: SU(2) diffusion model, Phys. Rev. A **76**, 022302 (2007)
6. **P. Kolenderski**, R. Demkowicz-Dobrzanski,, Optimal state for keeping reference frames aligned and the platonic solids, Phys. Rev. A **78**, 052333 (2008)
7. Wasilewski, W.; Wasylczyk, P.; **Kolenderski, P.**; Banaszek, K. & Radzewicz, C. Joint spectrum of photon pairs measured by coincidence Fourier spectroscopy, Opt. Lett., **31**, 1130 (2006)
8. Fisz, J. J.; Buczkowski, M.; Budziński, M. P. & **P. Kolenderski**, Genetic algorithms optimization approach supported by the first-order derivative and Newton-Raphson methods: Application to fluorescence spectroscopy Chemical Physics Letters, **407**, 8-12 (2005)
- 5) List of project, engineering and design as well as technological achievements (including the achievements not mentioned in section I.3).
n/a
- 6) List of public realizations of works of art (including the works not mentioned in section I.3).
n/a
- 7) Information on presentations given at national or international scientific or arts conferences, including a list of lectures delivered upon invitation and plenary lectures.
 1. *Lectures delivered upon invitation:*
 1. „Benefits of quantum correlations for communication and optical coherence tomography,, Quantum Optics X, Torun, 2021
 2. „Satelite Qauntum Communication” DronTechWorld 2020
 3. „Single photons in micro and macro applications” Raman Research Institute, Bengalor, India, 2020
 4. „On photonic spectral entanglement improving quantum communication”, 2018 7th IEEE International Conference on Photonics (ICP2018), Malaysia
 5. „Experiments on quantum communication and clock synchronization with single photons”, Raman Research Institute, Bengalor, India, 2018

6. "Single photons for long-distance quantum communication", Palacky University, April 2016, Olomuc, Czech Republic;
7. "Single Photon. Engineering Its Spatial and Spectral Degree of Freedom," 2016 IEEE 6th International Conference on Photonics (ICP2016), Kuching, Malaysia;
8. "Quantum communication with single photons." University Malaysia Perlis, March 2016;
9. "Single Photon Sources", Polish Physicists Congress, Poznan 2013;
10. "Single Photon Sources, Characterization and Applications," Optics Seminar, Faculty of Physics, University of Warsaw, 2012;
11. "Single Photon Sources, Characterization and Applications," Seminar of Department of Atomic, Molecular and Optical Physics, Institute of Physics, Nicolaus Copernicus University in Torun, 2012;
12. Series of 8 lectures regarding Quantum Communication, MIMOS Berhad, Kuala Lumpur, 2006.

2. *Lectures and posters:*

1. Fifth International Conference on Quantum Technologies (ICQT 2019), poster, Single Photons. Micro and Macro Applications
2. XVI International Conference on Quantum Optics and Quantum Information, talk, Optimal detection scheme for quantum communication protocols and photon-matter interaction
3. Nanonlight, poster, On photonic spectral entanglement improving quantum communication. 2019
4. EGAS 2018, poster, Time-resolved analysis of NV centers' fluorescence dynamics
5. Quantum Optics IX, poster, Experimental demonstration of remote temporal wave packet narrowing
6. SSEQL'16, Warsaw, Poland, 2016 talk, Spatial and spectral state of correlated photon pairs
7. SPIE Defence and Security, Baltimore, USA, 2015 talk, Multi-photon correlation measurements techniques
8. Central European Workshop on Quantum Optics, Warsaw, 2015, talk, Towards correcting atmospheric turbulences,
9. Zjazd Fizyków Polskich, Legnica, Poland, 2015 talk, Towards correcting atmospheric turbulences,
10. Single Photon Workshop, Oak Ridge, USA, 2013 talk, Photon pairs for long distance quantum communication
11. Zjazd Fizyków Polskich, Poznań, Poland, 2013 invited talk: Single Photon Sources
12. CLEO 2013, San Jose, USA, talk, Time-resolved double-slit interference pattern measurement with entangled photons

13. Quantum Optics VII, Warsaw, Poland, 2013 talk, Spectral correlation control in down-conversion
 14. APS March Meeting, Boston, USA 2012 talk, Implementing the Aharon-Vaidman quantum game with a Young type photonic qutrit
 15. CLEO 2012, San Jose, USA talk, Implementing the Aharon-Vaidman quantum game with a Young type photonic qutrit
 16. Quantum Information and Measurement, Berlin, Niemcy, 2012 talk, Implementing the Aharon-Vaidman quantum game with a Young type photonic qutrit
 17. Conference on Quantum Information & Quantum Control IV, Toronto, 2011 poster, Playing the Aharon-Vaidman quantum game with Young type photonic qutrit. poster, Phase retrieval from intensity measurements
- 8) Information on participation in organizational and scientific committees at national or international conferences, including the applicant's function.
n/a
- 9) Information on participation in the works of research teams realizing projects financed through national and international competitions, including the projects which have been completed and projects in progress, and information on the function performed in the team.:
1. Single photon techniques for atomic system analysis, Preludium Bis, 2020/39/O/ST2/00137, 2021-2025, 538.020 PLN, **leader, will start Nov, 2022**
 2. Satellite controller of polarization entangled photon pairs, National Center for Research and Development (NCBiR), Fast Track for Small and Medium Companies, 2019-2021, budget całkowity 5.757.585 PLN, kontrakt UMK 1.000.000 PLN, **subcontractor, principal investigator at the Nicolaus Copernicus University, in progress**
 3. National Center for Satellite Quantum Communication, Polish Ministry of Science and Higher Education (MNiSW), infrastructure grant, 2019-2021, 9.646.000 PLN **consortium member, principal investigator at the Nicolaus Copernicus University, in progress**
 4. National Laboratory of Quantum Technologies (NLPQT), Infrastructure grant, 2019-2024, 2.164.000 PLN, **research group leader, in progress**
 5. Applications of single photon technologies, Foundation for Polish Science (FNP), First Team, 2017-2023 4.122.925 PLN, **leader, in progress**
 6. Miniaturized integrated optical devices for experiments on light and plasmonic quanta National Science Center (NCN), Sonata, 2017-2020, 535.750 PLN, **leader, completed**
 7. Time-resolved single photon detection system for the spectral range of 600 - 2500 nm, Polish MNiSW Grant No 6576/IA/SP/2016, 705.000 PLN, **leader, completed**
 8. Iuventus Plus, 2015-2016, 206.000 PLN, **leader, completed**
 9. Homing Plus, Fundation for Polish Science, 2013-7/9, 300.000 PLN, **leader, completed**

10. NCU internal research grant, 1625-F, 2013, 10.000PLN, **manager, completed**
11. Mobility Plus, Ministry of Science and Higher Education of Poland, 602/MOB/2011/0, 460.000 PLN, **leader, completed**
12. Development of a compact all-in-fiber entangled photon source, Canadian Institute for Photonics Innovation, TEN program, **contractor, completed**

Scientific supervision of NCN Preludium projects:

1. "Quantum information in the time domain", mgr Karolina Sędziak, 2017-2020, 149.300 PLN
 2. "Photon triplets generation", mgr Marta Misiaszek, 2019-2021, 140.000 PLN
 3. "Diamond-based fundamental research on light-matter interaction with single photons", mgr Maria Gieysztor, 2020-2021, 140.000PLN
- 10) Membership in international or national organizations and scientific societies, including the functions performed by the applicant.
n/a
 - 11) Information on internships completed in scientific or artistic institutions, also abroad, including the place, time and duration of the internship and its character.
 1. Institute for Quantum Computing, Waterloo, Ontario, Canada, postdoctoral internship, 2010-2013
 - 12) Membership in editorial committees and scientific boards of journals, including the functions performed by the applicant (e.g. editor-in-chief, chairman of scientific board etc.).
n/a
 - 13) Information on scientific or artistic works reviewed, in particular those published in international journals

1. Nature	2
2. Nature Physics	2
3. Nature Communication	1
4. Physical Review A	21
5. Physical Review Applied	3
6. Physics Review Letters	12
7. Journal of Physics B	2
8. Optics Letters	8
9. JOSA A	1
10. Journal of Optics	1
11. Applied Physics Letters	2
12. APL Photonics	1
 - 14) Information on participation in European or other international programmes.
n/a

15) Information on participation in research teams realizing projects other than those defined in section II.9.

n/a

16) Information on membership in the teams assessing applications for financing of research projects, applications for scientific awards, applications in other competitions of scientific or didactic character

Reviewing international and national projects:

1. Ministry of Science, Rumania,
2. Ministry of Science and Higher Education
3. Foundation for Polish Science (FNP)
4. Polish National Agency for Academic Exchange
5. Research University, Nicolaus Copernicus University,

III. INFORMATION ON COOPERATION WITH SOCIAL AND ECONOMIC ENVIRONMENT

1) List of technological works.

2) Information on cooperation with economic sector.

1. Participation as a subcontractor in a project financed by NCBiR entitled "Satellite quantum entanglement controller", the leader of which is the company Syderal Polska
2. Cooperation with the companies Syderal Polska, Work Microwave GmbH, Cilium Engineering, Sybilla Technologies, Exatel in order to develop and implement quantum satellite communication.
3. Cooperation with the companies Syderal Polska, Work Microwave GmbH in the preparation of offers in tenders of the European Space Agency.

3) Obtaining the right of industrial property, including the national or international patents granted.

n/a

4) Information on implemented technologies.

n/a

5) Information on performed expert analyses or other studies prepared on request of public institutions or entrepreneurs.

1. Development of a report for the Syderal Polska company on the method of controlling the optical system used to generate entangled pairs of photons.
2. Development and delivery to Syderal Polska of an optical system generating pairs of photons entangled in polarizations.

6) Information on participation in expert and competition teams.

1. Expert, Research University, Nicolaus Copernicus University,
2. Expert, Research Panel, Polish Space Agency

7) Information on artistic projects realized in non-artistic environment.

n/a

IV. SCIENTOMETRIC INFORMATION

- 1) Information on the Impact Factor: Factor: The total impact factor according to the Journal Citation Reports (JCR) list, according to the year of publication: **32,467 scientific achievement, 86,563 after the conferment of the PhD degree**
- 2) Liczba cytowań publikacji według bazy Web of Science (WoS): **382 (312 without self-citations)**
- 3) Information on h-index held: Indeks Hirsch index according to the Web of Science database (WoS): **11**
- 4) Information on the number of the points awarded by the Ministry of Science and Higher Education.: according to the scoring in the year of publication **810** (scientific achievement)