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REPORT ON THE RESEARCH ACTIVITIES OF THE CENTRE FOR THEORETICAL PHYSICS PAS in 2017

In 2017, the Centre for Theoretical Physics of the Polish Academy of Sciences (CTP PAS) was engaged in research activity in the following topics:

Topic 1. Mathematical and cosmological aspects of the evolution of gravitational fields

Topic 2. Quantum mechanics of non-linear and complex systems

Topic 3. Physical foundations of information processing

Topic 4. Thermodynamics and dynamics of mesoscopic quantum systems

Topic 5. Studying space phenomena across a range of time scales

Topic 6. High-energy astrophysics

Topic 7. Science and society

Topic 8. Optoelectronics and automation in studying the control and regulation of behavior using neuroengineering methods

Topic 9. Using electrodynamics methods to describe gravitational waves

Topic 10. Observational constraints on the properties of dark energy

Topic 11. Cartan Connections and special contact geometries

Topic 12. Topology and geometry in a quantum mechanics

Topic 13. Mathematical and numerical general relativity and cosmology

The scientific activity of the CTP PAS employees in 2017 was carried out mainly within statutory activity and **17** national research projects financed by the **National Science Center** and **MNiSW** and **2** foreign research projects. Framework program of the European Union **Horizon 2020** is the largest research program in the history of the Union and innovation. In 2017, **1 POLONEZ** scholarship was awarded, financed by Horizon 2020, for the implementation of the project at CTP PAS. The project, under the name "*Special geometries related to the exceptional group G_2*" is carried out by dr **Katja Sagerschnig** in cooperation with Prof. **Paweł Nurowski**. In addition, the Center's employees were contractors of **1** research project coordinated by another scientific institution.

In conducted in 2017 the categorization of the scientific units the CTP PAS received again the **A category**.

The year 2017 was another year of development of the Center's scientific potential. Using funds from subsidies to maintain research potential and from the Center's grants in the open competitions, Center employed further academic employees, adjuncts and assistants. In 2017, the Center employed full-time employees of **34.8** employees per year, including **29.6** scientific employees. In the competition for scientific projects carried out in 2017 at the CTP PAS by young researchers were awarded **8** projects under the supervision of scientific supervisors.

In 2017, the Center's employees published **68** peer-reviewed scientific papers, including **56** works in the most-valued journals, including **1** article in Physical Review X and **4** in Physical Review Letters, **3** in Astrophysical Journal, **1** in Astrophysical Journal Letters and **1** in Nature Astronomy. Center staff have published also **17** popular and social publications. Employees of the Center in 2017 gave **159** lectures at national and international conferences and seminars and published **12** reports in conference materials.

Since 2014, CTP PAS has its own YouTube channel (https://www.youtube.com/channel/UCBmbEBj4eybdApFesQCcc2w) where the recordings of seminars and lectures organized by CTP PAS are published. Until now, we have published **220** videos that have collected **129** thousand views, and the channel itself already has **1000** subscriptions. This form of informing the public about our current activity is related to the policy of openness and open access, practiced in ours institute.

Cooperation with the foreign scientific institutes plays a significant role in the Center. In 2017, **30** scientific papers were published in international scientific journals, carried out together with scholars from the foreign scientific institutions. As part of the cooperation with foreign countries in 2017, employees of the Center left for **82** short foreign visits. In 2017, the Center was visited by **15** foreign guests, **4** foreigners were accepted to work in the Center (in total, in the Center works **9** foreigners). The Center in 2017 cooperated continuously without concluded agreement with **28** foreign scientific institutions, implementing within cooperation of **28** scientific topics. In 2017, the Center was a co-organizer of **14** international research conferences.

In 2017, the Center continued 1-3 months scientific internships intended for talented students. Many talented students continue scientific cooperation with CTP PAS and are also employed as contractors in research projects carried out at the Center.

In 2017, a large group of young physicists (**11** assistants) worked in the Center over their doctoral dissertations, and **10** adjuncts over habilitations. During this period, **3** employees of CTP PAS, dr Małgorzata Siudek, dr hab. Łukasz Rudnicki and dr hab. Mikołaj Korzyński, obtained new scientific degrees.

The Center of Theoretical Physics of the Polish Academy of Sciences participates in cooperation with the Institute of Physics of the Polish Academy of Sciences in International Doctoral Studies. CTP PAS has also signed a contract that allows our employees participate in doctoral studies at the Nicolaus Copernicus Astronomical Center of the Polish Academy of Sciences. Currently **7** of our PhD students are using these opportunities, **6** are trained as part of doctoral studies run by the Institute of Physics of the Polish Academy of Sciences, and **1** in Nicolaus Copernicus Astronomical Center PAS.

In 2017, three children were born in the families of our employees.

The most needed books are purchased for the Center's handheld library most often from funds obtained as part of research projects. Starting from 2012, CTP PAS gave up the traditional subscription of paper magazines. Internet access to large databases of scientific journals in an electronic version was ensured by participation of the Center in consortia, as well as thanks to the nationwide Virtual Library of Science financed from 2010 by the Ministry of Science and Higher Education. List of magazines available for employees of the Center in an electronic versions in 2017 in under a consortium agreement involving the American Physical Society and the American Institute of Physics contain **21** titles. The center has a fast local computer network and fast internet access, which greatly facilitates scientific work. The computer database is regularly renewed and modernized.

The Center is an active member of the National Center for Quantum Information Technology in Gdańsk. In addition to CTP PAS, National Center for Quantum Information Technology consists such institutions as Gdańsk University of Technology, University of Gdańsk, Adam Mickiewicz University in Poznań, Jagiellonian University, University of Łódź, Nicolaus Copernicus University in Toruń and the University of Wrocław.

CTP PAS employees are members of many scientific councils, committees and other scientific organizations. For example, Prof. **Marek Kuś** is a member of the Scientific Council of the Institute of Physics PAS, Institute of Social Studies of the University of Warsaw, Institute of Theoretical Physics of the University of Warsaw, chairman of the Council of the National Center for Quantum Computer Science in Gdańsk, editor of International Journal of Quantum Information and member of the editorial committee of the Reports on journals Mathematical Physics, Journal of Physics B and Open Systems and Information Dynamics. Prof. **Karol Życzkowski** is a member of the Open Systems and editorial committee of the Information Dynamics. Prof. **Kazimierz Rzążewski** is a member of the KL Scientific Council FAMO, chairman of the Scientific Council of the Quantum Atomic and Light Engineering Center and is a member (fellow) of the American Physical Society (APS) and the British Physical Society (IOP). Prof. **Bożena Czerny** is the editor of The Astrophysical Journal and representative of Poland in COST action TD1403 Big Data Era in Sky and Earth Observation. Prof. **Lech Mankiewicz** is a member of the Program Council of the Science

Festival. In total, the Center's employees participate in the work of **58** Scientific Councils and Editorial Committees and expert teams.

The Center's scientific staff took a keen interest in popularizing physical knowledge. Few informations about the Center's current educational and promotional initiatives can be found on the our website (http://www.cft.edu.pl/edu/). As part of the XXI Science Festival in Warsaw, CTP PAS employees organized 1 October 2017 scientific session entitled "*Earth and the Universe*".

Dr hab. Lech Mankiewicz is the coordinator of **KhanAcademy's** resources localization in Polish language. Thanks to the funds obtained from the PKO Bank Polski Foundation, the Orange Foundation, private donors as well as volunteer work, Khan Academy's Polish resources are over 3,300 movies from various fields of knowledge, unveiled in total over 11 million times, and 90% of a portal dedicated to mathematics, where 21 million tasks have been dissolved in two and a half years. The best materials include biology, chemistry and physics as well as interactive movies and programming materials. CTP PAS employees actively participate in development of resources in the field of physics.

The CTP PAS organizing national elimination to the international competition for young scientists "*Falling Walls Lab*". The qualifying rounds took place on October 4, 2017. The event was noticed in many portals and social media, including Polish Radio, PAP, FNP.

As part of the Simons' Symmetry and Geometric structures Semester, organized by Prof. **Paweł Nurowski**, Michael Eastwood (School of Mathematical Sciences, University of Adelaide), Wojciech Kryński (IMPAN, Warsaw) and Ben Warhurst (Faculty of Mathematics UW) took place workshop, which consisted of five ten-hours mini-lectures. Workshop was intended to introducing young scientists (shortly after PhD) to the subject of Simons Semester. At each of the workshop lectures was usually over 50 people from Poland and the whole world (from the Czech Republic, or Austria, to Australia and New Zealand). There was mainly people after doctorates, but also came international experts for these lectures.

For his activities to understand science in society, Prof. **Łukasz A. Turski** received in 2017, UN Global Compact Network Poland Award: Development Architect 2017 in the category Science, for work for sustainable development.

Research projects conducted at the Centre for Theoretical Physics PAS in 2017

Research projects conducted in Poland

Leader	Topic	Project no.	From-to
Prof. Karol Życzkowski	*Uncertainty relations and quantum entanglement*	2015/18/A/ST2/00274	2016-2021

Dr hab. Adam Sawicki, Prof. CFT PAN	*Optimality, universality and controllability in the theory of quantum computing*	2015/18/E/ST1/00200	2016-2021
Prof. Jerzy Kijowski	*Stability of initial value problem for the equations of Einstein: classical and quantum aspects*	2016/21/B/ST1/00940	2017-2020
Dr Agnieszka Kuźmicz,	*Stellar populations of giant radio sources*	2016/20/S/ST9/00142	2016-2019
Prof. Kazimierz Rzążewski	*Dynamics of quantum gases*	2015/19/B/ST2/02820	2016-2019
Prof. Bożena Czerny	*Quasar main sequence*	2015/17/B/ST9/03436	2016-2019
Prof. Iwo Białynicki-Birula	*Recovering geometry from scattering data*	2012/07/B/ST1/03347	2013-2018
Dr hab. Agnieszka Janiuk, Prof. CFT PAN	*Astrophysics processes around compact objects*	2012/05/E/ST9/03914	2013-2018
Mgr Tomasz Maciążek	*Maximally entangled quantum states and SLOCC classification of multiqubit states*	0165/DIA/2014/43	2014-2018
Mgr Tomasz Maciążek	*Topology of configuration spaces for particles on graphs*	2017/24/T/ST1/00489	2017-2018
Mgr Tomasz Maciążek	*Homology groups of configuration spaces for particles on graphs*	2016/23/N/ST1/03209	2017-2019
Dr hab. Łukasz Rudnicki	*Decoherence properties of non-gaussian states*	2014/13/D/ST2/01886	2015-2018
Dr Krzysztof Pawłowski	*Entanglement and decoherence of ultra cold gases*	2014/13/D/ST2/01883	2015-2018
Mgr Rafał Ołdziejewski	*Systems of several atoms in a dipole harmonic trap*	2016/21/N/ST2/03432	2017-2019
Dr hab. Mikołaj Korzyński, Prof. CFT PAN	*Local relativistic perturbation theory in hydrodynamics and general relativity and its applications in cosmology*	2016/22/E/ST9/00578	2017-2021
Prof. Paweł Nurowski	*Andrzej Trautman and Gold Age of General Relativity*	0019/DLG/2017/10	2017-2018
Dr hab. Agnieszka Janiuk, Prof. CFT PAN	*Matter hyperaccretion on the black hole*	2016/23/B/ST9/03114	2017-2020

International research projects

Leader	Topic	Project no.	From-to
Dr Remigiusz Augusiak	*Non-locality in Multipartite Quantum Systems*	705109	2016-2018
Dr Wojciech Hellwing	*Dance of galaxies: testing General Relativity and alternatives using galaxy velocity fields.*	748525	2017-2019

Research projects conducted at other institutions with the participation of the Centre's employees

Centre for Theoretical Physics PAS employees	Topic	Leader (unit)	From-to
Prof. Lech Mankiewicz	*Control and regulation of behaviours using neuroengineering methods*	Prof. A. Wróbel IBD im. NENCKIEGO	2013-2018

International collaboration

Partnerships with international academic institutes play an essential role in the Centre's research program laid out for each given year. Research conducted as part of the Centre's statutory activity and under specific projects is frequently conducted in conjunction with scientists from abroad.

In 2017, the Centre continued its direct research collaboration agreement, signed in 2011, with several academic institutions in Germany coordinated by the **Institut für Theoretische Physik Universität in Cologne** as part of the research project DFG no. SFB/TR-12. The group includes universities in **Bochum**, **Cologne** and **Duisburg/Essen**. In 2012, the Centre signed a collaborative agreement with the **University of Munich** and the **University of Stockholm** as part of the QOLAPS consortium implementing the **ERC Advanced Grant**. The Centre also has research agreements with the **Special Astrophysical Observatory of the Russian Academy of Sciences** and the **5th Institute of Physics at the University of Stuttgart**. The agreement between the Polish Academy of Sciences and the Russian Academy of Science includes the "Transient" project implemented by the Pi of the Sky team, represented by the Centre for Theoretical Physics PAS and the **Russian Space Institute of the Russian Academy of Sciences**. On behalf of the Pi of the Sky team, the Centre has also signed a Memorandum of Understanding with the LIGO and VIRGO experiments conducting observations of optical afterglows associated with sources of gravitational waves.

Publications by employees of the Centre for Theoretical Physics PAS in 2017

Publications in refereed journals, listed in the Journal Citation Reports

No.	Authors	Title	Journal
1	Eloisa Bentivegna, **Mikołaj Korzyński**, Ian Hinder, Daniel Gerlicher	*Light propagation through black-hole lattices*	JOURNAL OF COSMOLOGY AND ASTROPARTICLE PHYSICS, 2017, v. 2017, p. 014, https://doi.org/10.1088/1475-7516/2017/03/014
2	**Remigiusz Augusiak**	*Simple and tight monogamy relations for a class of Bell inequalities*	PHYSICAL REVIEW A, 2017, v. 95, p. 012113-1-012113-8, https://doi.org/10.1103/PhysRevA.95.012113
3	Florian Curchod, Markus Johansson, **Remigiusz Augusiak**, Matty Hoban, Peter Wittek, Antonio Acin	*Unbounded randomness certification using sequences of measurements*	PHYSICAL REVIEW A, 2017, v. 95, p. 020102-1-020102-5, https://doi.org/10.1103/PhysRevA.95.020102
4	Agata Antonina Różańska, Devaki Kunneriath, Bożena **Jadwiga Czerny**, Tek Adhikari, Vladimir Karas	*Multiphase environment of compact galactic nuclei: the role of the nuclear star cluster*	MONTHLY NOTICES OF THE ROYAL ASTRONOMICAL SOCIETY, 2017, v. 464, p. 2090, https://doi.org/10.1093/mnras/stw2460
5	Jordi Tura, Gemma de-las-Cuevas, **Remigiusz Augusiak**, Maciej Lewenstein, Antonio Acin, Juan Ignacio Cirac	*Energy as a Detector of Nonlocality of Many-Body Spin Systems*	Physical Review X, 2017, v. 7, p. 021005-1-021005-22, https://doi.org/10.1103/PhysRevX.7.021005
6	**Agnieszka Janiuk**	*Microphysics in the Gamma-Ray Burst Central Engine*	ASTROPHYSICAL JOURNAL, 2017, v. 837, p. 39-51, https://doi.org/10.3847/1538-4357/aa5f16
7	Krzysztof Bolejko, **Mikołaj Korzyński**	*Inhomogeneous cosmology and backreaction: Current status and future prospects*	INTERNATIONAL JOURNAL OF MODERN PHYSICS D, 2017, v. 26, https://doi.org/10.1142/S0218271817301100
8	**Krzysztof Pawłowski, Łukasz Andrzej Turski**	*On the Dissipative Version of the Gross-Pitaevski Equation*	PHYSICS LETTERS A, 2017, v. 381, p. 1710–1713, https://doi.org/10.1016/j.physleta.2017.03.021
9	**Adam Sawicki, Katarzyna Karnas**	*Criteria for universality of quantum gates*	PHYSICAL REVIEW A, 2017, v. 95, p. 062303, https://doi.org/10.1103/PhysRevA.95.062303

10	**Krzysztof Pawłowski**, Matteo Fadel, Philipp Treutlein, Yvan Castin, Alice Sinatra	*Mesoscopic quantum superpositions in bimodal Bose-Einstein condensates: Decoherence and strategies to counteract it*	PHYSICAL REVIEW A, 2017, v. 95, p. 063609, https://doi.org/10.1103/PhysRevA.95.063609
11	**Paweł Krzysztof Nurowski**, Ian Anderson	*Sp(3,R) Monge geometries in dimension 8*	DIFFERENTIAL GEOMETRY AND ITS APPLICATIONS, 2017, v. 53, p. 1-55, https://doi.org/10.1016/j.difgeo.2017.04.006
12	T. Bland, **Krzysztof Pawłowski**, M. J. Edmonds, **Kazimierz Maria Rzążewski**, N. G. Parker	*Interaction-sensitive oscillations of dark solitons in trapped dipolar condensates*	PHYSICAL REVIEW A, 2017, v. 95, p. 063622, https://doi.org/10.1103/PhysRevA.95.063622
13	Krzysztof Gawryluk, Mirosław Brewczyk, **Kazimierz Maria Rzążewski**	*Thermal solitons as revealed by the static structure factor*	PHYSICAL REVIEW A, 2017, v. 95, p. 043612, https://doi.org/10.1103/PhysRevA.95.043612
14	Alexia Salavrakos, **Remigiusz Augusiak**, Jordi Tura, Peter Wittek, Antonio Acin, Stefano Pironio	*Bell Inequalities Tailored to Maximally Entangled States*	PHYSICAL REVIEW LETTERS, 2017, v. 119, p. 040402-1-040402-6, https://doi.org/10.1103/PhysRevLett.119.040402
15	**Mikołaj Grzędzielski, Agnieszka Janiuk, Bożena Jadwiga Czerny**, Qingwen Wu	*Modified viscosity in accretion disks. Application to Galactic black hole binaries, intermediate mass black holes, and active galactic nuclei*	ASTRONOMY AND ASTROPHYSICS, 2017, v. 603, p. A110, https://doi.org/10.1051/0004-6361/201629672
16	Hadrien Kurkjian, **Krzysztof Pawłowski**, Alice Sinatra	*Einstein-Podolsky-Rosen-entangled Bose-Einstein condensates in state-dependent potentials: A dynamical study*	PHYSICAL REVIEW A, 2017, v. 96, p. 013621, https://doi.org/10.1103/PhysRevA.96.013621
17	Tomasz Karpiuk, Mirosław Brewczyk, **Kazimierz Maria Rzążewski**, Anita Gaj, Alexander Krupp, Robert Löw, Sebastian Hofferberth, Tilman Pfau	*Condensate losses and oscillations induced by Rydberg atoms*	JOURNAL OF PHYSICS B-ATOMIC MOLECULAR AND OPTICAL PHYSICS, 2017, v. 50, p. 055003, https://doi.org/10.1088/1361-6455/aa5245
18	**Wojciech Górecki, Kazimierz Maria Rzążewski**	*Electric dipoles vs. magnetic dipoles - for two molecules in a harmonic trap*	Europhysics Letters, 2017, v. 118, p. 66002, https://doi.org/10.1209/0295-5075/118/66002
19	Krzysztof Gawryluk, Tomasz Karpiuk, Mariusz Franciszek Gajda, **Kazimierz Maria Rzążewski**, Mirosław Brewczyk	*Unified way for computing dynamics of Bose–Einstein condensates and degenerate Fermi gases*	INTERNATIONAL JOURNAL OF COMPUTER MATHEMATICS, 2017, p. 1-19, https://doi.org/10.1080/00207160.2017.1370545
20	**Tomasz Maciążek**, Valdemar Tsanov	*Quantum marginals from pure doubly excited states*	Journal of Physics A-Mathematical and Theoretical, 2017, https://doi.org/10.1088/1751-8121/aa8c5f
21	**Mikołaj Grzędzielski, Agnieszka**	*Local Stability and Global*	ASTROPHYSICAL

	Janiuk, Bożena Jadwiga Czerny	*Instability in Iron-opaque disks*	JOURNAL, 2017, v. 845, https://arxiv.org/pdf/1706.08180.pdf
22	**Tomasz Maciążek, Adam Sawicki**	*Homology groups for particles on one-connected graphs*	Journal of Mathematical Physics, 2017, v. 58, p. 062103, https://doi.org/10.1063/1.4984309
23	**Adam Sawicki, Katarzyna Karnas**	*Universality of Single-Qudit Gates*	ANNALES HENRI POINCARE, 2017, v. 18, p. 3515–3552, https://doi.org/10.1007/s00023-017-0604-z
24	Petra Sukova, Szymon Charzyński, **Agnieszka Janiuk**	*Shocks in the relativistic transonic accretion with low angular momentum*	MONTHLY NOTICES OF THE ROYAL ASTRONOMICAL SOCIETY, 2017, v. 472, p. 4327-4342, https://doi.org/10.1093/mnras/stx2254
25	**Rafał Ołdziejewski, Kazimierz Maria Rzążewski**	*Diagnosing a two-body state of ultracold atoms with light*	Europhysics Letters, 2017, v. 119, p. 46002, https://doi.org/10.1209/0295-5075/119/46002
26	Andrzej Jerzy Maciejewski, **Tomasz Stachowiak**	*A novel approach to the spectral problem in the two photon Rabi model*	Journal of Physics A-Mathematical and Theoretical, 2017, v. 50, https://doi.org/10.1088/1751-8121/aa6fb8
27	**Bożena Jadwiga Czerny**, Yan-Rong Li, Krzysztof Hryniewicz, **Swayamtrupta Panda, Conor Patrick Wildy, Marzena Śniegowska**, Jian-Min Wang, Justyna Średzińska, Vladimir Karas	*Failed Radiatively Accelerated Dusty Out fl ow Model of the Broad Line Region in Active Galactic Nuclei. I. Analytical Solution.*	ASTROPHYSICAL JOURNAL, 2017, v. 846, p. 154, https://doi.org/10.3847/1538-4357/aa8810
28	**Iwo Białynicki-Birula**, Zofia Białynicka-Birula	*Relativistic Electron Wave Packets Carrying Angular Momentum*	PHYSICAL REVIEW LETTERS, 2017, v. 118, p. 114801, https://doi.org/10.1103/PhysRevLett.118.114801
29	**Iwo Białynicki-Birula**, Zofia Białynicka-Birula	*Comment on Relativistic Electron Vortices*	PHYSICAL REVIEW LETTERS, 2017, v. 119, p. 029501, https://doi.org/10.1103/PhysRevLett.119.029501
30	**Iwo Białynicki-Birula**, Zofia Białynicka-Birula	*Quantum-mechanical description of optical beams*	Journal of Optics, 2017, v. 10, p. 1-9, https://doi.org/10.1088/2040-8986/aa98b6
31	Ravishankar Ramanathan, Marco Tulio Quintino, Ana Belen Sainz, Gláucia Murta, **Remigiusz Augusiak**	*Tightness of correlation inequalities with no quantum violation*	PHYSICAL REVIEW A, 2017, v. 95, p. 012139-1-012139-15, https://doi.org/10.1103/PhysRevA.95.012139
32	Tomasz Ignacy Tylec, **Marek Kuś**	*Tensor product of no-signaling boxes in the framework of quantum logics*	Journal of Physics A-Mathematical and Theoretical, 2017, v. 50, p.

			04LT02, https://doi.org/10.1088/1751-8121/50/4/04LT02
33	**Agnieszka Olga Kuźmicz**, Marek Jamrozy, Dorota Kozieł-Wierzbowska, Marek Weżgowiec	*Optical and radio properties of extragalactic radio sources with recurrent jet activity*	MONTHLY NOTICES OF THE ROYAL ASTRONOMICAL SOCIETY, 2017, v. 471, p. 3806-3826, https://doi.org/10.1093/mnras/stx1830
34	**Jerzy Juliusz Kijowski**, Andrzej Okołów	*A modification of the projective construcion of quantum states for field theories*	Journal of Mathematical Physics, 2017, v. 58, p. 1-14, https://doi.org/10.1063/1.4989550
35	Piotr Tadeusz Grochowski, Tomasz Karpiuk, Mirosław Brewczyk, **Kazimierz Maria Rzążewski**	*Unified Description of Dynamics of a Repulsive Two-Component Fermi Gas*	PHYSICAL REVIEW LETTERS, 2017, v. 119, p. 215303, https://doi.org/10.1103/PhysRevLett.119.215303
36	**Lech Mankiewicz**, Aleksander Filip Żarnecki, **Rafał Opiela**, Arkadiusz Ćwiek, Mikołaj Stefan Ćwiok, B. P. Abbott, R. Abbott, T. D. Abbott, H Czyrkowski, R Dabrowski, G Kasprowicz, K Nawrocki, Lech Ryszard Piotrowski, G Wrochna, M Zaremba	*Multi-messenger Observations of a Binary Neutron Star Merger*	Astrophysical Journal Letters, 2017, v. 848, p. 59, https://doi.org/10.3847/2041-8213/aa91c9
37	**Justyna Średzińska, Bożena Jadwiga Czerny**, Krzysztof Hryniewicz, Magdalena Krupa, Paola Marziani, Tek Adhikari, Rupal Basak, Bei You, Jian-Min Wang, Chen Hu, Wojciech Pych, Maciej Bilicki, Agnieszka Kurcz	*SALT long-slit spectroscopy of quasar HE 0435-4312: fast displacement of the Mg II emission line*	Astronomy and Astrophysics, 2017, v. 601, p. A23, https://doi.org/10.1051/0004-6361/201628257
38	**Rafał Opiela, Lech Mankiewicz**, Aleksander Filip Żarnecki, Arkadiusz Ćwiek, Adam Zadrożny	*Transition from fireball to Poynting-flux-dominated outflow in the three-episode GRB 160625B*	Nature Astronomy, 2017, p. 2397-3366, https://doi.org/10.1038/s41550-017-0309-8
39	**Tomasz Maciążek, Adam Sawicki**	*Torsion in Cohomology Groups of Configuration Spaces*	ACTA PHYSICA POLONICA A , 2017, v. 6, p. 1695-1698, https://doi.org/10.12693/APhysPolA.132.1695
40	Kaneda, H.; Ishihara, D.; Oyabu, S.; Yamagishi, M.; Wada, T.; Armus, L.; Baes, M.; Charmandaris, V.; **Czerny, B.**; Efstathiou, A.; Fernández-Ontiveros, J. A.; Ferrara, A.; González-Alfonso, E.; Griffin, M.; Gruppioni, C.; Hatziminaoglou, E.; Imanishi, M.; Kohno, K.; Kwon, J.; Nakagawa, T.; Onaka, T.; Pozzi, F.; Scott, D.; Smith, J.-D. T.; Spinoglio, L.; Suzuki, T.; van der Tak, F.; Vaccari, M.; Vignali, C.; Wang, L.	*Unbiased Large Spectroscopic Surveys of Galaxies Selected by SPICA Using Dust Bands*	PUBLICATIONS OF THE ASTRONOMICAL SOCIETY OF AUSTRALIA, 2017, v. 34, p. 59, https://doi.org/10.1017/pasa.2017.56

41	Manabendra Nath Bera, Antonio Acin, **Marek Kuś**, Morgan W Mitchell, Maciej Lewenstein	*Randomness in quantum mechanics: philosophy, physics and technology*	Reports on Progress in Physics, 2017, v. 80, p. 124001, https://doi.org/10.1088/1361-6633/aa8731
42	**Agnieszka Janiuk**, Michał Bejger, Szymon Charzyński, Petra Sukova'	*On the possible gamma-ray burst–gravitational wave association in GW150914*	New Astronomy, 2016, v. 51, p. 07-14, https://doi.org/10.1016/j.newast.2016.08.002
43	**Krzysztof Pawłowski**, Konrad Szymański	*Evolution of entanglement under an Ising-like Hamiltonian with particle losses*	PHYSICAL REVIEW A, 2017, v. 96, p. 062312, https://doi.org/10.1103/PhysRevA.96.062312
44	**Karol Życzkowski**, Patryk Lipka-Bartosik	*Nuclear numerical range and quantum error correction codes for non-unitary noise models*	Quantum Information Processing, 2017, v. 16, p. 9, https://doi.org/10.1007/s11128-016-1484-8
45	M. Markiewicz, Z. Puchała, A. de Rosier, W. Laskowski, **K. Życzkowski**	*Quantum noise generated by local random Hamiltonians*	PHYSICAL REVIEW A , 2017, v. 95, p. 032333, https://doi.org/10.1103/PhysRevA.95.032333
46	K. Szymański, B. Collins, T. Szarek, **K. Życzkowski**	*Convex set of quantum states with positive partial transpose analysed by hit and run algorithm*	Journal of Physics A-Mathematical and Theoretical, 2017, v. 50, p. 255206, https://doi.org/10.1088/1751-8121/aa70f5/meta
47	W. Bruzda, D. Goyeneche, **K. Życzkowski**	*Quantum measurements with prescribed symmetry*	PHYSICAL REVIEW A, 2017, v. 96, p. 022105, https://doi.org/10.1103/PhysRevA.96.022105
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