Maciek Wielgus

Max Planck Institute for Radio Astronomy
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EDUCATION

Warsaw University of Technology **Sep 2016**
Ph.D. in Machine Design and Maintanance: Photonic Engineering
Dissertation: Adaptive decomposition and analytic signal concept in the interferometric fringe pattern analysis

Warsaw University of Technology **Dec 2010**
M.S. in Robotics and Automatic Control: Photonic Engineering (*interferometric pattern analysis*)

Warsaw University **Sep 2010**
B.S. in Mathematics: Numerical Analysis (*partial differential equations*)

PROFESSIONAL EXPERIENCE

Postdoctoral Researcher **Oct 2021 – present**
Max Planck Institute for Radio Astronomy, Bonn, Germany

Visiting Researcher **Jul 2022**
Paris Observatory Scientific Council grant, Meudon, France (*reference: Frederic Vincent*)

Black Hole Initiative Postdoctoral Fellow **May 2017 – Aug 2021**
Harvard University, Cambridge, USA (*mentor: Shep Doeleman*)

Confronting Theories of Accretion with Observations, KITP Program **Jan 2017 – Mar 2017**
Visiting Scholar, UCSB, Santa Barbara, USA

Postdoctoral researcher at Nicolaus Copernicus Astronomical Center **Jan 2017 – May 2017**
Polish Academy of Sciences, Warsaw, Poland (*mentors: Wlodek Kluźniak, Marek Abramowicz*)

Internship at Center for Astrophysics | Harvard & Smithsonian **Oct 2015 – Dec 2015**
Cambridge, USA (*mentors: Ramesh Narayan, Olek Sądowski*)

Visiting Scholar at Kavli Institute for Theoretical Physics, UCSB **Jun 2015**
Santa Barbara, USA (*mentors: Omer Blaes, Wlodek Kluźniak*)

Visiting Scholar at Peking University Kavli Institute for Astronomy and Astrophysics **Aug 2014**
Beijing, China (*mentors: Marek Abramowicz, Fukun Liu*)

Visiting Scholar at University of Capetown **May 2014**
Capetown, South Africa (*mentor: George F. R. Ellis*)

Internship at National Center of the Industrial Technology **Oct 2013 – Nov 2013**
Buenos Aires, Argentina (*mentors: Guillermo Kaufmann, Alejandro Frederico*)

Internship at Center for Astrophysics | Harvard & Smithsonian **Jun 2013 – Aug 2013**
Cambridge, USA (*mentors: Ramesh Narayan, Olek Sądowski*)

Internship at the College of Charleston **May 2013 – Jun 2013**
Charleston, USA (*mentor: Chris Fragile*)

Engineer at the Institute of Electron Technology **2011 – 2013**
Warsaw, Poland

RESEARCH INTERESTS

- astrophysics of compact objects
- general relativity
- very long baseline radio interferometry
- applied signal and image processing
- physics of accretion
- magnetohydrodynamics
- developing EHT data reduction and inspection pipeline

AWARDS

EHT Early Career Award (individual)	**2021 and 2020**
Group Award (A) from the Royal Astronomical Society (EHT collaboration)	**2021**
Albert Einstein medal (EHT collaboration)	**2020**
Bruno Rossi Prize for a contribution to High Energy Astrophysics (EHT collaboration)	**2020**
Breakthrough Prize in Fundamental Physics (EHT collaboration)	**2020**
Smithsonian Institute American Ingenuity Award (EHT collaboration)	**2019**
Black Hole Initiative Prize for scientific contributions to the EHT project (individual)	**2019**
National Science Foundation Diamond Achievement Award (EHT collaboration)	**2019**
First prize in IXth Nationwide Competition for a Best PhD Thesis "Young Innovators"	**2017**
Polish Prime Minister Award for the best PhD thesis in engineering	**2017**
Foundation for Polish Science START award (in 2015 with distinction as 1 of 5 young scientists nationwide)	**2015 – 2016**
Academic performance award from Polish Ministry of Science and Higher Education	**2013**
Scientific scholarship and travel award from the Center for Advanced Studies Warsaw University of Technology	**2012 – 2013**
SPIE best student presentation award, International Conference on Advanced Topics in Optoelectronics, Microelectronics and Nanotechnology, Constanza, Romania	**2012**
Laureate (6th place nationwide) of the National Mathematics Competition for high school students	**2005**

Publications

81 reviewed scientific journal papers (17 as a first author). 101 items **listed on ADS** (24 as a first author). 6767 citations, h-index=30, 58 papers cited at least 10 times (ADS, September 2022). Complete list of papers appended.

TALKS

I have given well over 100 professional talks, and a separate incomplete list can be found **here**. Below 10 talks that I am particularly happy with.

First image of the black hole shadow in Sagittarius A*, KIPAC seminar, Stanford (invited)	**Jun 2022**
Variability of the Sagittarius A* millimeter light curves, Black Hole Initiative Conference, Harvard (invited)	**May 2022**
Would we know a wormhole if we saw one? 16th Marcel Grossmann Meeting (invited)	**Jul 2021**

Polarized emission around the M87 supermassive black hole, **Mar 2021**
SLAC seminar, Stanford (invited)

Monitoring M87* in 2009–2017 with the EHT, **Feb 2020**
Seminar at Radboud University, Nijmegen (invited)

Analyzing time variability of Sgr A* in the EHT data, **Oct 2019**
New Horizons in Galactic Center Astronomy and Beyond, Yokohama

Observing AGN sources with the Event Horizon Telescope, IAU 356, Addis Ababa **Oct 2019**

Optically thick accretion: from theory to the most recent results, **Sep 2019**
University of Waterloo, astronomy seminar (invited)

Event Horizon Telescope, CTA 1st Science Symposium, Bologna (invited) **May 2019**

First EHT results, Astronomy Department, Yale University (invited) **Apr 2019**

GRANTS AND FORMAL PROJECTS

PI: Dynamics of the Centaurus A jet base on a light-day scale **2022**
ALMA cycle 8 VLBI observations

Co-PI: Probing relativistic jets through mm-VLBI of X-ray binaries **2022**
GMVA VLBI observations, PI: Alex Tetarenko

Co-PI: Ultra-high resolution imaging of 3C84 **2022**
ALMA cycle 8 VLBI observations

PI: Thin disks GRRMHD simulations **2018 – 2022**
3×10^7 *CPU hours on PROMETHEUS supercomputer from PLGRID*

Named participant: Variable accretion flows **2013 – 2018**
Polish National Science Center Maestro grant, PI: Wlodek Kluźniak

CO-PI: Adaptive processing of fringe patterns in optical whole-field measurements **2013 – 2015**
Polish National Science Center Opus grant, PI: Krzysztof Patorski

PI: Automatic image analysis for nanomaterials research **2012 – 2014**
Foundation for Polish Science VENTURES grant

Named participant: Turbulent viscosity in non-stationary black hole accretion disks **2012 – 2014**
Polish National Science Center Opus grant, PI: Marek Abramowicz

TEACHING EXPERIENCE

Lecturer of astrophysics at the relativistic accretion workshop, University of Bremen **Sep 2016**
Transonic flows, ideal MHD, MRI

Teaching at Warsaw University of Technology **2011 – 2015**
Optomechatronics lab, Mechatronic systems lab, and Instrumental optics lab

Teaching assistant and tutor at Warsaw University **2010 – 2011**
Calculus I & II, linear algebra for math students

OTHER ACTIVITIES

- leading the EHT Time Domain Working Group 2018-2022
- one of the key contributors to the EHT data set reduction and inspection pipeline development
- reviewer for MNRAS, A&A, ApJ, PRL, New Astronomy, Applied Optics, Optics Express, Optics Letters
- SOC member, EHT polarization workshop, Max-Planck Institute for Radio Astronomy, July 2019; EHT Collaboration Meeting, Granada, June 2022,
- advised multiple students with scientific projects (W. Yan, D. Bollimpalli, S. Steel, D. Lancova)

- named participant on multiple VLBI observational proposals
- reviewer of grant proposals at the Czech Science Foundation in the Astronomy panel
- member of the Polish Astronomical Society

LANGUAGES

- **Polish** [fluent]
- **English** [fluent]
- **Russian** [basic]
- **Spanish** [trying to learn]

NON-SCIENTIFIC INTERESTS

- travelling and tourism
- running (mostly long distances)
- playing the guitar

Journal papers

83. *Spectra of Puffy Accretion Discs: the kynbb Fit*, Lancova, D., Yilmaz, A., **Wielgus, M.**, + 3 authors, submitted to Astronomische Nachrichten, arXiv:2209.03713,
82. *Polarimetric signatures of hot spots in black hole accretion flows*, Vos, J., Moscibrodzka, M., and **Wielgus, M.**, submitted to A&A,
81. *Collimation of the relativistic jet in the quasar 3C 273*, Okino, H., Akiyama, K., Asada, K., +32 authors, submitted to ApJ, arXiv:2112.12233,
80. *Orbital motion near Sagittarius A*. Constraints from polarimetric ALMA observations*, **Wielgus, M.**, Moscibrodzka, M., Vos, J., Gelles, Z., + 5 authors, accepted in A&A Letters,
79. *Photon ring test of the Kerr hypothesis: variation in the ring shape*, Paugnat, H., Lupsasca, A., Vincent, F., and **Wielgus, M.**, accepted in A&A, arXiv:2206.02781,
78. *A first search of transients in the galactic center from 230 GHz ALMA observations*, Mus, A., Marti-Vidal, I., **Wielgus, M.**, and Stroud, G., accepted in A&A, arXiv:2208.08248,
77. *Images and photon ring signatures of thick disks around black holes*, Vincent, F., Gralla, S., Lupsasca, A., and **Wielgus, M.**, accepted in A&A, arXiv:2206.12066,
76. *A robust test on the existence of primordial black holes in galactic dark matter halos*, Abramowicz, M., Bejger, M., Udalski, A., and **Wielgus, M.**, ApJL 935, L28 (2022), arXiv:2206.13335,
75. *Photon ring in M87**, Broderick, A., Pesce, D., Gold, R. + 48 authors, ApJ 935, 61 (2022), arXiv: 2208.09004,
74. *Resolving the inner parsec of the blazar J1924–2914 with the Event Horizon Telescope*, Issaoun, S., **Wielgus, M.**, Jorstad, S., Krichbaum, T. + 264 authors, ApJ 934, 145 (2022), arXiv:2208.01662,
73. *Observational properties of puffy disks: radiative GRMHD spectra of mildly sub-Eddington accretion*, **Wielgus, M.**, Lancova, D., Straub, O., Kluzniak, W. + 6 authors, MNRAS 514, 780 (2022), arXiv:2202.08831,
72. *Characterizing and Mitigating Intraday Variability: Reconstructing Source Structure in Accreting Black Holes with mm-VLBI*, Broderick, A., Gold, R., Georgiev, B., + 264 authors, ApJL 930, L21 (2022),
71. *A Universal Power-law Prescription for Variability from Synthetic Images of Black Hole Accretion Flows*, Georgiev, B., Pesce, D., Broderick, A., Wong, G., Dhruv, V., **Wielgus, M.** + 263 authors, ApJL 930, L20 (2022),
70. *Millimeter Light Curves of Sagittarius A* Observed during the 2017 Event Horizon Telescope Campaign*, **Wielgus, M.**, Marchili, N., Marti-Vidal, I., Keating, G. K. + 263 authors, ApJL 930, L19 (2022), arXiv:2207.06829,
69. *Selective Dynamical Imaging of Interferometric Data*, Farah, J., Galison, P., Akiyama, K., Bouman, K., Bower, G., Chael, A., Fuentes, A., Gomez, J. L., Narayan, R., Honma, M., Johnson, M. D., Moriyama, K., Kofuji, Y., **Wielgus, M.** + 221 authors, ApJL 930, L18 (2022),
68. *First Sagittarius A* Event Horizon Telescope Results. VI. Testing the Black Hole Metric*, EHT Collaboration (270 authors), ApJL 930, L17 (2022),
67. *First Sagittarius A* Event Horizon Telescope Results. V. Testing Astrophysical Models of the Galactic Center Black Hole*, EHT Collaboration (274 authors), ApJL 930, L16 (2022),
66. *First Sagittarius A* Event Horizon Telescope Results. IV. Variability, Morphology, and Black Hole Mass*, EHT Collaboration (269 authors), ApJL 930, L15 (2022),
65. *First Sagittarius A* Event Horizon Telescope Results. III. Imaging of the Galactic Center Supermassive Black Hole*, EHT Collaboration (270 authors), ApJL 930, L14 (2022),
64. *First Sagittarius A* Event Horizon Telescope Results. II. EHT and Multiwavelength Observations, Data Processing, and Calibration*, EHT Collaboration (337 authors), ApJL 930, L13 (2022),
63. *First Sagittarius A* Event Horizon Telescope Results. I. The Shadow of the Supermassive Black Hole in the Center of the Milky Way*, EHT Collaboration (388 authors), ApJL 930, L12 (2022),
62. *The science case and challenges of space-borne sub-millimeter interferometry*, Gurvits, L., Paragi, Z. + 52 authors, Acta Astronautica 196, 314-333 (2022), arXiv:2204.09144,
61. *MeqSilhouette v2: Spectrally-resolved polarimetric synthetic data generation for the Event Horizon Telescope*, Natarajan, I., Deane, R., Marti-Vidal, I., Roelofs, F., Janssen, M., **Wielgus, M.** +14 authors, MNRAS 512, 490 (2022), arXiv:2202.11478,

60. *The intrinsic structure of Sagittarius A* at 1.3 cm and 7 mm*, Cho, I., Zhao, G.-Y., Kawashima, T., +63 authors, ApJ 926, 108 (2022), arXiv:2112.04929,
59. *The Variability of the Black-Hole Image in M87 at the Dynamical Time Scale*, Satapathy, K., Psaltis, D., Ozel, F., Medeiros, L., Dougall, S. T., Chan, C., **Wielgus , M.**, +231 authors, ApJ 925, 13 (2022), arXiv:2111.01317,
58. *Photon rings of spherically symmetric black holes and robust tests of non-Kerr metrics*, **Wielgus , M.**, PRD 104, 124058 (2021), arXiv:2109.10840,
57. *Event Horizon Telescope observations of the jet launching and collimation zone in Centaurus A*, Janssen, M., Falcke, H., Kadler, M., Ros, E., **Wielgus, M.**, +266 authors, Nat Astron 5 1017-1028 (2021), arXiv:2111.03356,
56. *Persistent Non-Gaussian Structure in the Image of Sagittarius A* at 86 GHz*, Issaoun, S., Johnson, M., Blackburn, L., Broderick, A., Tiede, P., **Wielgus, M.**, + 23 authors, ApJ 915, 99 (2021), arXiv:2104.07610,
55. *Three-dimensional general relativistic Poynting-Robertson effect. IV. Slowly rotating and non-spherical quadrupolar massive source*, De Falco, V., **Wielgus , M.**, PRD 103, 084056 (2021), arXiv:2103.17165,
54. *The Polarized Image of a Synchrotron Emitting Ring of Gas Orbiting a Black Hole*, Narayan, R., et al., ApJ 912, 35 (2021), arXiv:2105.01804,
53. *Light echos and coherent autocorrelations in a black hole spacetime*, Chesler, P., Blackburn, L., Doeleman, S., Johnson, M., Moran, J., Narayan, R., **Wielgus , M.**, Class. Quantum Grav. 38, 13 (2021), arXiv:2012.11778,
52. *Broadband Multi-wavelength Properties of M87 During the 2017 Event Horizon Telescope Campaign*, Algaba, J. C., + 744 authors, ApJL 911, L11 (2021), arXiv:2104.06855,
51. *Polarimetric Properties of Event Horizon Telescope Targets from ALMA*, Goddi, C., + 249 authors, ApJL 910, L14 (2021),
50. *First M87 Event Horizon Telescope Results. VIII. Magnetic Field Structure near The Event Horizon*, EHT Collaboration (240 authors), ApJL 910, L13 (2021),
49. *First M87 Event Horizon Telescope Results. VII. Polarization of the Ring*, EHT Collaboration (239 authors), ApJL 910, L12 (2021),
48. *Elliptical accretion disk as a model for TDEs*, Liu, F., Cao, C., Abramowicz, M., **Wielgus, M.**, Cao, R., Zhou, Z., ApJ 908, 179 (2021), arXiv:2012.05552,
47. *Geometric modeling of M87* as a Kerr black hole or a non-Kerr compact object*, Vincent, F., **Wielgus, M.**, Abramowicz, M., Gourgoulhon, E., J. P. Lasota, + 2 authors, A&A 646, A37 (2021), arXiv:2002.09226,
46. *Reflection-asymmetric wormholes and their double shadows*, **Wielgus, M.**, Horák, J., Vincent, F., Abramowicz, M., PRD 102, 084044 (2020), arXiv:2008.10130,
45. *Gravitational Test Beyond the First Post-Newtonian Order with the Shadow of the M87 Black Hole*, Psaltis, D., + 187 authors, PRL 125, 141104 (2020), arXiv:2010.01055,
44. *Monitoring the Morphology of M87* in 2009-2017 with the Event Horizon Telescope*, **Wielgus, M.**, Akiyama, K., Blackburn, L., + 216 authors, ApJ 901, 67 (2020), arXiv:2009.11842,
43. *Event Horizon Telescope imaging of the archetypal blazar 3C 279 at an extreme 20 microarcsecond resolution*, Kim, J.-Y., Krichbaum, T., Broderick, A., **Wielgus, M.**, + 349 authors, A&A 640, A69 (2020),
42. *Verification of Radiative Transfer Schemes for the EHT*, Gold, R., + 207 authors, ApJ 897, 148 (2020),
41. *THEMIS: A Parameter Estimation Framework for the Event Horizon Telescope*, Broderick, A., + 193 authors, ApJ 897, 139 (2020),
40. *Closure Statistics in Radio Interferometric Data*, Blackburn, L., Pesce, D., Johnson, M., **Wielgus, M.**, Chael, A., Christian, P., Doeleman, S., ApJ 894, 31 (2020), arXiv:1910.02062,
39. *SYMBA: An end-to-end VLBI synthetic data generation pipeline. Simulating Event Horizon Telescope observations of M 87*, Roelofs, F., Janssen, M., + 207 authors, A&A 636, A5 (2020)
38. *Universal Interferometric Signatures of a Black Hole's Photon Ring*, Johnson, M., + 16 authors, Science Advances 6, eaaz1310 (2020), arXiv:1907.04329,
37. *Optically thin outbursts of rotating neutron stars can not be spherical*, **Wielgus, M.**, MNRAS, 488, 4937 (2019), arXiv:1907.11268,
36. *Puffy Accretion Disks: Sub-Eddington, Optically Thick, and Stable*, Lančová, D., Abarca, D., Kluźniak, W., **Wielgus, M.**, + 5 authors, ApJL 884, L37 (2019), arXiv:1908.08396,
35. *EHT-HOPS Pipeline for Millimeter VLBI Data Reduction* , Blackburn, L., Chan, C.-K., Crew, G., Fish, V., Issaoun, S., Johnson, M. D., **Wielgus, M.**, + 8 authors, ApJ 882, 23 (2019), arXiv:1903.08832,

34. *Atmospheric oscillations provide simultaneous measurement of neutron star mass and radius*, Bollimpalli, D., **Wielgus, M.**, Abarca, D., Kluźniak, W., MNRAS 487, 5129 (2019), arXiv:1812.01299,
33. *The Event Horizon General Relativistic Magnetohydrodynamic Code Comparison Project*, Porth, O., + 220 authors, ApJSS 243, 26 (2019), arXiv:1904.04923,
32. *Calibration of ALMA as a Phased Array. ALMA Observations During the 2017 VLBI Campaign* Goddi, C., Martí-Vidal, I., Messias, H., + 14 authors, PASP 131, 075003 (2019), arXiv:1901.09987,
31. *rPICARD: A CASA-based calibration pipeline for VLBI data. Calibration and imaging of 7 mm VLBA observations of the AGN jet in M 87* Janssen, M., + 9 authors, A&A 626, A75 (2019), arXiv:1902.01749,
30. *First M87 Event Horizon Telescope Results. VI. The Shadow and Mass of the Central Black Hole*, EHT Collaboration (214 authors), ApJL 875, L6 (2019), arXiv:1906.11243,
29. *First M87 Event Horizon Telescope Results. V. Physical Origin of the Asymmetric Ring*, EHT Collaboration (221 authors), ApJL 875, L5 (2019), arXiv:1906.11242,
28. *First M87 Event Horizon Telescope Results. IV. Imaging the Central Supermassive Black Hole*, EHT Collaboration (215 authors), ApJL 875, L4 (2019), arXiv:1906.11241,
27. *First M87 Event Horizon Telescope Results. III. Data Processing and Calibration*, EHT Collaboration (217 authors, paper coordinated by Blackburn, L., Issaoun, S., **Wielgus, M.**), ApJL 875, L3 (2019), arXiv:1906.11240,
26. *First M87 Event Horizon Telescope Results. II. Array and Instrumentation*, EHT Collaboration (341 authors), ApJL 875, L2 (2019), arXiv:1906.11239,
25. *First M87 Event Horizon Telescope Results. I. The Shadow of the Supermassive Black Hole*, EHT Collaboration (348 authors), ApJL 875, L1 (2019), arXiv:1906.11238,
24. *Multi-wavelength torus-jet model for Sagittarius A**, Vincent, F., Abramowicz, M., Zdziarski, A., **Wielgus, M.**, Paumard, T., Perrin, G., Straub, O., A&A 624, A52 (2019), arXiv:1902.01175,
23. *The Size, Shape, and Scattering of Sagittarius A* at 86 GHz: First VLBI with ALMA*, Issaoun, S., Johnson, M., Blackburn, L., + 41 authors, ApJ 871, 30 (2019), arXiv:1901.06226,
22. *Collisions of Neutron Stars with Primordial Black Holes as Fast Radio Bursts Engines*, Abramowicz, M., Bejger, M., **Wielgus, M.**, ApJ 868, 17 (2018), arXiv:1704.05931,
21. *Double Compton and Cyclo-Synchrotron in Super-Eddington Discs, Magnetized Coronae, and Jets*, McKinney, J. C., Chluba, J., **Wielgus, M.**, Narayan, R., Sądowski, A., MNRAS 467, 2241 (2017), arXiv:1608.08627,
20. *Radiative, two-temperature simulations of low-luminosity black hole accretion flows in general relativity*, Sądowski, A., **Wielgus, M.**, Narayan, R., Abarca, D., McKinney, J. C., Chael, A., MNRAS 466, 705 (2017), arXiv:1605.03184,
19. *Levitating atmospheres of Eddington-luminosity neutron stars*, **Wielgus, M.**, Sądowski, A., Kluźniak, W., Abramowicz, M., Narayan, R., MNRAS, 458, 3420 (2016), arXiv:1512.00094,
18. *Limits on thickness and efficiency of Polish doughnuts in application to the ULX sources*, **Wielgus, M.**, Yan, W., Lasota, J.-P., Abramowicz, M., A&A 587, A38 (2016), arXiv:1512.00749,
17. *Stable, levitating, optically thin atmospheres of Eddington-luminosity neutron stars*, **Wielgus, M.**, Kluźniak, W., Sądowski, A., Narayan, R., Abramowicz, M., MNRAS 454, 3766 (2015), arXiv:1505.06099,
16. *Two-frame tilt-shift error estimation and phase demodulation algorithm*, **Wielgus, M.**, Sunderland, Z., Patorski, K., Optics Letters 40, 3460 (2015),
15. *Local stability of strongly magnetized black hole tori*, **Wielgus, M.**, Fragile, P. C., Wang, Z., Wilson, J., MNRAS 447, 3593 (2015), arXiv:1412.4561,
14. *Cosmic background radiation in the vicinity of a Schwarzschild black hole: no classic firewall*, **Wielgus, M.**, Ellis, G. F. R., Vincent F., Abramowicz, M., PRD 90, 124024 (2014), arXiv:1406.6551,
13. *Continuous phase estimation from noisy fringe patterns based on the implicit smoothing splines*, **Wielgus, M.**, Patorski, K., Etchepareborda, P., Federico, A., Optics Express 22, 10775 (2014),
12. *Denoising and extracting background from fringe patterns using midpoint-based bidimensional empirical mode decomposition*, **Wielgus, M.**, Patorski, K., Applied Optics 53, B215 (2014),
11. *The perihelion of Mercury advance and the light bending calculated in (enhanced) Newton's theory*, Abramowicz, M., Ellis, G. F. R., Horák, J., **Wielgus, M.**, General Relativity and Gravitation 46:1630 (2014), arXiv:1303.5453,

10. *Nanocoral ZnO films fabricated on flexible poly(vinyl chloride) using a carrier substrate*, Borysiewicz, M., Wojciechowski, T., Dynowska, E., **Wielgus, M.**, Bar, J.,Wojtowicz, T., Kamińska, E., Piotrowska, A., Thin Solid Films 550, 145 (2014),
9. *Advanced processing of optical fringe patterns by automated selective reconstruction and enhanced fast empirical mode decomposition*, Trusiak, M., **Wielgus, M.**, Patorski, K., Optics and Lasers in Engineering 52, 230 (2014),
8. *Escape, capture, and levitation of matter in Eddington outbursts*, Stahl, A., Kluźniak, W., **Wielgus, M.**, Abramowicz, M., A&A 555, A114 (2013), arXiv:1306.6556,
7. *AFM nanomoiré technique with phase multiplication*, Patorski, K., **Wielgus, M.**, Ekielski, M., Kaźmierczak, P., Measurement Science and Technology 24, 035402 (2013),
6. *Adaptive enhancement of optical fringe patterns by selective reconstruction using FABEMD algorithm and Hilbert spiral transform*, Trusiak, M., Patorski, K., **Wielgus, M.**, Optics Express 20, 23463 (2012),
5. *Oscillations of the Eddington capture sphere*, **Wielgus, M.**, Stahl, A., Abramowicz, M., Kluźniak, W., A&A 545, A123 (2012), arXiv:1208.2939,
4. *Eddington capture sphere around luminous stars*, Stahl A., **Wielgus, M.**, Abramowicz, M., Kluźniak, W., Yu, W., A&A 546, A54 (2012), arXiv:1208.2231,
3. *From porous to dense thin ZnO films through reactive DC sputter deposition onto Si (100) substrates*, Borysiewicz, M., Dynowska, E., Kolkovsky, V., Dyczewski, J., **Wielgus, M.**, Kamińska, E., Piotrowska, A., Physica Status Solidi A 209, 2463 (2012),
2. *Stability of radiation-pressure dominated disks. I. The dispersion relation for a delayed heating α-viscosity prescription*, Ciesielski, A., **Wielgus, M.**, Kluźniak, W., Sądowski, A., Abramowicz, M., Lasota, J.-P., Rebusco, P., A&A 538, A148 (2012), arXiv:1106.2335,
1. *Evaluation of amplitude encoded fringe patterns using the bidimensional empirical mode decomposition and the 2D Hilbert transform generalizations*, **Wielgus, M.**, Patorski K., Applied Optics 50, 5513 (2011)

Other publications

31. *The Event Horizon Explorer mission concept*, Kurczynski, P., Johnson, M., Doeleman, S., + 41 authors, Proc. SPIE 12180 (121800M), Space Telescopes and Instrumentation (2022),
30. *First M87 Event Horizon Telescope Results and the Role of ALMA*, Goddi, C., Crew, G., Impellizzeri, V., + 42 authors, The Messenger 177, 25 (2019), arXiv:1910.10193,
29. *Studying black holes on horizon scales with space-VLBI*, Johnson, M., + 27 authors, Astro2020 white paper, arXiv:1909.01405,
28. *Extremely long baseline interferometry with Origins Space Telescope*, Pesce, D., Haworth, K., Melnick, G., Blackburn, L., **Wielgus, M.**, + 6 authors, Astro2020 white paper, arXiv:1909.01408,
27. *Studying Black Holes on Horizon Scales with VLBI Ground Arrays*, Blackburn, L., + 37 authors, Astro2020 white paper, arXiv:1909.01411,
26. *Black Hole Physics on Horizon Scales* Doeleman, S., + 15 authors, Astro2020 white paper, BAAS, 51, 537 (2019),
25. *Global calibration of instrumental polarimetric phase gains*, Steel, S., **Wielgus, M.**, Blackburn, L., Issaoun, S., Johnson, M., EHT Memo Series, 2019-CE-03 (2019),
24. *EHT data set validation and characterization of errors*, **Wielgus, M.**, Blackburn, L., Issaoun, S., Janssen, M., Johnson, M., Koay, J.-Y., EHT Memo Series, 2019-CE-02 (2019),
23. *Flux Density Calibration of the EHT Array*, Janssen, M., Blackburn, L., Issaoun, S., Krichbaum, T., **Wielgus, M.**, EHT Memo Series, 2019-CE-01 (2019),
22. *The electromagnetic afterglows of gravitational waves as a test for Quantum Gravity*, Abramowicz, M., Bulik, T., Ellis, G. F. R., Meissner, K., **Wielgus, M.**, (2016), arXiv:1603.07830,
21. *Eddington capture sphere around luminous relativistic stars*, **Wielgus M.**, Proceedings IAU 312, 131, Beijing, China (2014),
20. *Stress-energy tensor of a radiating sphere inclosing black hole*, **Wielgus M.**, Abramowicz M., Proceedings of RAGtime 14-16, 293 (2014), arXiv:1501.01540,

19. *Evaluation of the implicit smoothing splines algorithm for the interferometric fringe pattern phase retrieval*, **Wielgus M.**, Patorski, K., Proc. SPIE 944112 (2014),
18. *Evaluation of optical parameters of quasi-parallel plates with single-frame interferogram analysis methods and eliminating the influence of camera parasitic fringes*, Sunderland, Z., Patorski, K., **Wielgus, M.**, Pokorski, K., Proc. SPIE 944111 (2014),
17. *Hilbert-Huang processing and analysis of complex fringe patterns*, Trusiak, M., Patorski, K., **Wielgus, M.**, Proc. SPIE 92030K-15 (2014),
16. *Fast adaptive processing of low quality fringe patterns by automated selective reconstruction and enhanced fast empirical mode decomposition*, Trusiak, M., Patorski, K., **Wielgus, M.**, Fringe 2013, 185, Stuttgart, Germany (2014),
15. *Filtering ESPI fringes with non-local means algorithm*, **Wielgus M.**, Patorski K., Fringe 2013, 317, Stuttgart, Germany (2014),
14. *Denoising and extracting background from fringe patterns using midpoint-based bidimensional empirical mode decomposition*, **Wielgus, M.**, Patorski, K., Proc. SPIE 90660K-9 (2013),
13. *Nanocrystallic thin films statistical structural analysis by the automatic image processing*, **Wielgus, M.**, Sunderland, Z., Koguciuk, D., Patorski, K., Słowik, G., Proc. SPIE 89234S-7 (2013),
12. *Enhanced measurements of displacements and strains in quasiperiodic nanostructures*, **Wielgus, M.**, + 4 authors, MRS Proceedings 1554, mrss13-1554-u04-07 (2013),
11. *Filtering fringe patterns with the extended non local means algorithm*, **Wielgus, M.**, Patorski, K., PHOTOPTICS 2013, Barcelona, Spain (2013),
10. *Sputter deposited ZnO porous films for sensing applications*, Borysiewicz, M., Dynowska, E., Kolkovsky, V., **Wielgus, M.**, + 6 authors, MRS Proceedings 1494, mrsf12-1494-z04-38 (2013),
9. *Comparative analysis of image fusion performance evaluation methods for the real-time environment monitoring system*, **Wielgus, M.**, Putz, B., Image Processing and Communications Challenges 4, Advances in Intelligent Systems and Computing 184, 119 (2012),
8. *Real-time Image Fusion Monitoring System: Problems and Solutions*, Putz, B., Bartyś, M., Antoniewicz, A., Klimaszewski, J., Kondej, M., **Wielgus, M.**, Image Processing and Communications Challenges 4, Advances in Intelligent Systems and Computing 184, 143 (2012),
7. *Continuous wavelet transform for d-space distribution analysis in nanocrystallic materials*, **Wielgus, M.**, Grochowski, J., Kamińska, E., Patorski, K., Proc. SPIE 84110A-6, (2012),
6. *Fast and Adaptive Bidimensional Empirical Mode Decomposition for the Real-time Video Fusion*, **Wielgus, M.**, Bartyś, M., Antoniewicz, A., Putz, B., Proc. IEEE 15th International Conference on Information Fusion, 649, Singapore (2012),
5. *Non-local fringe image filtration: a new interferometric data filtration paradigm?*, **Wielgus M.**, Patorski K., Photonics Letters of Poland, 4, 66 (2012),
4. *Multispectral phase shifting interferometry algorithm*, Wengierow, M., Sałbut, L., **Wielgus, M.**, Photonics Letters of Poland 4, 60 (2012),
3. *Amplitude demodulation of interferometric signals with a 2D Hilbert transform*, **Wielgus M.**, Challenges of modern technology 2, 8 (2011),
2. *Information retrieval from amplitude modulated fringe patterns using single frame processing methods*, Patorski, K., Pokorski, K. **Wielgus, M.**, Proc. SPIE 8338, 833802 (2011),
1. *Perona-Malik equation and its numerical properties*, **Wielgus, M.**, Bachelor thesis at the Faculty of Mathematics, Informatics and Mechanics, University of Warsaw (2010), arXiv:1412.6291