PD Dr Tatiana Latychevskaia

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Researcher unique identifiers
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EDUCATION

2019	Promotionsrecht (right to award doctorates).	UZH
2014 – 2016	Habilitation (PD) at the Department of Physics, MNF; Habilitation thesis "Phase retrieval methods applied to coherent imaging".	UZH
1997 – 2001	PhD in the group of Prof Urs P Wild, Department of Chemistry, ETH Zürich. Experimental PhD thesis "Single molecules in electric fields" - detection of single molecule fluorescence at cryogenic (liquid helium) temperature, measuring the Stark effect on individual polycyclic aromatic hydrocarbons (PAH) molecules.	ETH
1990 – 1996	Master's degree at the Department of Physics, Technical University of St. Petersburg, Russia; Theoretical and optical experimental thesis "Synthesis of rainbow holograms".	Technical University of St.-Petersburg

EMPLOYMENT

2018 – present	Scientist and PI at the Paul Scherrer Institute, developing coherent diffraction methods for imaging nano-objects and individual biomolecules.	PSI
2024 August	Invited visiting Professor in the Computational Imaging group, University of Tampere, Finland.	University of Tampere
2017 – 2018	Senior researcher in the group of Prof. Carbone at LUMES Laboratory, provided support in data analysis for experiments in electron diffraction of nano-object systems (nano-diffraction, small angle diffraction, time-resolved).	EPFL
2004 – 2016	Researcher in the group of Prof Hans-Werner Fink, Department of Physics, led the project of developing theory and numerical methods for simulation and reconstruction of diffraction patterns and holograms of single molecules and nano-sized objects.	UZH
2003 – 2004	Postdoctoral researcher at the Department of Physics, implemented a time-resolved component for room-temperature scanning confocal optical microscopy single-molecule detection setup.	University of Basel
2002 – 2003	Postdoctoral researcher in the group of Prof Hans-Werner Fink, Department of Physics, developed theory and numerical methods for simulation and reconstruction of diffraction patterns and holograms of single molecules and nano-sized objects.	UZH
2002 – 2002	Invited guest researcher at Academia Sinica, Taipei, Taiwan. Together with Prof Urs P Wild, built a room-temperature single-molecule detection setup.	Academia Sinica, Taipei
1996 – 1997	Teaching assistant at the Department of Theoretical Physics, Technical University of St. Petersburg, Russia.	Technical University of St. Petersburg

TEACHING ACTIVITIES

2020 – present	Lecturer in the course PHY 425 "Modern Optics and Microscopy" (every spring semester) together with Prof Christof Aegerter.	UZH
2019 – present	Lecturer in the course PHY 427 "Electron Microscopy Lectures" (every fall semester) together with Prof Takashi Ishikawa (ETH).	UZH
2012 – 2015	Teaching assistant in the Advanced Physics Practicum course: Experiments on X-ray diffraction, single photon interference, and electron diffraction. Teaching graduate students self-made course "Introduction to coherent optics".	UZH
2004 – 2012	Teaching assistant in physics lab-courses and lectures for medical, biology and chemistry students.	UZH
2003 – 2003	Guest lecturer in the course "Single-molecule detection and spectroscopy" by Prof Bert Hecht.	Uni Basel
2003 – 2003	Teaching assistant in Physics lecture course for physics students.	Uni Basel
2002 – 2002	Teaching assistant in physics lab-courses and lectures for medical, biology and chemistry students. Guest lecturer in the course "Modern Microscopy Techniques; Principles and Applications in Physics, Chemistry and Biology".	UZH
1998 – 2001	Teaching assistant in the lectures and lab-courses "Chemistry for Physicists". The results of the practicum experiment "Surface Tension" were published in "Axisymmetric liquid hanging drops" by E. Meister and T. Latychevskaia, J. Chem. Educ. 83, 117-126 (2006). The results of the practicum experiment "Viscosity" were published in the book "Grundpraktikum Physikalische Chemie. Theorie und Experimente" by E. Meister (2000).	ETH
1996 – 1997	Teaching assistant at the Department of Theoretical Physics (teaching practical exercises in classical mechanics, quantum mechanics and electrodynamics); Technical University of St. Petersburg, Russia.	Technical University of St.Petersburg

SUPERVISION OF UNDER- and GRADUATE STUDENTS

Physics Department, MNF, UZH

2024 – present	Soheil Hajibaba	PhD	Investigation of the spatial coherence of Dirac materials field emitters (co-supervision with Dr Soichiro Tsujino, PSI)
2021 – present	Sara Mustafi	PhD	Convergent beam electron diffraction
2023	Heba Hussein	semester	Parseval's theorem in optical simulations
2022	Sarah Bernardinis	Bachelor	Study of electrical transport and field emission of CVD graphene (co-supervision with Dr Soichiro Tsujino, PSI)
2021	Alice Kohli	Master	A quantum mechanical scheme to reduce radiation damage in electron microscopy
2018	Jonas Heidler	PhD	Wavefront modulation for phase retrieval (Uni Basel, unofficial co-supervision and project support)
2014 – 2018	Pavlo Kliuiev	PhD	Phase retrieval of photoemission data (unofficial co-supervision and project support)
2014 – 2018	Marianna Lorenzo	PhD	Intercalation of alkali metals in graphene
2015	Daniel Schachtler	Bachelor	Creation of Airy beams with spatial light modulator and study of their optical properties, published in Applied Optics 55(22), 6095 – 6101 (2016)
2012 – 2016	Giulia Mancini	PhD	Femtosecond diffractive imaging of structures, charge and spin textures (EPFL, unofficial co-supervision and project support)
2012	Jessica Britschgi	Bachelor	4D Particle tracking by optical holography
2012	Simon Schwegler	Master	Sub-pixel registration methods for enhancement of coherent diffraction images
2012	Beat Lauber	Bachelor	Optical Fourier transform holography
2010	Roland Stania	Bachelor	Optical holography of graphite/graphene flakes
2011 – 2013	Mirna Saliba	PhD	Fourier transform holography with low-energy electrons (unofficial supervision and project support)
2009	Fabian Gehri	Bachelor	Three-dimensional deconvolution methods applied to holographic reconstructions, published in Opt. Express 18, 22527 (2010)
2008	Florian Schwarz	Bachelor	Experimental study of optical holography of a charged tungsten tip
2008	Matthias Germann	Master	Pulsed low-energy electron holography (unofficial supervision and project support)
2007	Igor Beati	Master	Image enhancement of electron holograms with nonlinear filtering (unofficial supervision, in collaboration with Prof Joachim Buhmann, ETH)

HIGHLIGHTS

In 2007 Latychevskaia solved long-standing problem in holography which existed since the invention of holography by Dennis Gabor; the solution initiated a new field of applying iterative reconstruction methods in holography. The related publication (T. Latychevskaia and H.-W. Fink, Solution to the twin image problem in holography, Phys. Rev. Lett. 98(23), pp. 233901 (2007)) was featured in popular scientific journals world-wide:

PhysOrg: http://www.physorg.com/news101465939.html
NewScientist: http://www.newscientist.com/article/dn12032
UZH: https://www.news.uzh.ch/de/articles/2007/2673.html

AWARDS

2022 OSA 2022 Outstanding Reviewer Award

2021 Photonics 2021 Outstanding Reviewer Award

2010 – 2010 Individual grant "Structure of Individual Bio-Molecules by Numerical Reconstruction of Coherent Diffraction Images" from the Forschungskredit of the University of Zurich

2010 Poster awarded an oral presentation at Gordon Research Conference Three-Dimensional Electron Microscopy, Barga, Italy

2003 "Single Molecule Spectroscopy" by Latychevskaia et al., J. Chin, Chem. Soc. 50, 477 (2003), awarded "Best Article of the Chinese Chemical Society 2003"

ORGANIZATION OF SCIENTIFIC MEETINGS

2024 – 2025 Member of the Scientific Program Committee of the Optica (former Optical Society of America) topical meeting Digital Holography 2025, Seattle, USA.

2023 Chair of Symposium A089 "Coherent scattering methods using X-rays or electrons" at the IUCr 2023 Congress in Melbourne, Australia.

2007 – 2008 Organized and led a team of scientists in illustrating the potential of holographic techniques to the general public, both on a stand and on stage at the European Researcher Night in Zürich in 2007 and 2008.

2004 – 2015 Engaged speakers for the "Solid State Physics Seminar" at the Physics Institute, University of Zürich.

MEMBERSHIPS OF SCIENTIFIC SOCIETIES

2022 – present Member of the Swiss Physical Society (SPS).
2022 – present Member of the Physical Society of Zürich (Physikalische Gesellschaft Zürich).
2011 – present Member of Optica (former Optical Society of America - OSA).
2012 – 2013 Member of the Material Research Society (MRS).

EDITORIAL ACTIVITIES

2024 – present Associated editor for Optics and Lasers in Engineering (Elsevier).
2022 – present Associated editor for Scientific Reports (Nature).
2023 – 2024 Guest editor for Micron (Elsevier) special issue "Low-dimensional materials and electron microscopy".

PEER REVIEW FOR

Journals: Nature, Science Advances, PNAS, Nature Physics, Nature Nanotechnology, Nature Communications, Scientific Reports, PlosOne, Nano Letters, Optics Express, Optics Letters, Journal of the Optical Society of America A, Applied Optics, Optics Communications, Optics and Lasers in Engineering, Macromolecular Rapid Communications, Microscopy and Microanalysis, Applied Physics Letters, Journal of Infrared, Millimeter, and Terahertz Waves, Chinese Optics Letters and others. In total: more than 450 reviews.
Grants applications: EU and other international programs.

SCIENTIFIC GRANTS

2025 – 2029	*"Coherent imaging with low-energy electrons"* (SNF grant 10003659).	990'000.00 CHF
2021 – 2025	*"Novel high-resolution and 3D diffraction imaging methods"* (SNF grant 197107).	500'000.00 CHF
2013 – 2015	*"Exploring the resolution limit of coherent low-energy electron diffraction microscopy"* (SNF 150049); co-author of the proposal. The project was dedicated to developing of experimental setup for obtaining atomic-resolution structural information.	258'925.00 CHF
2012 – 2014	*"Novel phase retrieval methods in coherent diffraction from non-crystalline objects of nanometer dimensions"* (SNF 140764). The project was dedicated to developing of the numerical methods for obtaining atomic-resolution structural information from coherent diffraction patterns and holograms.	223'646.00 CHF
2010 – 2010	*"Structure of individual bio-molecules by numerical reconstruction of coherent diffraction images"*. Individual grant from Forschungskredit University of Zürich to support promising young academics engaged in outstanding research projects. The project was dedicated to developing of the numerical phase retrieval methods.	52'096.00 CHF
2006 – 2010	*"Obtaining Atomically Resolved Structural Information on Individual Bio-molecules Using Electron Holography"* (EUFP6); cco-author of the proposal, lead the sub-project of numerical methods. The project was dedicated to developing of the experimental setup and numerical methods for obtaining atomic-resolution structural information.	1'542'000.00 EUR
2009 – 2013	*"Coherent low-energy electron diffraction microscopy of single nio-molecules"* (SNF 126848, 138118); co-author of the proposal.	333'140.00 CHF
2006 – 2009	*"Coherent low-energy electron diffraction microscopy of single biomolecules"* (SNF 113814); co-author of the proposal, developed the theory for the design of the first coherent diffraction imaging low-energy electron microscope which was built during the project and which allows imaging of individual macromolecules.	342'291.00 CHF

PUBLICATIONS LIST

94 **T. Latychevskaia** "Criteria for objects suitable for reconstruction from holograms and diffraction patterns", J. Opt. Soc. Am. A 41(11), 2219 – 2230 (2024), doi:10.1364/JOSAA.534332.

93 **T. Latychevskaia**, D. A. Bandurin and K. S. Novoselov "A new family of septuple-layer 2D materials of $MoSi_2N_4$-like crystals", Nature Reviews Physics (2024), doi:10.1038/s42254-024-00728-x.

92 F. Wicki and **T. Latychevskaia**, "Double-slit holography – a single-shot lensless imaging technique", Scientific Reports 14, 12528 (2024), doi:10.1038/s41598-024-62785-7.

91 **T. Latychevskaia**, "Controlling topological states in bilayer graphene", Nature Nanotechnology News and Views (2023), doi:10.1038/s41565-023-01454-8.

90 **T. Latychevskaia**, "Coherent imaging with low-energy electrons, quantitative analysis", Ultramicroscopy 253, 113807 (2023), doi:10.1016/j.ultramic.2023.113807.

89 S. Mustafi and **T. Latychevskaia**, "Fourier Transform Holography: A Lensless Imaging Technique, Its Principles and Applications", Photonics (mdpi) 10(2), 153 (2023), doi:10.3390/photonics10020153.

88 **T. Latychevskaia**, C. R. Woods, Y. B. Wang, M. Holwill, E. Prestat, S. Mustafi, S. J. Haigh, K. S. Novoselov, "Potentials of individual atoms by convergent beam electron diffraction", Carbon 201, 244-250 (2023), doi:10.1016/j.carbon.2022.09.003.

87 **T. Latychevskaia** and A. Kohli, "Low-dose shift- and rotation-invariant diffraction recognition imaging", Scientific Reports 12, 11202 (2022), doi:10.1038/s41598-022-15486-y.

86 **T. Latychevskaia**, P. Huang and K. Novoselov, "Imaging defects in two-dimensional crystals by convergent-beam electron diffraction", Phys. Rev. B 105, 184113 (2022), doi:10.1103/PhysRevB.105.184113.

85 **T. Latychevskaia**, C. Cassidy and T. Shintake, "Bragg holography of nano-crystals", Ultramicroscopy 230, 113376 (2021), doi:10.1016/j.ultramic.2021.113376.

84 **T. Latychevskaia**, "Three-dimensional structure from single two-dimensional diffraction intensity measurement", Phys. Rev. Lett. 127, 063601 (2021), doi:10.1103/PhysRevLett.127.063601.

83 **T. Latychevskaia**, "Phase retrieval methods applied to coherent imaging", Advances in Imaging and Electron Physics 218, 1-62 (2021), doi:10.1016/bs.aiep.2021.04.001.

82 **T. Latychevskaia**, "Wavefront modulation and beam shaping into arbitrary three-dimensional intensity distributions", Photonics 8(6), 179 (2021), doi:10.3390/photonics8060179.

81 **T. Latychevskaia**, "Three-dimensional volumetric deconvolution in coherent optics and holography", Applied Optics 60(5), 1304-1314 (2021), doi:10.1142/10.1364/AO.412736.

80 **T. Latychevskaia**, S. J. Haigh and K. S. Novoselov, "Holographic convergent electron beam diffraction (CBED) imaging of two-dimensional crystals", Surface Review and Letters 28(8), 2140001 (2021), doi:10.1142/S0218625X21400011.

79 **T. Latychevskaia**, Y. Zou, C. R. Woods, Y. B. Wang, M. Holwill, E. Prestat, S. J. Haigh and K. S. Novoselov, "Holographic reconstruction of interlayer distance of bilayer two-dimensional crystal samples from their convergent beam electron diffraction patterns", Ultramicroscopy 219, 113020 (2020), doi:10.1016/j.ultramic.2020.113020.

78 **T. Latychevskaia**, "Holography and coherent diffraction imaging with low-(30-250 eV) and high-(80-300 keV) energy electrons: History, principles, and recent trends", Materials 13 (14), 3089 (2020), doi:10.3390/ma13143089.

77 **T. Latychevskaia**, C. R. Woods, Y. B. Wang, M. Holwill, E. Prestat, S. J. Haigh and K. S. Novoselov, "Convergent beam electron diffraction of multilayer van der Waals structures", Ultramicroscopy 212, 112976 (2020), doi:10.1016/j.ultramic.2020.112976.

76 **T. Latychevskaia**, "Iterative phase retrieval for digital holography (invited)", J. Opt. Soc. Am A 36(12), D31-D40 (2019), doi:10.1364/JOSAA.36.000D31.

75 **T. Latychevskaia**, "Reconstruction of missing information in diffraction patterns and holograms by iterative phase retrieval", Optics Communications 452, 56-67 (2019), doi:10.1016/j.optcom.2019.07.021.

74 **T. Latychevskaia** and J. P. Abrahams, "Inelastic scattering and solvent scattering reduce dynamical diffraction in biological crystals", Acta Cryst. B 75(4), 52 - 531 (2019), doi:10.1107/S2052520619009661.

73 **T. Latychevskaia**, C. Escher, W. Andregg, M. Andregg and H.-W. Fink, "Direct visualization of charge transport in suspended (or free-standing) DNA strands by low-energy electron microscopy", Scientific Reports 9, 8889 (2019), doi:10.1038/s41598-019-45351-4.

72 I. Madan, G. M. Vanacore, E. Pomarico, G. Berruto, R. J. Lamb, D. McGrouther, T. T. A. Lummen, **T. Latychevskaia**, F. J. Garca de Abajo and F. Carbone, "Holographic imaging of electromagnetic fields via electron-light quantum interference ", Science Advances 5(5), eaav8358 (2019), doi:10.1126/sciadv.aav8358.

71 **T. Latychevskaia**, "Lateral and axial resolution criteria in incoherent and coherent optics and holography, near- and far-field regimes", Applied Optics 58(13), 3597 – 3603 (2019), doi:10.1364/AO.58.003597.

70 G. F. Mancini, F. Pennacchio, **T. Latychevskaia**, J. Reguera, F. Stellacci and F. Carbone, "Local photomechanical stiffness revealed in gold nanoparticles supracrystals by ultrafast small-angle electron diffraction", Structural Dynamics 6, 024304 (2019), doi:10.1063/1.5091858.

69 **T. Latychevskaia**, C. Escher and H.-W. Fink, "Moiré structures in few layer twisted graphene studied by transmission electron microscopy", Ultramicroscopy 197, 46 – 52 (2019), doi:10.1016/j.ultramic.2018.11.009.

68 **T. Latychevskaia**, S.-K. Son, Y. Yang, D. Chancellor, M. Brown, S. Ozdemir, I. Madan, G. Berruto, F. Carbone, A. Mishchenko and K. Novoselov, "Stacking transition in rhombohedral graphite", Frontiers of Physics 14, 13608 (2019), doi:10.1007/s11467-018-0867-y.

67 **T. Latychevskaia**, C. R. Woods, Y. B. Wang, M. Holwill, E. Prestat, S. J. Haigh and K. S. Novoselov, "Convergent and divergent beam electron holography and reconstruction of adsorbates on free-standing two-dimensional crystals", Frontiers in Physics 14, 13606 (2019), doi:10.1007/s11467-018-0851-6.

66 P. Huang, R. Jayaraman, GF Mancini, A. Kruchkov, M. Cantoni, Y. Murooka, **T. Latychevskaia**, D. McGrouther, E. Baldini, J. S. White, A. Magrez, T. Giamarchi, F. Carbone, H. M. Ronnow, "Investigating Skyrmions Using Lorentz Transmission Electron Microscopy", Microscopy and Microanalysis 24, 932 (2018), doi:10.1017/S1431927618005159.

65 **T. Latychevskaia** and H.-W. Fink, "Three-dimensional double helical DNA structure directly revealed from its X-ray fiber diffraction pattern by phase retrieval", Optics Express 26(23), 30991 – 31017 (2018), doi:10.1364/OE.26.030991.

64 **T. Latychevskaia**, "Iterative phase retrieval in coherent diffractive imaging: practical issues", Appl. Optics 57(25), 7187 – 7197 (2018), doi:10.1364/AO.57.007187.

63 P. Kliuiev, **T. Latychevskaia**, G. Zamborlini, M. Jugovac, J. Osterwalder, M. Hengsberger and L. Castiglioni, "Algorithms and image formation in orbital tomography", Phys. Rev. B 98, 085426 (2018), doi:10.1103/PhysRevB.98.085426.

62 **T. Latychevskaia**, C. R. Woods, Y. B. Wang, M. Holwill, E. Prestat, S. J. Haigh and K. S. Novoselov, "Convergent beam electron holography for analysis of van der Waals heterostructures", PNAS 115(29), 7473 – 7478 (2018), doi:10.1073/pnas.1722523115.

61 M. Lorenzo, C. Escher, **T. Latychevskaia** and H.-W. Fink, "Metal adsorption and nucleation on free-standing graphene by low-energy electron point source microscopy", Nano Letters 18(6), 3421 – 3427 (2018), doi:10.1021/acs.nanolett.8b00359.

60 **T. Latychevskaia**, F. Wicki, C. Escher, and H.-W. Fink, "Imaging the potential distribution of charged adsorbates on graphene by low-energy electron holography", Ultramicroscopy 182, 276 – 282 (2017), doi:10.1016/j.ultramic.2017.07.019.

59 **T. Latychevskaia** and H.-W. Fink, "Resolution enhancement in in-line holography by numerical compensation of vibrations", Optics Express 25(17), 20109 – 20124 (2017), doi:10.1364/OE.25.020109.

58 **T. Latychevskaia**, "Spatial coherence of electron beams from field emitters and its effect on the resolution of imaged objects", Ultramicroscopy 175, 121 – 129 (2017), doi:10.1016/j.ultramic.2016.11.008.

57 **T. Latychevskaia**, W.-H. Hsu, W.-T. Chang, C.-Y. Lin and I.-S. Hwang, "Three-dimensional surface topography of graphene by divergent beam electron diffraction", Nature Communications 8, 14440 (2017), doi:10.1038/ncomms14440.

56 J.-N. Longchamp, S. Rauschenbach, S. Abb, C. Escher, **T. Latychevskaia**, K. Kern and H.-W. Fink,"Imaging proteins at the single molecule level", PNAS 114(7), 1474 – 1479 (2017), doi:10.1073/pnas.1614519114.
Featured by:
• PhysOrg: Electron holography of individual proteins

- NewScientist: First ever pictures of single proteins thanks to graphene sheet
- Graphenea: Graphene sheets enable single protein snapshots
- Futurism.com: These are the first-ever photos of a single protein

55 **T. Latychevskaia**, Y. Chushkin and H.-W. Fink, "Resolution enhancement by extrapolation of coherent diffraction images: a quantitative study about the limits and a numerical study of non-binary and phase objects", Journal of Microscopy 264 (1), 3 – 13 (2016), doi:10.1111/jmi.12408.

54 P. Kliuiev, **T. Latychevskaia**, J. Osterwalder, M. Hengsberger and L. Castiglioni, "Application of iterative phase-retrieval algorithms to ARPES orbital tomography", New Journal of Physics 18, 093041 (2016), doi:10.1088/1367-2630/18/9/093041.

53 **T. Latychevskaia**, F. Wicki, J.-N. Longchamp, C. Escher and H.-W. Fink, "Direct observation of individual charges and their dynamics on graphene by low-energy electron holography", Nano Letters 16 (9), 5469 – 5474 (2016), doi:10.1021/acs.nanolett.6b01881.

52 F. Wicki, J.-N. Longchamp, **T. Latychevskaia**, C. Escher, H.-W. Fink, "Mapping unoccupied electronic states of freestanding graphene by angle-resolved low-energy electron transmission", Phys. Rev. B 94 (7), 075424 (2016), doi:10.1103/PhysRevB.94.075424.

51 **T. Latychevskaia**, D. Schachtler and H.-W. Fink, "Creating Airy beams employing a transmissive spatial light modulator", Applied Optics 55(22), 6095 – 6101 (2016), doi:10.1364/AO.55.006095.

50 **T. Latychevskaia** and H.-W. Fink, "Inverted Gabor holography principle for tailoring arbitrary shaped three-dimensional beams", Scientific Reports 6, 26312 (2016), doi:10.1038/srep26312.

49 G. F. Mancini, **T. Latychevskaia**, F. Pennaccio, J. Reguera, F. Stellacci, and F. Carbone, "Order/disorder dynamics in a dodecanethiol-capped gold nanoparticles supracrystal by small-angle ultrafast electron diffraction", Nano Letters 16(4), 2705 – 2713 (2016), doi:10.1021/acs.nanolett.6b00355.

48 E. V. Orlenko, **T. Latychevskaia**, A. V. Evstafev and F. E. Orlenko, "Invariant time-dependent exchange perturbation theory and its application to the particles collision problem", in 9th Congress on Electronic Structure: Principles and Applications, volume 11, pages 41 – 56 (Springer-Verlag Berlin, Berlin, 2016), doi:10.1007/s00214-015-1646-2.

47 **T. Latychevskaia**, J.-N. Longchamp, C. Escher, and H.-W. Fink, "Holography and coherent diffraction with low-energy electrons: A route towards structural biology at the single molecule level", Ultramicroscopy 159, 395 – 402 (2015), doi:10.1016/j.ultramic.2014.11.024.

46 **T. Latychevskaia**, G. F. Mancini and F. Carbone, "The role of the coherence in the cross-correlation analysis of diffraction patterns from two-dimensional dense mono-disperse systems", Scientific Reports 5, 16573 (2015), doi:10.1038/srep16573.

45 J. Rajeswari, H. Ping, G. F. Mancini, Y. Murooka, **T. Latychevskaia**, D. McGrouther, M. Cantoni, E. Baldini, J. S. White, A. Magrez, T. Giamarchi, H. M. Rønnow and F. Carbone, "Filming the formation and fluctuation of skyrmion domains by cryo-Lorentz transmission electron microscopy", PNAS 112 (46), 14212 – 14217 (2015), doi:10.1073/pnas.1513343112.

44 **T. Latychevskaia**, Y. Chushkin, F. Zontone, and H.-W. Fink, "Imaging outside the box: Resolution enhancement in X-ray coherent diffraction imaging by extrapolation of diffraction patterns", Appl. Phys. Lett. 107 (18), 183102 (2015), doi:10.1063/1.4934879.

43 J.-N. Longchamp, **T. Latychevskaia**, C. Escher, and H.-W. Fink, "Low-energy electron holographic imaging of individual tobacco mosaic virions", Appl. Phys. Lett. 107 (13), 133101 (2015), doi:10.1063/1.4931607.

42 **T. Latychevskaia** and H.-W Fink, "Reconstruction of purely absorbing, absorbing and phase-shifting, and strong phase-shifting objects from their single-shot in-line holograms", Appl. Optics 54(13), pp. 3925 – 3932 (2015), doi:10.1364/AO.54.003925.

41 E. V. Orlenko, **T. Latychevskaia**, A. V. Evstafev, F. E. Orlenko, "Invariant time-dependent exchange perturbation theory and its application to the particles collision problem", Theor. Chem. Acc. 134(5), pp. 1 – 16 (2015), doi:10.1007/s00214-015-1646-2.

40 **T. Latychevskaia** and H.-W Fink, "Practical algorithms for simulation and reconstruction of digital in-line holograms", Appl. Optics 54(9), pp. 2424 – 2434 (2015), doi:10.1364/AO.54.002424.

39 L. Rong, **T. Latychevskaia**, D. Wang, Z. Yu, X. Zhou, C. Chen, H. Huang, Y. Wang, Z. Li, and Z. Zhou, "Terahertz in-line digital holography of human hepatocellular carcinoma tissue", Scientific Reports 5, 8445 (2015), doi:10.1038/srep08445.

38 **T. Latychevskaia** and H.-W. Fink, "Atomically resolved structural determination of graphene and its point defects via extrapolation assisted phase retrieval", Appl. Phys. Lett. 106, 021908 (2015), doi:10.1063/1.4906089.

37 J.-N. Longchamp, C. Escher, **T. Latychevskaia**, and H.-W. Fink, "Low-energy electron holographic imaging of gold nanorods supported by ultraclean graphene", Ultramicroscopy 145, pp. 80 – 84 (2014), doi:10.1016/j.ultramic.2013.10.018.

36 **T. Latychevskaia**, J.-N. Longchamp, C. Escher, and H.-W. Fink, "On artefact-free reconstruction of low-energy (30-250 eV) electron holograms", Ultramicroscopy 145, pp. 22 – 27 (2014), doi:10.1016/j.ultramic.2013.11.012.

35 **T. Latychevskaia**, and H.-W. Fink, "Holographic time-resolved particle tracking by means of three-dimensional volumetric deconvolution", Opt. Express 22(17), pp. 20994 – 21003 (2014), doi:10.1364/OE.22.020994.

34 L. Rong, **T. Latychevskaia**, D. Wang, X. Zhou, H. Huang, Z. Li, and Y. Wang, "Terahertz in-line digital holography of dragonfly hindwing: amplitude and phase reconstruction at enhanced resolution by extrapolation", Opt. Express 22(14), pp. 17236 – 17245 (2014), doi:10.1364/OE.22.017236.

33 **T. Latychevskaia**, J.-N. Longchamp, C. Escher, and H.-W. Fink, "Coherent diffraction and holographic imaging of individual biomolecules using low-energy electrons", in Present and Future Methods for Biomolecular Crystallography (Springer, 2013), pp. 331 – 342, doi:10.1007/978-94-007-6232-9_29.

32 **T. Latychevskaia** and H.-W. Fink, "Coherent microscopy at resolution beyond diffraction limit using post-experimental data extrapolation", Appl. Phys. Lett. 103(20), 204105 (2013), doi:10.1063/1.4831985.

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PRESENTATIONS LIST

2024 June	"Iterative Methods in Digital Holography", invited tutorial presentation at Digital Holography OPTICA (former OSA) Topical Meeting	Paestum Italy
2023 Sep	"Quantitative Low-Energy Electron Coherent Imaging and Convergent Beam Electron Diffraction of 2D Materials", invited presentation at 2D23 SALVE symposium	Ulm Germany
2023 Sep	"Convergent beam electron diffraction (CBED) of two-dimensional (2D) crystals", invited presentation at the 20th International Microscopy Congress (IMC20)	Busan Korea
2023 Sep	"In-line holography with low-energy electrons, quantitative analysis", presentation at the 20th International Microscopy Congress (IMC20)	Busan Korea
2023 Aug	Chairman of mini-symposium "Coherent scattering methods using X-rays or electrons" at the 26th Congress of the International Union of Crystallography (IUCr)	Melbourne Australia
2023 May	"Potentials of individual atoms by convergent beam electron diffraction", invited presentation at the International Workshop on Models and Data for Plasma-Material Interaction in Fusion Devices (MoD-PMI)	Aachen Germany
2022 Aug	"Low-energy electron holography and coherent diffraction imaging", invited presentation at Native Mass Spectrometry and Single Molecule Imaging MS M22 conference	Oxford UK
2022 Jul	"Holography and coherent diffraction imaging with low-energy electrons", invited seminar at the Max Planck Institute	Stuttgart Germany
2022 Apr	"Convergent beam electron diffraction of two-dimensional materials", invited presentation at the SALVE symposium	Ulm Germany
2022 Mar	"Ptychography - scanning coherent diffraction imaging technique, principles and applications", seminar at the Physikalische Gesellschaft Zürich	Zürich Switzerland
2022 Feb	"Phase retrieval for coherent imaging", invited webinar at the IIT Dehli student chapter of OPTICA (formerly OSA) / SPIE	online
2022 Jan	"Holography and coherent diffraction imaging with electrons, light and X-rays", invited presentation at the Institute of Optics, Information and Photonics, Friedrich-Alexander University of Erlangen-Nuernberg (FAU)	Erlangen Germany
2021 Sep	"Recent results in 3D wavefront modulation and quantum mechanical detection", invited presentation at the Q-SORT International Conference on Quantum Imaging and Electron Beam Shaping	online
2020 Jul	"Iterative Phase Retrieval in Holography and Coherent Diffraction Imaging (CDI)", invited seminar at the Society for Industrial and Applied Mathematics congress (online)	Toronto Canada
2019 Dec	"Iterative Phase Retrieval in Holography", invited seminar at CEMES-CNRS, Universite de Toulouse	Toulouse France
2019 Sep	"Holographic and convergent beam electron diffraction imaging", invited presentation at the Nano- and Ultrafast Surface Science Workshop	Garching Germany
2019 Sep	"Iterative phase retrieval methods", invited lecture at the Lecture Week organized by the Helmholtz-Institute Jena	Jena Germany
2019 Sep	"Iterative phase retrieval for digital holography", keynote presentation at the International Forum on Microscopy 2019	Beijing China
2019 Aug	"Prospects and progress towards collecting and phasing of single molecule electron diffraction data", presentation at the 32nd European Crystallographic Meeting	Vienna Austria
2019 Jul	"Convergent beam electron diffraction on 2D van der Waals structures", invited seminar	Ulm Germany
2019 Jul	"Wavefront modulation by inverted Gabor holography", presentation at the Q-SORT International Conference on Quantum Imaging and Electron Beam Shaping	Erlangen Germany

2019 Jun	"In line holography and coherent diffraction imaging in electron microscopy", invited presentation at the NannoInnovation 2019	Rome Italy
2019 May	"Phase retrieval for digital holography", invited presentation at the Digital Holography and 3-D Imaging OSA topical meeting	Bordeaux France
2019 Apr	"Iterative phase retrieval in coherent diffractive imaging and holography", invited seminar at the Institut für Optik und Quantenelektronik (IOQ), Friedrich-Schiller Universitt	Jena Germany
2018 Oct	"Modern imaging without lenses: portraits of individual molecules", Antrittsvorlesung at the University of Zurich	Zurich Switzerland
2018 Feb	"Coherent lensless low-energy electron imaging", invited presentation at the 5th Ringberg Meeting on Structural Biology with FELs	Ringberg Germany
2017 Dec	"Coherent imaging with low-energy electrons (30 – 250 eV)", invited presentation at the 3rd SALVE Symposium	Ulm Germany
2017 Apr	"Coherent imaging with low-energy electrons", invited seminar at the Okinawa Institute of Science and Technology (OIST)	Okinawa Japan
2017 Apr	"Coherent imaging with low-energy electrons", invited seminar at the Fritz Haber Institute	Berlin Germany
2017 Feb	"Coherent imaging with low-energy electrons (30 - 250 eV): Imaging charged impurities and three-dimensional topography of graphene" (invited), Electron Holography Workshop organized by Hitachi and sponsored by Japanese government	Tokyo Japan
2015 Jun	"Resolution enhancement in coherent imaging via extrapolation beyond detector area" (invited), Optical Society of America Optics and Photonics Congress	Washington USA
2015 Feb	"Coherent imaging with ultra-low energy electrons" Sub-Angstrom Low-Voltage Electron Microscopy (SALVE) Symposium	Ulm Germany
2015 Feb	"Phase retrieval methods applied to coherent imaging" (invited) International School and Workshop "Matter in Extreme Conditions: from Material Science to Planetary Physics (MECMATPLA)"	Montgenvre France
2014 Sep	"Coherent imaging beyond detector area and Abbe limit, towards atomic resolution", International Microscopy Congress	Prague Czech Republic
2013 Aug	"On the reconstruction of ultra low-energy electron holograms and diffraction patterns", International Microscopy Conference	Regensburg Germany
2013 Apr	"Imaging outside the box: resolution enhancement by hologram self-extrapolation", The Optical Society of America, Digital Holography Meeting	Hawaii USA
2013 Apr	"Holographic time-resolved particle tracking using 3d-deconvolution" The Optical Society of America, Digital Holography Meeting	Hawaii USA
2012 Nov	"Low-energy electron holograms and diffraction patterns of individual biomolecules", Material Research Society Fall Meeting	Boston USA
2012 May	"Coherent low-energy electron imaging - a new tool for structural biology" (invited), 45th Erice Crystallographic Course	Erice Italy
2012 Apr	"When holography meets coherent diffraction imaging" The Optical Society of America, Digital Holography Meeting	Miami USA
2011 Oct	"Coherent diffraction imaging of individual biological molecules using coherent low-energy electrons" (invited, keynote speaker) Centre of Excellence for Coherent X-Ray Science (CXS) Workshop	Melbourne Australia
2011 Sep	"Imaging individual biological molecules with coherent low-energy electrons" 25th Rhine-Knee Regional Meeting on X-ray Crystallography of Biomacromolecules	Sursee Switzerland

2011 Aug	"Numerical reconstruction of holograms and diffraction patterns of individual biomolecules", Microscopy Conference	Kiel Germany
2010 Dec	"Coherent imaging of individual molecules with low-energy electrons" Invited seminar at the IGBMC	Strasbourg France
2010 Jul	"Imaging of individual molecules with coherent low-energy electrons" The Gordon Research Conference "Diffraction Methods in Structural Biology"	Lewiston USA
2010 Jun	"Numerical reconstruction of low-energy electron holograms" Selected talk from the poster session at the Gordon Research Conference "Three Dimensional Electron Microscopy"	Barga Italy
2010 Apr	"Coherent imaging of individual molecules with low-energy electrons" Invited seminar at the Physics Department of the EPFL	Lausanne Switzerland
2009 Jan	"Reconstruction of low-energy electron holograms" International conference "Current Trends in Structural Biology on the Single Molecule Level"	Luzern Switzerland
2008 Mar	"Holography with low-energy electrons, a new tool for structural biology" American Physics Society March meeting	New Orleans USA
2007 Dec	"Theory of hologram alignment method" International meeting of the European FP-7 SIBMAR project	Jena Germany
2007 and 2008	"Holography" Public show presentations on stage at the European Researcher Night	Zurich Switzerland
2007 Feb	"Conformational and structural studies on single bio-molecules" Swiss Physical Society Meeting	Zurich Switzerland
2006 Sep	"Electron holography of an individual virus" International Conference on Nanoscience and Technology (ICN+T)	Basel Switzerland
2002 Sep	"Towards online reconstruction of electron holograms" NCCR workshop	Pontresina Switzerland
2001	"Spectral diffusion of single DPNP molecules in n-hexadecane matrix" International NCCR winter workshop	Andermatt Switzerland
2000	"Higher order Stark effect on single molecules" (invited) Seminar at the Physics Department, University of Leiden	Leiden Netherlands