Dr. Dennis Schlippert

Curriculum Vitae

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Scholar profile

Academic experience

since 08/2018 **Research Group Leader** — Institute of Quantum Optics, Hannover

Lead of independent BMBF group performing trapped matter-wave interferometry in painted optical potentials and hybrid quantum sensing concepts for inertial sensing in dynamic environments. Principle investigator role in multiple DFG and BMBF projects, including the implementation of research in the Very Long Baseline Atom Interferometry (VLBAI) facility into the collaborative research centers (SFBs) DQ-mat & TerraQ as well as the Cluster of Excellence QuantumFrontiers. Permanent employment since 11/2021. Supervision of early career researches at all levels.

11/2014 – 07/2018 **Postdoc** — Institute of Quantum Optics, Hannover

Scientific lead of the planning, detailed engineering design, installation, and commissioning of all components of the Hannover VLBAI facility in the newly established laboratory building HITec as well as coordination of research conducted within the SFBs geo-Q & DQ-mat. The position included managing & supervising a team of three PhD students, three postdocs, and various B.Sc. & M.Sc. students. In addition, continuation of research on sensor fusion, quantum tests of the universality of free fall using potassium & rubidium, and collaboration with ZARM on optical dipole traps in the microgravity environment of the Bremen drop tower in the frame of the DLR project PRIMUS.

10/2012 – 11/2014 **Graduate researcher** — Institute of Quantum Optics, Hannover

Realization of the first quantum test of the universality of free fall using two different chemical elements, rubidium & potassium.

01/2011 – 08/2011 **Visiting scholar** — University of California Berkeley

Setting up a dual-isotope lithium atom interferometry apparatus under supervision of Prof. Dr. H. Müller. During the visit, a lithium-7 magneto-optical trap was realized.

10/2009 – 09/2012 **Stipendiary fellow** — QUEST Excellence Cluster, Hannover

Fellowship support during conducting research in optical dipole traps at 2 μm for completing the physics diploma within the framework of the Research Training Group HALOSTAR. Moreover, design, construction, and operation of the first quantum test of the universality of free fall using two different chemical elements, rubidium & potassium.

11/2008 – 05/2009 **Visiting scholar** — NASA Jet Propulsion Laboratory, Pasadena & California Institute of Technology, Pasadena

Operation of a prototype cesium gravity gradiometer for space applications under supervision of Dr. N. Yu and characterization of the laser systems and atomic sources.

03/2008 – 10/2008 **Research assistant** — Institute of Quantum Optics, Hannover

Preparatory work concerning electronic feedback loops and imaging systems for operating a rubidium optical dipole trap at a wavelength of 2 μm.

University education

07/2010 – 11/2014 **PhD in physics** — Leibniz University Hannover

Quantum Tests of the Universality of Free Fall (link)
Supervision: Prof. Dr. E. M. Rasel
Degree: Dr. rer. nat., Grade: **summa cum laude**

10/2005 – 07/2010 **Diploma in physics** — Leibniz University Hannover

Bose-Einstein-Kondensation in einer optischen Dipolfalle bei einer Wellenlänge von 2 µm
Supervision: Prof. Dr. E. M. Rasel
Degree: Dipl.-Phys., Grade: **very good**

Awards

08/2018 – 07/2022 **Quantum inertial sensor with guided matter waves** — BMBF

Quantum Futur Nachwuchswettbewerb
Competitive grant by the German Federal Ministry of Education and Research for excellent early-career researchers to start an independent research group in the field of quantum technologies
3 M€ [1]

[1] Figure includes 20 % overhead

Organization of scientific meetings

2025 Local organizer for "3rd Terrestrial Very-Long-Baseline Atom Interferometry" workshop, Leibniz University Hannover, Hannover, Germany

2021 – 2024 Member of "CLEO" subcommittee S&I 15: Quantum and Atomic Devices

2024 Co-organizer for "2nd Terrestrial Very-Long-Baseline Atom Interferometry" workshop, Imperial College, London, UK

2023 Session convener for "ELGAR, a future European Laboratory for Gravitation and Atom-interferometric Research" workshop, Talence, France

2023 DQ-mat Summer School "Quantum States of Matter: Fundamental Physics and Applications", Hannover, Germany; 30 participants

2023 Session convener for "Terrestrial Very-Long-Baseline Atom Interferometry" workshop, CERN, Switzerland

2017 Satellite student workshop on "Cold atoms in microgravity" during DPG spring meeting Mainz, Germany; Coordination of contributions & invitations, scheduling; 15 participants

2016 International workshop on "Atom Interferometry, General Relativity and Space Technologies" Hannover, Germany; Coordination of contributions & invitations, scheduling; 40 participants

Institutional responsibilities & academic self governance

since 2024 Leibniz University Hannover ombudsperson for good scientific practice

since 2024 Executive board member of CRC "DQ-mat" (SFB 1227)

since 2022 Admission committee member & Course advisor for the "Quantum Engineering" Master program

since 2020 Executive board member of CRC "TerraQ" (SFB 1464)

since 2019 Executive board member of Cluster of Excellence "QuantumFrontiers" (EXC-2123)

since 2018 Regular invited contributions in the scope of Leibniz University's personnel development
Workshop: *Drittmittel erfolgreich einwerben*, panel discussions, etc.

2020 – 2022 Leadership of a team establishing a new Master program in "Quantum Engineering"

2018 – 2023 QUEST-Leibniz Research School faculty council member

2015 – 2018 Executive board member of CRC "geo-Q" (SFB 1128)

Reviewing activities

since 2020 **Peer reviewer for scientific proposals** DFG & ANR
Referee for proposals submitted to the German Research Foundation, the French National Research Agency, & the Royal Society

since 2016 **Peer reviewer for various scientific journals**
Science, Nature Communications, Science Advances, Physical Review Letters, Physical Review X Quantum, Communications Physics, Applied Physics Letters, Physical Review Research, Physical Review A, Review of Scientific Instruments, Sensors, Photonics, Atoms, EPJ Quantum Technology, Advanced Optical Technologies, Applied Sciences, IOP Measurement Science and Technology, Machines, Physica Scripta

2024 **External reviewer** University Bremen
Accreditation of "Erasmus Mundus Joint Master program in Astrophysics and Space Science" (MASS)

2021 **Participant selection panel member** Leibniz University Hannover
Conference "Humboldt meets Leibniz: Emerging Topics in Optics and Photonics"

2020 **Review panel member** ESA
ESA "Voyage 2050" Topical Team for cosmology, astroparticle physics, and fundamental physics

Memberships

since 2020 Member of German physical society's (DPG) "Working Group young Leaders in Physics" (AGyouLeaP)

since 2020 Appointed fellow of "Junge Braunschweigische Wissenschaftliche Gesellschaft", interdisciplinary academy of young scientists

since 2010 Member of the German physical society (DPG)

Invited presentations

"The Hannover VLBAI facility"

2025 3rd workshop on Terrestrial Very-Long-Baseline Atom Interferometry, Hannover, Germany

2025 University of Ulm Physics Colloquium, Ulm, Germany

2025 Laboratoire Collisions Agrégats Réactivité (LCAR) seminar, Toulouse, France

2024 FOMO – Frontiers of Matter Wave Optics, Kolymbari, Greece

"Multi-axis sensing using matter-wave arrays"

2025 Photonics West 2025, San Francisco, USA

"Very Long Baseline Atom Interferometry"

2024 Universität Wien, Vienna, Austria

2024 55th Annual Meeting of the APS Division of Atomic, Molecular and Optical Physics, Forth Wort, USA

2024 Innovation Academy for Precision Measurement Science and Technology (APM), Wuhan, PR China

2022 Texas A&M, College Station, USA

"Inertial sensing using matter-wave interferometry"

2024 13th Sino-German Frontiers of Science Symposium, Shanghai, PR China

2023 Quantum Information in Spain ICE-8, Santiago de Compostela, Spain

"The Hannover Very Long Baseline Atom Interferometry facility - Overview and recent developments"

2023 AION collaboration meeting, Abingdon, UK

"High flux all-optical sources: from Rb/K to Yb"
2023 ELGAR workshop, Talence, France

"Hybrid inertial sensing through correlation of atom interferometers with opto-mechanical resonators"
2023 Quantum Sensors for Science Exploration, Noordwijk, Netherlands

"Gravitational Environment and Geodesy with VLBAI"
2023 Atom Interferometric Sensing of Earth's Spheres, Cambridge, UK

"The Hannover VLBAI Atom Interferometer"
2023 1st workshop on Terrestrial Very-Long-Baseline Atom Interferometry, Geneva, Switzerland

"Understanding the environment surrounding a very long baseline atom interferometer"
2023 Blackbody Radiation Induced Effects and Phenomena, Vienna, Austria

"Very Long Baseline Atom Interferometry – Status and next steps"
2022 9th Meeting on CPT and Lorentz Symmetry, Online

"Matter Wave Interferometry for Inertial Sensing and Tests of Fundamental Physics"
2019 Workshop on matter-wave interferometry, Atominstitut, Vienna, Austria

2019 8th Meeting on CPT and Lorentz Symmetry, Bloomington, USA

2019 PQE meeting, Snowbird, USA

2018 TU Wien – Atominstitut, Vienna, Austria

"Matter Wave Interferometry for Inertial Sensing"
2019 Universität der Bundeswehr, Munich, Germany

"Atom Interferometry using macroscopic superposition states – Applications and fundamental tests"
2018 COST - AtomQT conference talk, IESL-FORTH, Heraklion, Greece

"Atom interferometry – Applications and fundamental tests"
2018 DPG Summer school on quantum technologies, Bad Honnef, Germany

"Towards tests of Fundamental Physics using Very Long Baseline Atom Interferometry"
2018 PQE meeting, Snowbird, USA

"Considerations for Gravitational Wave Observation with Atoms – A species tradeoff"
2016 Multi-loop interferometry workshop, Leibniz University Hannover

"Tests of fundamental physics on very long baselines on ground (and in space)"
2016 Workshop on matter-wave interferometry, JQI, College Park, USA

"Testing the Universality of Free Fall using Atom Interferometry"
2016 Korea University, Seoul, South Korea

2016 KRISS, Daejeon, South Korea

2016 Agency for defense development, Daejeon, South Korea

"Tests of fundamental physics using atom interferometry"
2016 École de Physique winter school, Les Houches, France

"Quantum Tests of the Universality of Free Fall"

2016 UC Berkeley, USA

2015 University of Birmingham, UK

2015 UC Los Angeles, USA

2015 Australian National University, Canberra, Australia

2015 IPS Meeting, NTU, Singapore

Training

02/2019 – 11/2019 **Teaching certificate "Pro Lehre"** — Leibniz University Hannover
120 work hours
Certificate: download link

06/2017 **646. WE-Heraeus-Seminar** — Bad Honnef
Gravitational Decoherence
Summer school

10/2015 **600. WE-Heraeus-Seminar** — Bad Honnef
Frontiers of Quantum Optics
Autumn school

07/2013 **188. International School of Physics "Enrico Fermi"** — Varenna
Atom Interferometry
Summer school

04/2010 **École de Physique** — Les Houches
Atom Lasers
Winter school

Languages

German Mother tongue
English Business fluent
Spanish Basic skills (A2/B1)
Russian Basic skills (A2)