

CONTACT INFORMATION	IST Austria	<i>E-mail:</i> onur.hosten@ist.ac.at
	Am Campus 1 3400 Klosterneuburg Austria	<i>Web:</i> https://hostenlab.pages.ist.ac.at/
EDUCATION	University of Illinois at Urbana-Champaign	2005 – 2010
	Ph.D. Physics Thesis: <i>Applications of quantum measurement techniques</i>	
	University of Illinois at Urbana-Champaign	2003 – 2005
	M.S. Physics	
	Hacettepe University , Turkey	1999 – 2003
	B.S. Physics Engineering <i>Valedictorian, with highest GPA of previous 5 years</i>	
EMPLOYMENT	IST Austria (Klosterneuburg, Austria)	June 2018 – present
	Assistant Professor	
	Stanford University (Stanford, California)	June 2015 – May 2018
	Research Scientist	
	Stanford University (Stanford, California)	May 2010 – June 2015
	Postdoctoral Scholar	
	University of Illinois at Urbana-Champaign (Urbana, Illinois)	Aug 2003 – May 2010
	Research Assistant	
	Hacettepe University & Bilkent University (Ankara, Turkey)	Sept 1999 – June 2003
	Junior Research Assistant	
AWARDS & HONORS	ERC Consolidator Grant	2023
	American Physical Society Outstanding Doctoral Thesis in AMO Physics (finalist)	2011
	Karl van Bibber Postdoctoral Research Fellowship, Stanford	2010
	MIT Pappalardo Postdoctoral Fellowship (offered)	2010
	Ross J. Martin Award for Outstanding Research Achievement, University of Illinois	2008
	Quantum Foundations Summer School Fellowship, Perimeter Institute	2007
	Harry G. Drickamer Graduate Fellowship	2007
	QCMC'04 Young Researchers Prize	2004
	Excellence in Teaching Award, University of Illinois	2004
	Valedictorian Award, Physics Engineering, Hacettepe University	2003
	Ihsan Dogramaci Superior Success Award, Hacettepe University	2003
	TUBITAK research grant for college students	2002
TEACHING	PHY-601, Physics track core course	Spring 2024
	Phy-3002, Quantum optics with atoms and circuits (<i>Graduate</i>)	2020 - present
	403 Modern Experimental Physics (<i>Advanced undergraduate lab</i>)	Spring 2007
	213 Thermal Physics, 214 Waves and Quantum Physics (<i>Undergraduate lab</i>)	Fall 2004

TALKS & LECTURES	Seminar, University of Vienna, “Control, sensing and gravitational coupling of milligram pendulums: towards interfacing quantum and gravity”	2025
	Conference on Relativistic Quantum Information (RQI), “Control, sensing and gravitational coupling of milligram pendulums: towards interfacing quantum and gravity”	2025
	Fundamental Problems in Quantum Physics Workshop (FPQP 2025), Trieste, Italy, “Control, sensing and gravitational coupling of milligram pendulums: towards interfacing quantum and gravity”	2025
	Seminar, CERN, Geneva, Switzerland, “Gravitational fields and quantum mechanics in the lab”	2025
	Seminar, Stanford University, CA, “Control, sensing and gravity of milligram pendulums: towards interfacing quantum and gravity”	2025
	SPIE Photonics West, San Francisco, CA, “Controlling and sensing milligram pendulums: towards interfacing quantum and gravity”	2025
	CSF Conference on Quantum Physics with Trapped Particles, Monte Verità, Switzerland, “Torsional optomechanics at the milligram scale”	2024
	A look at the interface between gravity and quantum theory, Workshop, San Vito di Cadore, Italy, “Torsional optomechanics at the milligram scale”	2024
	Second quantA Workshop, Klosterneuburg, Austria, “Controlled hybrid gravitational and electromagnetic interactions near the quantum regime”	2024
	Terrestrial Very-Long-Baseline Atom Interferometry Workshop, London, UK, “Progress towards a squeezed-state atom interferometer in a ring cavity”	2024
	First quantA Workshop, Innsbruck, Austria, “Gravitational interactions towards the quantum regime”	2023
	VCQlada talk, Klosterneuburg, Austria, “Quantum sensing with atoms, light and pendulums”	2023
	Colloquium, ISTA, Klosterneuburg, Austria, “Quantum sensing with atoms, light and pendulums”	2023
	Talk, Quantum and material science topical review, ISTA, Klosterneuburg, Austria, “Quantum sensing with atoms, light and pendulums”	2023
	Seminar, Vienna University of Technology, Austria. “Quantum sensing with entangled atoms and mechanical pendulums”	2023
	Colloquium, Leibniz Universität Hannover / PTB, Germany. “Quantum sensing with entangled atoms and mechanical pendulums”	2023
	SPIE Quantum West, San Francisco, CA. “Sub-millikelvin cooling of a milligram-scale pendulum”	2023
	ERC Consolidator panel presentation (Online-COVID), “A quantum hybrid of Atoms and milligram-scale pendulums: Towards gravitational quantum mechanics”	2022
	Summer school lecture, Frontiers of Matter Wave Optics (FOMO) (Online-COVID), “Interferometry 2.0 – Entanglement”	2021
	OSA Optical Sensors and Sensing Congress, Vancouver, Canada (Online-COVID). “Quantum Entanglement for Inertial Sensing with Atoms in Cavities”	2021
	Seminar, Vienna University of Technology, Vienna, Austria. “Quantum entanglement for precision sensing with atoms in cavities”	2020
	Quantum optics and information meeting 4, Izmir, Turkey (Online-COVID), “Quantum entanglement for sensing with atoms and light”	2020

SPIE Photonics West OPTO, San Francisco, CA. “Laser locking to cavities with mode interference and post-selection”	2020
Seminar, University of Innsbruck, Innsbruck, Austria. “Quantum entanglement for precision sensing with atoms in cavities”	2020
Generation Y> Quantum meeting, Ramsau am Dachstein, Austria. “Quantum sensing with atoms and light”	2019
Quantum and Nonlinear Optics 2019, Kuala Lumpur, Malaysia. “Quantum entanglement for sensing with atoms and light”	2019
Introductory Course on Ultracold Quantum Gases, Innsbruck, Austria. “Atom interferometry” (<i>Summer school</i>)	2019
Vienna Center for Quantum Science and Technology meeting, Vienna, Austria. “Quantum entanglement for precision sensing with atoms and light”	2019
Seminar, Vienna University of Technology, Vienna, Austria. “Quantum entanglement for precision sensing with atoms and light”	2019
Seminar, ICFO, Barcelona, Spain. “Quantum entanglement for precision sensing with atoms and light”.	2019
SPIE Photonics West OPTO, San Francisco, CA. “Atomic spin squeezing – recent developments”	2019
Seminar, University of Vienna, Vienna, Austria. “Quantum entanglement for precision sensing with atoms and light”	2018
Plenary talk, 7th International Conference on New Frontiers in Physics, Crete, Greece. “Quantum metrology frontiers with cold atoms”	2018
Seminar, University of Innsbruck, Innsbruck, Austria. “Quantum entanglement for precision sensing with atoms and light”	2018
Seminar, Perimeter Institute, Waterloo, Canada. “Atomic spin squeezing – concepts and experiments”	2018
SPIE Photonics West OPTO, San Francisco, CA. “Quantum phase magnification”	2018
Winter Colloquium on the Physics of Quantum Electronics, Snowbird, UT. “Quantum phase magnification”	2018
Special seminar, IST Austria, Vienna, Austria. “Quantum entanglement for precision sensing with atoms and light”	2017
Special seminar, Delft University of Technology, Delft, Netherlands. “Quantum entanglement for precision sensing with atoms and light”	2017
AMO physics seminar, University of Arizona, Tucson, AZ. “Quantum entanglement for precision sensing with atoms and light”	2017
Special seminar, Institute for Quantum Computing, Waterloo, Canada. “Quantum entanglement for precision sensing with atoms and light”	2017
Special seminar, Columbia University, New York, NY. “Quantum entanglement for precision sensing with atoms and light”	2017
Center for Fundamental physics seminar, Northwestern University, Evanston, IL. “Quantum entanglement for precision sensing with atoms and light”	2017
AMO physics seminar, University of Wisconsin-Madison, Madison, WI. “Quantum entanglement for precision sensing with atoms and light”	2017
Special colloquium, Rochester University, Rochester, NY. “Quantum entanglement for precision sensing with atoms and light”	2017

Quantum Innovators Workshop, Institute for Quantum Computing, Waterloo, Canada. “Manipulation of quantum noise for precision measurements with cold atoms”	2016
Frontiers in Matter Wave Optics – Conference, Arcachon, France. “Manipulation of quantum noise for precision measurements with cold atoms”	2016
Bay Area Cold Atom Meeting, Stanford, CA. “Manipulation of quantum noise for precision measurements with cold atoms”	2016
DTRA Basic Research Technical Review, Springfield, VA. “Gravitational sensors based on atom interferometry”	2016
AMO physics seminar, UC San Diego, CA. “Manipulation of quantum noise for precision measurements with cold atoms”	2016
Hot topics session, APS DAMOP Meeting, Providence, RI. “Manipulation of quantum noise for precision measurements with cold atoms”	2016
International Frequency Control Symposium, New Orleans, LA. “Entanglement enhanced metrology for atom interferometry”	2016
AMO physics seminar, MIT, Boston, MA. “Quantum metrology frontiers with cold atoms”	2016
Special seminar, Columbia University, New York, NY. “Quantum metrology frontiers with cold atoms”	2016
AMO physics seminar, University of Michigan Ann Arbor, MI. “Quantum metrology frontiers with cold atoms”	2016
International Conference on Laser Spectroscopy, Singapore. “Entanglement enhanced metrology: 20dB-squeezed states for atom interferometry”	2015
Applied Physics AMO Seminar Series, Stanford University, CA. “Generation of highly squeezed quantum states of atomic ensembles for sensor applications”	2014
SPIE Photonics West OPTO, San Francisco, CA. “Cavity Aided Atomic Spin Squeezing for Quantum Enhanced Metrology”	2013
Stanford Photonics Research Center Symposium, CA. “Cavity QED Raman Lasers”	2011
APS DAMOP Meeting, Atlanta, GA. “First practical application of quantum weak measurements, used to perform the first experimental investigations of the Spin Hall Effect of Light”	2011
Ginzton Lab seminar, Stanford University, Stanford, CA. “Spin Hall effect of Light”	2009
Special seminar, Harvard University, MA. “Applications of quantum measurement techniques – ‘Counterfactual quantum computation’ and ‘Spin Hall effect of Light’ ”	2009
The Ninth Rochester Conference on Coherence and Quantum Optics (CQO9), Rochester, NY. “Observing the Spin Hall Effect of Light via quantum weak measurements”	2007
Special seminar, Osaka University, Osaka, Japan. “Counterfactuality in quantum processes”	2006
The Winter Colloquium on the Physics of Quantum Electronics (PQE), Snowbird UT. “Counterfactual quantum computation”	2006
Quantum Information seminar, University of Illinois at Urbana-Champaign, IL. “Counterfactual quantum computation”	2006
Institut für Quantenoptik und Quanteninformation (IQOQI), Vienna, Austria. “Counterfactual quantum computation”	2006

PREPRINTS

- M. Galanis*, O.Hosten*, A. Arvanitaki, S. Dimopoulos, “Toward 48 dB Spin Squeezing and 96 dB Signal Magnification for Cosmic Relic Searches with Nuclear Spins”, arXiv:2508.20520 [hep-ph].
- S. Agafonova, P. Rossello, M. Mekonnen, O. Hosten “1-milligram torsional pendulum for experiments at the quantum-gravity interface”, (arXiv:2408.09445, under review).

A. Balaz et al. (TVLBAI Proto-Collaboration), “Long-Baseline Atom Interferometry”, arXiv:2503.21366 [hep-ex] (preprint).

PUBLICATIONS

- A. Abdalla et al. (TVLBAI Proto-Collaboration), “Terrestrial Very-Long-Baseline Atom Interferometry: Summary of the Second Workshop”, *EPJ Quantum Technol.* **12**, 42 (2025).
- S. Agafonova, U. Mishra, F. Diorico, O. Hosten, “Zigzag optical cavity for sensing and controlling torsional motion”, *Phys. Rev. Research* **6**, 013141 (2024).
- F. Diorico, A. Zhutov, O. Hosten, “Laser-cavity locking utilizing beam ellipticity: accessing the 10^{-7} instability scale relative to cavity linewidth”, *Optica* **11**, 26 (2024).
- U. Mishra, V. Li, S. Wald, S. Agafonova, F. Diorico, O. Hosten, “Monitoring and active stabilization of laser injection locking using beam ellipticity”, *Opt. Lett.* **48**, 3973 (2023).
- S. Wald, F. Diorico, O. Hosten, “Analog Stabilization of an Electro-Optic I/Q Modulator with an Auxiliary Modulation Tone”, *Appl. Opt.* **62**, 1 (2023).
- V. Li, F. Diorico, O. Hosten, “Laser Frequency-Offset Locking at 10-Hz-Level Instability Using Hybrid Electronic Filters”, *Phys. Rev. Applied* **17**, 054031 (2022).
- O. Hosten, “Constraints on probing quantum coherence to infer gravitational entanglement”, *Phys. Rev. Research* **4**, 013023 (2022).
- S. S. Szigeti, O. Hosten, and S. A. Haine. "Improving cold-atom sensors with quantum entanglement: Prospects and challenges." *App. Phys. Lett.* **118**, 140501 (2021).
- B. K. Malia, J. Martínez-Rincón, Y. Wu, O. Hosten & M. A. Kasevich, “Free Space Ramsey Spectroscopy in Rubidium with Noise below the Quantum Projection Limit”, *Phys. Rev. Lett.* **125**, 043202 (2020).
- Y. Wu, R. Krishnakumar, J. Martínez-Rincón, B. K. Malia, O. Hosten & M. A. Kasevich, “Retrieval of cavity-generated atomic spin-squeezing after free-space release”, *Phys. Rev. A* **102**, 012224 (2020).
- N. J. Engelsens, R. Krishnakumar, O. Hosten & M. A. Kasevich, “Bell correlations in spin-squeezed states of 500 000 atoms”, *Phys. Rev. Lett.* **118**, 140401 (2017).
- O. Hosten, R. Krishnakumar, N. J. Engelsens & M. A. Kasevich, “Quantum phase magnification”, *Science* **352**, 1552 (2016).
- O. Hosten, N. J. Engelsens, R. Krishnakumar & M. A. Kasevich, “Measurement noise 100 times lower than the quantum projection limit using entangled atoms”, *Nature* **529**, 505 (2016).
- J. Lee, G. Vrijsen, I. Teper, O. Hosten & M. A. Kasevich, “Many-atom-cavity QED system with homogeneous atom-cavity coupling”, *Opt. Lett.* **39**, 4005 (2014).
- D. Schmid, T. Y. Huang, S. Hazrat, R. Dirks, O. Hosten, S. Quint, D. Thian, P. G. Kwiat, “Adjustable and robust methods for polarization-dependent focusing”, *Opt. Express* **21**, 15538 (2013).
- O. Hosten, “Quantum Physics – How to catch a wave”, *Nature* **474**, 170 (2011).
- G. Vrijsen, O. Hosten, J. Lee, S. Bernon & M. A. Kasevich, “Raman Lasing with a Cold Atom Gain Medium in a High-Finesse Optical Cavity”, *Phys. Rev. Lett.* **107**, 063904 (2011).
- O. Hosten & P. G. Kwiat, “Observation of the spin Hall effect of light via Weak Measurements”, *Science* **319**, 787 (2008).
- O. Hosten, M. T. Rakher, J. T. Barreiro, N. A. Peters & P. G. Kwiat, “Counterfactual quantum computation through quantum interrogation”, *Nature* **439**, 949 (2006).
- O. Hosten & P. G. Kwiat “Weak Measurements and Counterfactual computation”, *quant-ph/0612159* (2006).
- O. Hosten, M. T. Rakher, J. T. Barreiro, N. A. Peters & P. G. Kwiat, “Counterfactual Computation Revisited”, *quant-ph/0607101* (2006).

N. A. Peters, K. J. Arnold, A. P. VanDevender, E. R. Jeffrey, R. Rangarajan, O. Hosten, J. T. Barreiro, J. B. Altepeter & P. G. Kwiat, "Towards a quasi-deterministic single-photon source", *Proc. SPIE*. **6305**, 630507 (2006).

R. Rangarajan, J. B. Altepeter, E. R. Jeffrey, M. J. A. Stoutimore, N. A. Peters, O. Hosten & P. G. Kwiat, "High-efficiency single-photon detectors", *Proc. SPIE* **6372**, 63720T (2006).

O. Hosten, P. Vignolo, A. Minguzzi, B. Tanatar & M. P. Tosi, "Free Expansion of Two-Dimensional Condensates with a Vortex", *J. Phys. B* **36**, 2455 (2003).

PATENTS
F. Diorico, O. Hosten, "A closed loop method and a system for controlling an injection-locked laser", EP 22194904.3 (2022).
F. Diorico, O. Hosten, "A robust modulation-free locking of a laser-cavity system", EP 21216871.0 (2021).

PROFESSIONAL SERVICE

Peer review

For journals: Nature, Science, Physical Review Letters, Physical Review A, Optics Letters, New Journal of Physics, IEEE.

For grants: ERC Stg, ERC Synergy, UK Research and Innovation

Committees served on at IST Austria

Faculty search committee, Equipment investment committee, Summer internships committee, Student mentorship committee, Colloquium committee, Interdisciplinary projects committee, Thesis and qualification exam committees.

External Committees:

Thesis and qualifications committees:

ICFO Barcelona (Chiara Mazzinghi), University of Vienna (Yaakov Fein).

External PhD Mentorship:

University of Vienna (Sebastian Pedalino).

Exploratory professorship search committee, TU Vienna.

Vienna Center for Quantum Science: Awards committee.

GRANTS
Controlled hybrid gravitational and electromagnetic interactions near the quantum regime, quantA CoE, €236,730 (own share in a 4 PI collaboration as lead PI); 6/2024-9/2026
A quantum hybrid of atoms and milligram-scale pendulums: towards gravitational quantum mechanics, HE ERC CoG, €2,000,000; 6/2023-5/2028
Tunable ultra-low noise lasers of the future, FFG Spin-off (as Host with Fellow Fritz Diorico), €493,052; 1/2023-9/2024