

Haocun Yu

Quantum Optics, Quantum Nanophysics & Quantum Information
Department of Physics, University of Vienna
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Education

Massachusetts Institute of Technology, MA, US 2015 – 20
PhD in Physics, MIT Kavli Institute
Thesis title: Quantum Correlations in Advanced LIGO
Imperial College London, London, UK 2012 – 15
BSc in Physics with Theoretical Physics

Research

Marie-Curie Postdoctoral Fellow, University of Vienna
Macroscopic quantum mechanics in 3rd generation gravitational-wave detectors 2024 –
Photon counting for axion interferometry 2023 –
Test the influence of gravity on quantum effects in photonic systems 2021 –
Measurement of Earth's rotation with quantum entanglement 2021 – 23
Postdoctoral Associate, MIT LIGO Lab
Quantum sensing using nano-scale optomechanical cavity 2020 – 21
Research Assistant, MIT LIGO Lab
Quantum correlations and sub-SQL quantum noise in Advanced LIGO 2019 – 20
Gram-scale quantum optomechanical experiment 2015 – 17
LIGO Scientific Collaboration (LSC) Fellow, LIGO Livingston & Hanford Observatory
Squeezed vacuum injection and commissioning for Advanced LIGO Observation Run 3 2017 – 19
Commissioning work for the Observation Run 1 & 2 of Advanced LIGO 2016
Undergraduate research student, MIT LIGO Lab
Performance testing on optical fibers for LIGO squeezer in vacuum 2014

Fundings & Grants

ERC Synergy Grant (significant contributor) 2024 – 30
GRAVITES – exploring how quantum entangled particles gravitate € 9 Million
Marie-Curie Actions Postdoctoral Fellowship 2022 – 24
MAGIQUE – Measurement of gravitational effects on photonic quantum system € 184 K

Awards & Honors

Boeing Quantum Creators Prize with \$3500 honorarium, Chicago Quantum Exchange, US 2023
Top Ten Leading Chinese Technology Talents in Europe 2023
2021 TR35 – Innovators Under 35 China, MIT Technology Review 2022
2021 Carl E. Anderson Division of Laser Science Dissertation Award, APS 2021
Kaufman Teaching Certificate, MIT 2020
Leadership and Professional Strategies and Skills Certificate, MIT, US 2020
Martin Deutsch Student Award, MIT 2019
Conflict Management and Mediation Skills Training Certificate, MIT 2017
Seo Fellowship, Department of Physics, MIT 2015
Associate of the Royal College of Science, Imperial College London, UK 2015

Creative Prize, as a team coach, PLANCKS International Physics Olympiad, Netherlands	2014
Meritorious Winner, 2013 Mathematical Contest in Modelling, US	2013

Selected Publications

Dr. Yu has over 80 peer-reviewed publications. Top 10 highlighted publications are listed as below:

1. R. Silvestri, **H. Yu**, C. Hilweg, R. Peterson, P. Walther.
Experimental observation of Earth's rotation with quantum entanglement
Science Advances, in press (2024).
2. **H. Yu**, O. Kwon, D. K. Namburi, R. H. Hadfield, H. Grote, D. Martynov
Photon counting for axion interferometry
Phys. Rev. D 109, 095042 (2024).
3. **Haocun Yu**, L. McCuller, M. Tse, N. Kijbunchoo, L. Barsotti, N. Mavalvala, et al.
Quantum correlations between the light and kilogram-mass mirrors of LIGO
Nature 583, 43-47 (2020).
4. M.Tse, **Haocun Yu**, N. Kijbunchoo, A. Fernandez-Galiana, P. Dupej et al.
Quantum-enhanced Advanced LIGO detectors in the era of gravitational-wave astronomy
Phys. Rev. Lett. 123, 231107 (2019).
5. L. McCuller, S. E. Dwyer, A. C. Green, **Haocun Yu**, L. Barsotti, et al.
LIGO's quantum response to squeezed states
Phys. Rev. D 104, 062006 (2021).
6. N. Kijbunchoo, T. McRae, D. Sigg, S. Dwyer, **Haocun Yu**, L. McCuller, L. Barsotti, et al.
Low phase noise squeezed vacuum for future generation gravitational wave detectors
Class. Quantum Grav. 37 185014 (2020).
7. B. P. Abbott, Haocun Yu, et al. (LSC and Virgo Collaboration*)
GW190521: A Binary Black Hole Merger with a Total Mass of $150 M_{\odot}$
Phys. Rev. Lett. 125, 101102 (2020).
8. A. B. Buikema, et al. (LSC Instrument Authors)
Sensitivity and performance of the Advanced LIGO detectors in the third observing run
Phys. Rev. D 102, 062003 (2020).
9. T. Bodiya, V. Sudhir, C. Wipf, N. Smith, A. Buikema, A. Kontos, **H. Yu**, N. Mavalvala
Sub-Hertz Optomechanically-Induced Transparency
Phys. Rev. A 100, 013853 (2018).
10. B. P. Abbott, Haocun Yu, et al. (LSC and Virgo Collaboration*)
GW170817: Measurements of neutron star radii and equation of state
Phys. Rev. Lett. 121 (16), 161101 (2018).

* All equally contributed author

Conferences & Invited Talks

Invited talk, Optica Sensing Congress, France.	2024
Poster, 2024 Gravitational Wave Advanced Detector Workshop, Australia.	2024
Invited talk, 2023 Chicago Quantum Summit, IL, US.	2023
Invited talk, Workshop: Brainstorming new ideas for the km-scale facilities University of Birmingham, UK.	2023
Poster, 2023 Atomic Physics Conference GRC, RI, US.	2023
Poster, SFB BeyondC Conference 2022, Vienna, Austria.	2022
Invited talk, Ocean College, Zhejiang University, China, virtual.	2021
Invited talk, colloquium at Bard College, NY, US, virtual.	2021
Invited talk. Wilczek Quantum Center, Shanghai JiaoTong University, China, virtual.	2020

Poster, “Frontiers of Nanomechanics” Workshop, Max Planck Institute for the Science of Light, Germany, virtual.	2020
Poster, OSA Quantum 2.0 Conference, virtual.	2020
Invited talk, QSIT seminar, ETH Zurich, Switzerland, virtual.	2020
The LIGO-Virgo-KAGRA Collaboration March Meeting, virtual.	2020
Invited talk, GrEAT Conference, Wuhan, China.	2019
Contributed talk, Gravitational Wave Advanced Detector Workshop, Elba, Italy.	2019
Invited talk, Shanghai Observatory, Shanghai, China.	2018
Poster, QCMC International Conference, Baton Rouge, LA, US.	2018
Gordon Research Conference: Mechanical System in the Quantum Regime. Stowe, VT, US.	2016

Teaching & Co-supervising Experiences

2 PhD students and 1 Master student, University of Vienna.	2021 – 23
1 Undergraduate and 2 PhD students, MIT.	2020 – 21
Teaching Assistant for 8.223 Classical Mechanics II, MIT.	2017

Professional Services

Member of Cosmic Explorer Consortium, US	2024 –
Reviewer, Optica, US	2021 –
Member of Early Career, American Physical Society, US	2020 –
Member of Early Career, Optica, US	2020 –
Member, Physics Resources for Easing Friction and Stress (PhysREFS), MIT	2016 – 21
Member & Representative, Physics Community Values, MIT	2017 – 18
Member of LIGO Scientific Collaboration, Instrument Working Group	2016 – 21

Collaborators

Prof. Ling Sun	Australian National University
Prof. Denis Martynov	University of Birmingham
Prof. Yanbei Chen, Prof. Lee McCuller	California Institute of Technology
Prof. Thomas Corbitt	Louisiana State University
Prof. Nergis Mavalvala, Prof. Matthew Evans, Prof. Vivishek Sudhir, Dr. Lisa Barsotti	Massachusetts Institute of Technology
Prof. Quntao Zhuang, Dr. Anthony Brady	University of Southern California
Prof. Philip Walther, Prof. Markus Aspelmeyer, Prof. Časlav Brukner	University of Vienna
Prof. Zheshen Zhang	University of Michigan