Haocun Yu

Quantum Optics, Quantum Nanophysics & Quantum Information
Department of Physics, University of Vienna
Boltzmanngasse 5, A-1090 Vienna, Austria
☎ +1 617-949-6379 ✉ haocun.yu@univie.ac.at

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**
Non-Gaussian states in quantum information processing — 2024 –
Macroscopic quantum mechanics in 3rd generation gravitational-wave detectors — 2024 –
Photon counting for axion interferometry — 2023 – 24
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**
Quantum sensing using nano-scale optomechanical cavity — 2020 – 21

***Research Assistant*, MIT**
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**
Squeezing generation and injection for Advanced LIGO — 2017 – 19
Commissioning work for the Observation Run 1 & 2 of Advanced LIGO — 2016

***Undergraduate research student*, MIT**
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 Postdoctoral Fellowship — 2022 – 24
MAGIQUE – Measurement of gravitational effects on photonic quantum system — *€ 184 K*

Awards & Honors

2024 Rising Stars in Physics, US — 2024
125th Anniversary Fellow, University of Birmingham, UK (declined) — 2024
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 10, eado0215 (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.
   LIGOs 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. 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).
8. W. Jia, et al. including **Haocun Yu**
   LIGO operates with quantum noise below the Standard Quantum Limit
   Science 385, 1318-1321 (2024).
9. LSC Instrument Authors including Haocun Yu
   Sensitivity and performance of the Advanced LIGO detectors in the third observing run
   Phys. Rev. D 102, 062003 (2020).
10. LSC and Virgo Collaboration* including Haocun Yu
    GW190521: A Binary Black Hole Merger with a Total Mass of 150 $M_\odot$
    Phys. Rev. Lett. 125, 101102 (2020).

* All equally contributed author; † Corresponding author.

Conferences & Invited Talks

Table-top AMO for Fundamental Physics workshop, Harvard University, US 2024
Invited Quantum Science & Technology Seminar, University of Southern California, US 2024
Invited seminar, Princeton University, US 2024
Invited talk, Rising Stars in Physics Workshop, Columbia University & Flatiron Institute 2024
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, Gordon Research Conference: 2023 Atomic Physics Conference, 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
Poster, Gordon Research Conference: Mechanical System in the Quantum Regime, VT, US.	2016

Teaching & Co-supervising Experiences

2 PhD students and 1 Master student, University of Vienna.	2021 – 24
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 –
Referee, Optica, US	2021 –
Referee, Physical Review Series, US	
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