

The International Research Training Group “Imaging of Quantum Systems”

cordially invites you to a guest lecture by



Prof. Dr. Wenyuan Wang
(University of Calgary)

entitled

Towards implementation-secure and scalable
quantum key distribution: protocols and networks

The lecture will take place
on Tuesday, 15 September 2026, at 1:00 p. m.
in HS II (Albert-Einstein-Straße 24)

Abstract:

Quantum key distribution (QKD) uses quantum mechanics to promise information-theoretic security between remote parties. It has received worldwide attention as a candidate protocol for next-generation secure communications, and it paves the way for large-scale quantum networks. However, practical components in the sender/receiver of a QKD system can still contain loopholes. Ensuring the implementation security of QKD is, as of today, still a major challenge in the field. In this talk, I will introduce two of our main contributions to the field in addressing this challenge: (1) asymmetric Measurement-Device-Independent (MDI) and Twin-Field (TF) QKD protocols, which close loopholes from the receiver's detectors while also enabling high-performance and scalable quantum networks unrestrained by user location, as well as (2) fully passive QKD protocols, which remove loopholes from the sender's modulators, and they can further be combined with MDI-QKD/TF-QKD to simultaneously protect the sender and the receiver and enable more secure quantum networks. The above two new families of protocols represent a huge step toward building more implementation-secure QKD systems and future quantum networks with high performance and robustness.

Short Bio:

Prof. Dr. Wenyuan Wang

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Dr. Wenyuan (Mike) Wang is currently an Assistant Professor at the University of Calgary. Dr. Wang received his Bachelor of Science degree from the University of Hong Kong (HKU) in 2015 and his PhD degree from the University of Toronto in 2020 under supervision of Prof. Hoi-Kwong Lo. He worked as a Postdoctoral fellow at the Institute of Quantum Computing, University of Waterloo in the group of Prof. Norbert Lutkenhaus for a year and worked as a Research Assistant Professor at HKU during 2021-2024, before joining Nara Institute of Science and Technology (NAIST) as a fixed-term Associate Professor in 2024 summer. Dr. Wang joined the University of Calgary in July 2025 and also holds a Visiting Associate Professor position at NAIST.

His main research interest is quantum communication, especially the design and optimization of quantum key distribution (QKD) protocols, quantum networks, as well as the combination of novel computational techniques (e.g. machine learning and semi-definite programming) with QKD. He is also interested in expanding the quantum optical platform into fields beyond QKD, such as quantum conferencing, linear optical quantum computing, quantum metrology, and quantum machine learning.