Department of Physics
THE UNIVERSITY OF HONG KONG

Physics Colloquium

Quantum Networks: From a physics experiment to a quantum network system

Date: December 6, 2023 (Wednesday)
Time: 5:00 p.m.
Zoom Online Lecture: https://rb.gy/z34fta
Meeting ID: 957 8712 9577
Password: 2859

Prof. Stephanie WEHNER
QuTech, Delft University of Technology

Abstract:
The internet has had a revolutionary impact on our world. The vision of a quantum internet is to provide fundamentally new internet technology by enabling quantum communication between any two points on Earth. Such a quantum internet can —in synergy with the "classical" internet that we have today—connect quantum information processors in order to achieve unparalleled capabilities that are provably impossible by using only classical information.

At present, such technology is under development in physics labs around the globe, but no large-scale quantum network systems exist. This talk is an introduction to quantum networks, with an example of an implementation of a quantum processor network based on Nitrogen-Vacancy centers in diamond. We will take a look at recent work to move such networks from a physics experiment to an eventual real world quantum network system that can be programmed and controlled in high level software. We will discuss a number of recent theoretical results as well as open questions to inspire further theory research.

We close by providing a series of pointers to learn more, as well as tools to download that allow you to investigate properties quantum networks yourself.

Biography:
Stephanie is Antoni van Leeuwenhoek Professor in quantum information at Delft University of Technology, and the director of the European Quantum Internet Alliance. Her goal is to understand the world of small particles – the laws of quantum mechanics – in order to construct better networks and computers. Quantum bits behave quite differently than classical bits, and allow us to solve tasks that are provably impossible for any classical device. Stephanie has worked extensively in quantum cryptography and communication, and together with the Quantum Internet Alliance she is working on realizing a large scale quantum network.

Stephanie is a member of the Royal Dutch Academy of Arts and Sciences, has won an KNAW Ammodo award, and is one the founders of QCRYPT, which has become the largest conference in quantum cryptography. She has written numerous scientific articles in both physics and computer science. From 2010 to 2014, her research group was located at the Centre for Quantum Technologies, National University of Singapore, where she was first Assistant and later Associate Professor. Previously, she was a postdoctoral scholar at the California Institute of Technology in the group of John Preskill. In a former life, she worked as a professional hacker in industry.

Anyone interested is welcome to attend!

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