INTERNATIONAL SOLVAY INSTITUTES BRUSSELS

ONLINE SOLVAY COLLOQUIUM

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Quantum hardware for quantum communication

We develop single photon sources based on semiconductor quantum dots to generate single photons as well as photon pairs at telecom wavelengths that ultimately, enable the implementation of long distance quantum communication in optical fibers. Operation at telecom wavelengths also allows us to implement experiments at the single photon level with off-the-shelf components such as modulators.

Schemes to manipulate light on-chip, allowing for integration, scalability and higher reliability are also carried out with the aim of operating at telecom frequencies as well. Last but not least, single photon detectors with high efficiency, low noise and high time resolution are required to realize quantum communication experiments. For this purpose, we develop NbTiN superconducting nanowire single photon detectors. To allow for complex systems, integrated quantum optics circuits where we combine quantum sources and superconducting detectors are under development.

Finally, we demonstrate single photon transmission over 32 km of deployed SMF28 fibers, paving the way to secure telecommunication links using quantum technologies.

Zoom link: https://zoom.us/j/95152477598?pwd=blc4R3YzY3Bad0F1c0RqQXhwS1lXdz09

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