PRESS RELEASE

Pioneering Impulses from the Rhenish Region for Photonic Quantum Technologies

Quantum technologies offer great potential for the development of disruptive applications such as in communication, computing, imaging and sensor technology. In the Rhenish region, the Fraunhofer Institute for Laser Technology ILT is initiating strategic alliances with its partners to advance photonics-based quantum technologies. Together with Forschungszentrum Jülich, Fraunhofer ILT is coordinating the establishment of a Center of Quantum Science and Engineering CQSE to open the way for a high-growth innovation ecosystem. In addition, a quantum internet node is to be installed in Aachen in cooperation with the Dutch QuTech as part of a transnational network.

On March 7, 2022, leading universities and research institutions in the state of North Rhine-Westphalia (NRW) gave the starting signal for the competence network "EIN Quantum NRW," initiated by the state government of NRW. In this network, these universities and institutes are pooling their expertise in researching and implementing quantum technologies to help players from industry and science network more effectively, and to create a broad knowledge infrastructure. Also on board is the Fraunhofer-Gesellschaft, which is focusing on technology transfer to industry from its traditional point of view.

Together with the Fraunhofer Institutes FHR, IAIS, IMS and SCAI located in NRW, Fraunhofer ILT and the Research Center Jülich are establishing a Center of Quantum Science and Engineering (CQSE) in the Rhineland region. The partners are thus spurring on the establishment of a high-growth innovation ecosystem for quantum technologies in NRW and forming a relevant pillar for practice-oriented research and development in Germany.

On an international level, the Fraunhofer-Gesellschaft and the Dutch research center QuTech – a collaboration of TU Delft and TNO – already joined forces in December 2021, signing a Memorandum of Understanding for a close and long-term cooperation in the field of quantum networks. In the run-up to this cooperation, Fraunhofer ILT and QuTech developed a quantum frequency converter (QFC) with a world record for low noise – a decisive step toward realizing a stable quantum internet. The overall QFC efficiency is comparable to that of converters based on conventional design principles. However, compared to the current state of the art in NV center qubits, the number of noise photons is simultaneously reduced by at least a factor of four, resulting in a significantly increased signal-to-noise ratio for the transfer of quantum information.

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This is a prerequisite for the rapid networking of quantum computers at different locations, especially via already installed fiber optic lines. Using this as a basis, Fraunhofer ILT in Aachen is planning to set up the first German quantum node in a transnational quantum network coordinated by QuTech, which includes the cities of Delft, Leiden, The Hague and Amsterdam.

Photonic Quantum Technologies at the International Laser Technology Congress AKL´22

Results from quantum research, potentials of new quantum technologies and current approaches for industrial applications are the focus of the new expert forum "Quantum Technology & Photonics" at the upcoming AKL´22 - International Laser Technology Congress, hosted by Fraunhofer ILT in Aachen. On Wednesday May 4, 2022, quantum technology experts and interested parties from industry and academia will gather at AKL´22 to explore current photonic developments in quantum computing, sensing, and communication with speakers from renowned institutions.

Further information on the expert forum "Quantum Technology & Photonics": https://s.fhg.de/Wj2

Further information on quantum technologies at Fraunhofer ILT: www.ilt.fraunhofer.de/quantum-technology

Image 1:
With QuTech, Fraunhofer ILT is developing e.g. key components for the quantum internet (shown here: laboratory prototype for a low-noise quantum frequency converter).
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