



Press Release

Geneva, March 13th, 2023

UNPRECEDENTED DETECTOR PERFORMANCE OPENS NEW PERSPECTIVES FOR QUANTUM CRYPTOGRAPHY

A team from ID Quantique (IDQ), together with the University of Geneva (UNIGE), has succeeded in increasing the processing speed of superconducting nanowire detectors by a factor of twenty. This innovation, featured in [Nature Photonics of March 9th](#), makes it possible to achieve world best performances in low-light applications including quantum communications.

ID Quantique, founded in 2001, initially operated as a spin-off company of the University of Geneva, working on research projects to demonstrate the feasibility of quantum key distribution (or QKD, also known as quantum cryptography). In late 2003, IDQ developed the first QKD product for data centers to protect data in transit. 20 years later, IDQ released its [4th generation of quantum key distribution systems](#) and remains the market leader in quantum safe cryptography and quantum sensing solutions. It maintains close ties with academic institutions by participating in numerous research programs and plays a leading role in cutting-edge projects to drive innovation to the market.

This time, the experiment carried out jointly by researchers from ID Quantique and from the Group of Applied Physics of the University of Geneva has demonstrated generation of secret keys for quantum-key distribution at a record-breaking rate of 64 Mbps over a distance of 10 km and at a rate of 3 Mbps over a distance of 102.4 km, both with a negligible quantum-bit error rate (QBER) of only 0.4%. These performances are at least 5x better in terms of speed and over 10x better in terms of QBER than current state of the art experimental QKD systems.

The key enabler for this experiment has been the development of a novel ultra-fast multipixel superconducting nanowire single-photon detector (SNSPD). By integrating fourteen nanowires, or pixels, in a single active area of micrometer-size dimensions, the teams were able to deliver unmatched performances in terms of speed and efficiency. In fact, the detector can count single-photons more than 20x faster than a single-wire i.e. single pixel, SNSPD. The multipixel architecture allows for the detection of several photons even when they arrive within the deadtime of one of the pixels, as all the remaining pixels are still active, whereas with a single wire this is impossible. This detector has pushed the boundaries of what is currently possible to achieve with SNSPD technology, delivering a single-photon efficiency of 60% at a detection rate of 400 Mcps.

Only a few months after commercializing the first photon-number resolving (PNR) detector based on multipixel SNSPDs, IDQ confirms its leadership and continues to push the boundaries of single-photon detection performance and applications with these multi-pixel SNSPD arrays.

The results of this experiment show IDQ's commitment to advancing the limits of quantum communications and science through its superconducting single-photon detector technology development. We look forward to enabling your experiments with the unmatched performances of [our multi-pixel SNSPDs products](#).

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This experiment clearly demonstrates our ability to develop and manufacture single-photon detectors with leading performance and to address the needs of end users involved in quantum communication activities. We are convinced that these new detectors will enable breakthrough in quantum communication and information research similarly to the QKD high key rate experiment put together with the University in Geneva.

Félix Bussi eres, VP of Research and Technology at ID Quantique

Read the article in [Nature Photonics](#)

Read the press release from [UNIGE](#)

About ID Quantique

Founded in 2001 as a spin-off of the Group of Applied Physics of the University of Geneva, ID Quantique is the world leader in quantum-safe crypto solutions, designed to protect data for the future. The company provides quantum-safe network encryption, secure quantum key generation and Quantum Key Distribution solutions and services to the financial industry, enterprises and government organizations globally. IDQ’s quantum random number generator has been validated according to global standards and independent agencies, and is the reference in highly regulated and mission critical industries – such as security, encryption, critical infrastructure and IoT – where trust is paramount.

Additionally, IDQ is a leading provider of optical instrumentation products, most notably photon counters and related electronics. The company’s innovative photonic solutions are used in both commercial and research applications. IDQ’s products are used by government, enterprise and academic customers in more than 60 countries and on every continent. IDQ is proud of its independence and neutrality, and believes in establishing long-term and trusted relationships with its customers and partners.

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