

Press Release

Successful Demonstration of Quantum Communication Between Bavaria, Thuringia & Berlin

Conclusion of the QuNET initiative: Federal Minister of Research Bär Launches Quantum Communication Network Between Bavaria, Thuringia, and Berlin

Berlin / Erfurt / Erlangen / Munich (Germany)

The QuNET Research initiative, which received 125 million euros in funding by the German Federal Ministry of Research, Technology and Space (BMFTR), concluded its final key experiment today with a live demonstration. Together with representatives from the federal states of Bavaria, Berlin, Saxony, and Thuringia, Germany's Federal Minister of Research, Technology and Space Dorothee Bär activated a cross-state experimental network for quantum communication in Berlin.

Since 2019, the German Federal Ministry of Research, Technology and Space (BMFTR) has been supporting research into the technological foundations for highly secure communication through the QuNET initiative. At the heart of the initiative is quantum key distribution (QKD). The core consortium includes the Fraunhofer Institute for Applied Optics and Precision Engineering IOF, the Fraunhofer Heinrich Hertz Institute for Telecommunications HHI, the Max Planck Institute for the Science of Light (MPL), the Institute of Communications and Navigation at the German Aerospace Center (DLR), and Friedrich-Alexander-Universität Erlangen-Nürnberg (FAU).

Dorothee Bär, Federal Minister of Research, Technology, and Space, stated: "Today, with the conclusion of the final key experiment of the QuNET initiative, we have reached an important milestone of the High-Tech Agenda Germany. I am delighted that we were able to see here live today how quantum communication can help us protect our sensitive data from attack, even in the quantum age of the future. This is how we are strengthening our technological sovereignty and value creation. The task now is to quickly translate this research into broad application for the cybersecurity of tomorrow."

Federal states provide sub-networks, federal minister connects them

Marking the official conclusion of the QuNET initiative, researchers conducted their final and largest key experiment in Berlin on October 28 in the presence of the Federal Minister.



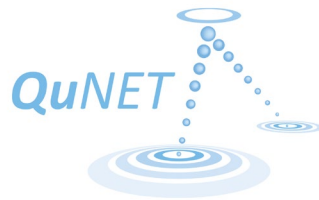
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Working alongside partners from industry, academia, and society, they successfully demonstrated the exchange of quantum-encrypted data across a realistic, cross-state network.

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To this end, political representatives from the participating federal states first activated their regional subnetworks on site in Erlangen, Erfurt, and Berlin. For Bavaria, this was done by Minister-President Dr. Markus Söder; for the State of Berlin, by Governing Mayor Kai Wegner; and for Thuringia, by Minister-President Mario Voigt. Also represented were the state of Saxony, represented by Dr. Babett Gläser, Head of the Research Division at the Saxon State Ministry of Science, Culture, and Tourism. Through their respective state initiatives, the federal states contributed significantly to the development of local research infrastructures for quantum communication, upon which the cross-state QuNET network was built.

Following the successful deployment of the regional subnetworks, Federal Minister of Research Dorothee Bär gave the start signal in Berlin for the interconnection of these subnetworks into a joint Quantum Communications network, followed by a live demonstration.

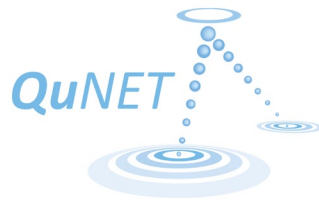
Live demonstration using fictitious health data

Several key experiments paved the way for this: As early as 2021, QuNET researchers in Bonn had demonstrated a [quantum-secure communication link in the government district](#). In 2023, they combined [free-space and fiber-optic links](#) in Thuringia to create a hybrid quantum connection. This was followed in 2024 by a [network with multiple nodes](#) in Berlin, and by 2025, a [mobile quantum network node](#) was demonstrated in Bavaria using an aircraft.

During the most recent live demonstration in Berlin, which was conducted under the technical leadership of the MPL and FAU, various quantum cryptography systems were interconnected to form a network. The demonstration focused on a real-world application scenario: Fictitious pharmacy invoices were transmitted in a quantum-secure manner from Jena University Hospital via DATEV to the Bundesdruckerei. The transmission itself took place over conventional communication networks consisting of fiber-optic cables. This is because QuNET investigated not only components and systems for Quantum Communication but also their integration into real-world and already widely existing communication infrastructures.

“The future of Quantum Communication will be shaped by a hybrid, quantum-secure infrastructure consisting of fiber-optic networks, free-space networks, and satellite networks,” said Prof. Dr. Andreas Tünnermann, spokesperson for the QuNET Initiative. “In this final QuNET key experiment, we are demonstrating exactly that: that different systems and regional networks can function together. This brings us a crucial step closer to the goal of a practically usable network infrastructure for highly secure communication.”

Prof. Christoph Marquardt, scientific director of the live demonstration in Berlin, adds: “With QuNET, we have created a strong ecosystem for quantum-secure communication networks. The key to this success lies in the close collaboration between research institutions and numerous companies throughout Germany, with whom we have jointly laid the technical foundation for a reliable and marketable security architecture.”



QuNET+ Brings Technology Closer to Practical Application

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To integrate quantum communication into real-world communication infrastructures, the QuNET Initiative has always strengthened close collaboration between academia and industry, thereby making a significant contribution to the development of an innovation ecosystem for quantum communication in Germany. To this end, the so-called QuNET-Plus projects (QuNET+) were launched alongside the initiative to bridge the gap between research and industrial application. Since 2022, as part of QuNET+, companies and research institutions have developed building blocks for future Quantum Communication networks in a total of twelve projects—ranging from detector modules and laser sources to data post-processing, optical routing, and key management, as well as test laboratories and optical ground stations, such as those located in Oberpfaffenhofen and Jena.

QuNET+'s industry partners include renowned companies from the fields of cybersecurity, telecommunications, electronics, photonics and aerospace. The industry partners also focus on standardization and scaling. This includes standardized, interoperable interfaces for key management systems as well as the development of methods for testing, qualifying, and certifying Quantum Communication technologies.

After QuNET comes the next generation

With the live demonstration in Berlin, the QuNET initiative is now nearing the end of its seven-year research period. At the same time, the next phase is beginning—moving from an experimental quantum communication network focused on QKD applications toward value creation for the technologies and research results in Germany.

“The expertise, technologies, and industry partnerships established through QuNET and QuNET+ form the foundation for further developing key technologies for secure communication in Germany and translating them into commercial applications,” concludes QuNET spokesperson Andreas Tünnermann. “This is not just about protecting sensitive data, but also about technological sovereignty and the opportunity for German and European companies to participate in a future market for highly secure communications. In addition to scientific and technical findings, the initiative’s output is reflected not only in patents but also in several startups that have transformed the initiative’s developments into marketable products,” says Tünnermann.

More information:

www.qunet-initiative.de/en

Specialized Portal on Communication Technologies and Cybersecurity: <https://www.forschung-it-sicherheit-kommunikationssysteme.de/forschung/it-sicherheit/qunet>

Quantum technologies: [Quantum technologies – BMFT](#)

Quantum Technology Roadmap: [Hightech Agenda Deutschland: Quantentechnologien](#)



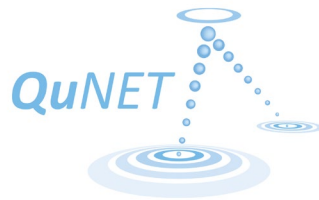
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Press Images

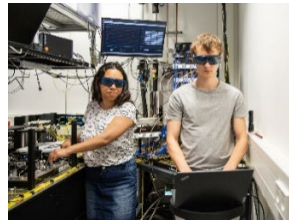
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Photos from the conclusion event in Berlin will be available for download after the event via the following link: <https://s.fhg.de/QuNET-2026-Pressebilder> (valid through December 31, 2026).

In addition, the following **archive images** are available via the download link provided.



Archive image: The QuNET Initiative, funded by the BMFTR, has been developing Quantum Communication systems since 2019. © Fraunhofer IOF



Archive image: Researchers from the Fraunhofer-Gesellschaft and the Max Planck Society are collaborating with the DLR and FAU on this initiative. © Fraunhofer IOF



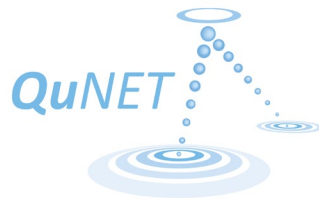
Archive image © Fraunhofer HHI



Archive image: In 2023, a combination of free-space and fiber connections was tested for the first time, shown here with a mobile Quantum Communication unit. © Fraunhofer IOF



Archive image: In 2025, quantum channels were tested in flight—using a research aircraft from the DLR. © DLR



Questions and Answers About the QuNET Initiative (FAQ)

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Why this initiative?

Increasingly powerful digital technologies are impacting today's data networks and pose a growing threat to the security of the critical infrastructure of the modern information society. Added to this is the ongoing development of quantum computers. With their ability to calculate and analyze a multitude of potential options simultaneously, they create not only new opportunities but also risks. Many of the core components of encryption are currently in widespread use—and upon which security is based—can be broken as a result. Therefore, government organizations, the healthcare system, and security-critical companies must re-think and modernize their security infrastructures.

What is the goal of the initiative?

The QuNET Initiative was launched in 2019 and has since received 125 million euros in funding from the Federal Ministry of Research, Technology, and Space.

QuNET's primary goal is the application-oriented development of fundamental physical and technical principles, as well as the necessary technologies, for highly secure communication networks under real-world conditions using quantum physics. The initial focus is on practical applications for quantum-secure networking, such as for government agencies. However, QuNET enables more than just secure communication: The potential applications of quantum state transmission extend all the way to networked quantum computers, the so-called quantum internet.

How does quantum encryption work?

Quantum encryption takes advantage of the property of every individual quantum particle that it cannot be fully characterized by measurement and therefore cannot be perfectly copied. For example, a quantum source generates light pulses with variable properties that are exchanged between two locations. The results of a quantum mechanical measurement can reveal any manipulation or eavesdropping on the light pulses. Building on this, a key can be generated that is known only to the sender and receiver and that can be used for encryption. The core of this method is also resistant to future attacks by a quantum computer. To bridge greater distances, satellites equipped with quantum sources can generate quantum keys over intercontinental distances, or quantum repeaters currently under development can be used.

What is the current state of the art in Quantum Communication?

Quantum communication offers many potential applications that benefit the economy and society. Among these, quantum key distribution (QKD) is arguably one of the most thoroughly studied and internationally advanced examples.

What QuNET key experiments have been conducted so far?

The live demonstration in Berlin on October 28, 2026, marks the final key experiment (SE4) of the QuNET Initiative. It was preceded by a pioneering experiment in Bonn (SE0) and three other key experiments (SE1–SE3):



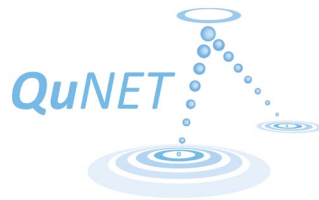
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- Pioneer Experiment (SE0), Bonn 2021:
 - **First quantum-secure video conference between the BMFTR and the BSI in Bonn**
 - More information: <https://s.fhg.de/QuNET-Pionier-SE0>
 - Scientific contact for the Pioneer Experiment, led by MPL: Christoph Marquardt (christoph.marquardt@mpl.mpg.de)
- Key Experiment 1 (SE1), Jena 2023:
 - **Ad-hoc metro network for quantum-secure communication**
 - More information: <https://s.fhg.de/QuNET-SE1>
 - Scientific Contact SE1, led by Fraunhofer IOF: Fabian Steinlechner (fabian.steinlechner@iof.fraunhofer.de), Matthias Goy (matthias.Goy@iof.fraunhofer.de)
- Key Experiment 2 (SE2), Berlin 2024:
 - **Securing critical infrastructure and digital identities**
 - More information: <https://s.fhg.de/QuNET-SE2>
 - Scientific Contact SE2, led by Fraunhofer HHI: Nino Walenta (nino.walenta@hhi.fraunhofer.de)
- Key Experiment 3 (SE3), Oberpfaffenhofen / Erlangen 2025:
 - **Dynamic QKD transmission from a mobile aerial platform**
 - More information: <https://s.fhg.de/QuNET-SE3>
 - Scientific Contact SE3, led by DLR-IKN: Friederike Fohlmeister (friederike.fohlmeister@dlr.de) / Florian Moll (florian.moll@dlr.de)

Which research institutes are participating in the initiative?

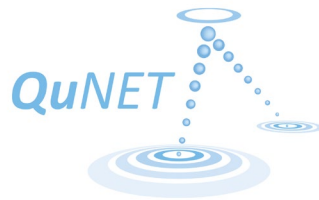
The **Fraunhofer Institute for Applied Optics and Precision Engineering IOF**, based in Jena, uses its core areas of expertise in the generation, guidance, and measurement of light to, among other things, lay the technological foundations for Quantum Communication. Founded in 1992, the institute translates quantum-optical phenomena from the laboratory into practical applications by developing precision hardware components—such as sources of entangled photon pairs—for secure communication networks. Through close collaboration with academia and industry, the institute is developing systems ready for practical application in terrestrial and satellite-based quantum key distribution.

Press Contact Fraunhofer IOF: Desiree Haak / presse@iof.fraunhofer.de / +49 3641 - 807 803

Innovations for tomorrow's digital society are at the heart of the research conducted by the **Fraunhofer Heinrich Hertz Institute (HHI)** in Berlin. Founded in 1928, the institute is a global leader in research on mobile and optical communication networks and systems, as well as video signal coding and data processing. Together with international partners from research and industry, the Fraunhofer HHI works across the entire spectrum of digital infrastructure—from basic research to the development of prototypes and solutions. The institute makes significant contributions to standards for information and communication technologies and creates new applications as a partner to industry.

Press Contact Fraunhofer HHI: Elzem Kaya / presse@hhi.fraunhofer.de / +49152 54272681

The **Max Planck Institute for the Science of Light (MPL)** in Erlangen covers a broad spectrum of research, including nonlinear optics, quantum optics, nanophotonics, photonic crystal fibers, optomechanics, quantum technology, biophysics, and—in collaboration with the Max



Planck Center for Physics and Medicine—interfaces between physics and medicine. The MPL was founded in January 2009 and is one of more than 85 institutes of the Max Planck Society that conduct basic research in the natural sciences, life sciences, humanities, and social sciences for the benefit of the general public. Today, nearly 400 people from around 50 countries work at the institute. Some of the researchers have decades of experience in the field of Quantum Communication. They also use telecommunications technology for the exchange of quantum keys, which allows these methods to be rapidly commercialized. In addition, for more than ten years, the institute has been investigating how keys can be transmitted on the ground using laser light over several kilometers (known as a free-space link) or via satellite over greater distances. In this context, the MPL—also in collaboration with the national industry—plays a key role in many major national and international projects.

Press Contact MPL: Edda Fischer / mplpresse@mpl.mpg.de / +49 9131 7133-805

The **Institute of Communications and Navigation at the German Aerospace Center (DLR)** is dedicated to mission-oriented research in selected areas of communication and navigation. The work conducted at the Oberpfaffenhofen and Neustrelitz locations ranges from fundamental research to the demonstration of new methods and systems. The DLR institute develops solutions for human-machine interaction, high-precision positioning for future navigation applications, and methods for autonomous and cooperative systems. Key areas of focus in cybersecurity include post-quantum cryptography and the transmission of quantum keys via satellite.

Press Contact DLR Institute of Communications and Navigation: Claudia Stadler / kn-media@dlr.de / +49 8153 281876

The **Friedrich-Alexander-Universität Erlangen-Nürnberg (FAU)** was founded in 1743 and is the third-largest university in Bavaria. This highly innovative university offers a wide range of academic disciplines. The research-intensive Department of Physics collaborates closely with the Max Planck Institute for the Science of Light (MPL). The Chair of Optical Quantum Technology, established in 2022 as part of the Bavarian High-Tech Agenda and headed by Prof. Dr. Christoph Marquardt, focuses on the fundamentals of quantum information and the implementation of quantum protocols. This research group is a key partner in numerous national and international projects on Quantum Communication and plays a leading role in satellite-based Quantum Communication and the practical application of quantum technology.

Press Contact FAU: Blandina Mangelkramer / presse@fau.de / +49 9131 85-70210

QuNET Initiative Homepage: www.gunet-initiative.de