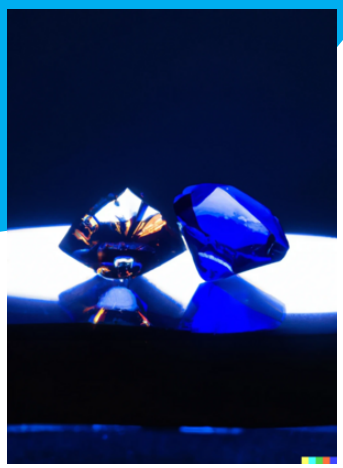
Quantum communication with coherent single photon sources

Technologie-Lizenz-Büro
der Baden-Württembergischen Hochschulen GmbH

Quantum information security and quantum communication networks with coherent single photon sources

- Absolutely tap-proof
- Easy integration into existing chip manufacturing processes
- Inexpensive manufacturing



Fields of application

Can be used in areas of ultimate data security and tap-proof information transfer.

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Development Status
TRL 4 - Technology checked in the laboratory

Patent Situation
PCT/EP2023/064304 pending

Reference ID
23/008TLB

Service
Technologie-Lizenz-Büro GmbH has been entrusted with the exploitation of this technology and assists companies in obtaining licenses.

Background

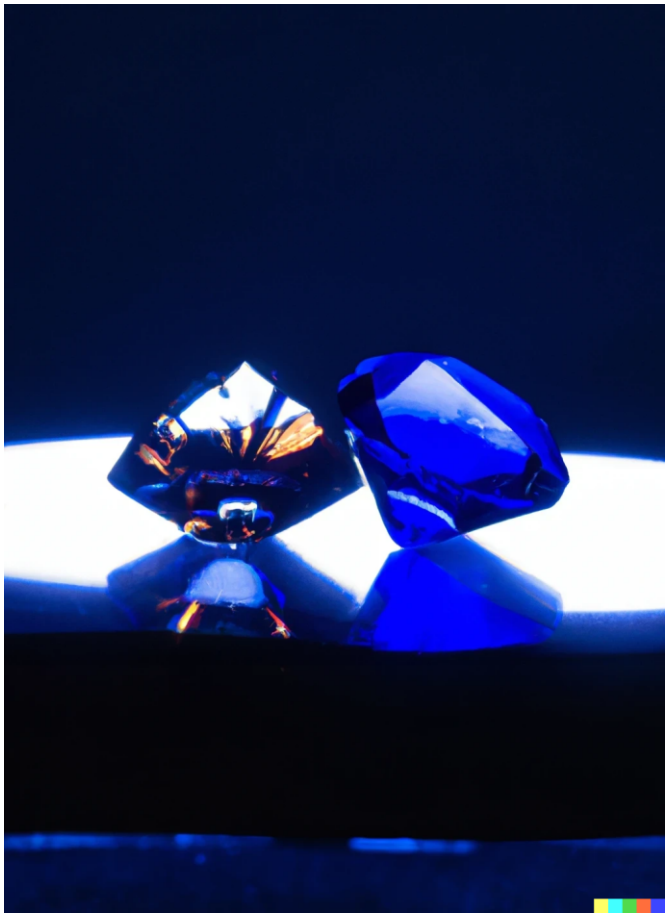
Absolutely tap-proof data communication based on the physical properties of quantum objects, such as the nature of individual light quanta, also known as photons, can be commercialized with this basic patent. You don't need any mathematical constructs made by human hands, but instead shift the security against eavesdropping directly into the physical nature of the quantum object.

Problem

Today, security in data communication is still based on the exchange of mathematically generated keys. The underlying algorithm for this can still be deciphered with considerable expenditure of time and energy. Using quantum objects, one shifts data security directly into the physical appearance of the same. The reason for this is that unknown quantum states cannot be copied or measured without destroying them during the measurement. Disturbances of quantum states are inevitably recognized as transmission errors and expose the eavesdropping attack.

Solution

It is now possible to set up communication links whose security is based on physics and not just on mathematical calculations. This was realized at the University of Ulm, where two identical nanodiamond defect sources were brought as building blocks for quantum mechanical entanglement, which represent the basis for a quantum data network. The nanoscale dimension of the units enables them to be easily integrated into existing microchip manufacturing processes.



AI generated picture of single photon sources embedded on a PCB chip. (Copyright HJ Eisler)