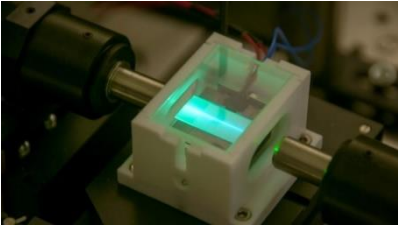


Greatly improved radar/lidar sensor

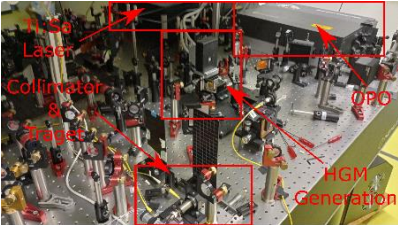
Quantum-supported measurement procedure

Invention

Radio detection and ranging (radar) and light detection and ranging (lidar) are measurement procedures for recording high-resolution environmental and ranging information in real time. The sensor measures the distance with radio waves (radar) or laser light (lidar). The decisive parameters for such sensor systems are range and resolution. An invention from Paderborn University provides quantum optical support for radar/lidar systems. It uses quantum mechanical effects to exceed the theoretical resolution limits of a classic sensor. The central element is a quantum pulse gate (QPG) in which several optical signals are superimposed. The advantages are that measurement precision is no longer subject to the Rayleigh limit and that the system is much more robust in operation than other quantum sensor systems that use entangled photons.



Quantum pulse gate (QPG) in operation



Measurement and laboratory set-up

Commercial Opportunities

Environmental sensors are a key technology for the future: for completely automated driving and other automated processes in industry in such areas as robotics or augmented reality. They are also used in aerospace, geology, and archeology. Robust, high-precision sensor systems are a key to their successful use. The university can contribute its technology.

Current Status

The invention is available as a laboratory set-up – initial lidar measurements have confirmed the technology's functionality and advantages. It has been registered with the German Patent and Trade Mark Office. A subsequent application abroad can be submitted in the priority year. We are offering interested companies the opportunity to license and refine the technology in collaboration with the inventors and Paderborn University.

Relevant Publications

"A Pulsed Lidar System with Ultimate Quantum Range Accuracy", Stephan Kruse et al., IEEE Photonics Technology Letters, vol. 35, no. 14, pp. 769-772, 15 July 2023

An invention from Paderborn University.

Competitive Advantages

- Greatly improved resolution
- Robust measurement
- Classic resolution limits can be exceeded

Technology Readiness Level

123456789

Experimental proof of concept

Industries

- Optoelectronics
- Sensors
- Automation

Ref. No.

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