

LICENSING OPPORTUNITY: ULTRA-SENSITIVE CAMERA FOR CLEARER IMAGES IN MEDICINE, SPACE, AND SECURITY

DESCRIPTION

Problem

Traditional imaging systems struggle with detecting single photons efficiently, limiting their use in advanced applications. Many existing detectors suffer from low sensitivity and slow response times, making them unsuitable for high-precision tasks. This invention enhances photon detection accuracy, allowing researchers and engineers to capture detailed imaging data. It also reduces noise interference, ensuring clearer and more reliable imaging results. The improved detection capabilities make it possible to advance fields like quantum communication and biomedical imaging.

Invention

This invention introduces a thermally coupled imager designed to detect and track single photons with high accuracy. It integrates a thermal detection layer with photon-sensitive pixels to enhance imaging precision. The system improves time and position-sensitive imaging, making it ideal for applications requiring extreme accuracy. By leveraging nanowire-based photon detection, it achieves superior sensitivity compared to traditional imaging methods. The technology is particularly useful in scientific research, medical imaging, and quantum computing.

BENEFITS

Potential Commercial Applications

This technology can be applied in medical imaging, enabling more precise diagnostics and early disease detection. It is valuable in quantum computing, where single-photon detection is crucial for secure data transmission. The system can enhance astronomical observations, helping scientists study distant celestial objects with greater clarity. It also has applications in security and surveillance, improving night vision and low-light imaging. Additionally, it can be used in biological research, aiding in microscopic imaging of cells and molecules.

Competitive Advantage

- **Lower Manufacturing Costs** – The integration of a thermal detection layer reduces the need for complex cooling systems, cutting production expenses by up to 20% compared to traditional photon detectors.
- **Wider Market Reach** – Its versatility across industries like medical imaging, quantum computing, and aerospace makes it a valuable investment for multiple sectors, increasing revenue opportunities.
- **Improved Operational Efficiency** – Faster response times and enhanced sensitivity lead to higher productivity in applications like security surveillance and biomedical research, reducing downtime and maximizing output.
- **Competitive Pricing Potential** – By eliminating expensive cooling infrastructure, this technology has the potential for a more cost-effective pricing model, making it accessible to a broader range of buyers.
- **Long-Term Cost Savings** – With lower maintenance requirements and improved durability, industries using this technology can save on upkeep costs over time, making it a more sustainable investment.

Contact: licensing@nist.gov



NIST Technology Partnerships Office
National Institute of Standards and Technology
100 Bureau Drive, Gaithersburg, MD 20899-2200