



Infrared photodetector utilizing coaxial nanoaperture antennas

An infrared photodetector utilizing coaxial nanoaperture antennas that enhance photodetection capabilities.

Technology No. 2020-119

IP Status: US Patent Issued / U.S. Patent No. 11,688,820

Applications

- High-resolution infrared imaging

Technology Overview

Researchers at the University of Minnesota have developed an infrared (IR) photodetector by utilizing coaxial nanoaperture antennas. By integrating these engineered metal antennas with semiconductors to form Schottky junctions, this technology overcomes the limitations of conventional photodetectors, such as poor light absorption and inefficient energy conversion. Surface plasmons excited in metallic nanostructures enable the generation of hot electrons with a narrower energy distribution and controlled momentum. Due to its unit cell size being 10 times smaller than the wavelength of interest, this technology offers enhanced IR photodetection capabilities beyond mere mid-IR photodetection, making it potentially commercially applicable as a high-resolution long-wavelength IR camera.

Phase of Development

TRL: 4-5

The researchers have completed the development of fabrication/mass-production protocols for silicon-metal coaxial apertures and have characterized their infrared and LW-IR optical resonances.

Desired Partnerships

This technology is now available for:

- License

- Sponsored research
- Co-development

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Researchers

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