Researchers develop integrated dual-mode active and passive infrared camera
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Researchers at the Northwestern University’s Center for Quantum Devices have now found a way to integrate active and passive infrared imaging capability into a single chip. This opens the way to lighter and simpler dual-mode active/passive cameras with lower power dissipation.

A paper about the findings, “Active and Passive Infrared Imager Based on Short-Wave and Mid-Wave Type-II Superlattice Dual-Band Detectors,” was published January 1 in the journal Optics Letters. The work was led by Manijeh Razeghi, Walter P. Murphy Professor of Electrical Engineering and Computer Science in Northwestern's McCormick School of Engineering and Applied Science.

The researchers achieved this feat by engineering the quantum properties of novel semiconductor materials called the indium arsenide/gallium antimonide (InAs/GaSb) type-II superlattices. Researchers at the center have been pioneering the development of type-II superlattices as a superior replacement of aging mercury-cadmium-telluride (HgCdTe) infrared camera technology in terms of both performance and cost.

Using the unique band-structure engineering capabilities of type-II superlattices, they have developed a new structure incorporating two different superlattices with different layer spacings, thus enabling detection with a cutoff wavelength of either 2.2µm (active mode) or 4.5µm (passive mode). This new device can simply switch from passive to active mode by a very small change in bias.

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