



When cooled with liquid helium (blue line), the detection threshold reaches into THz and overall detector sensitivity is significantly improved.

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Scientific Achievement

Scientists discover that liquid-helium-cooled, photoconductive mercury-cadmium-telluride (MCT) detects beyond 50 μm wavelength with improved speed and sensitivity for far-infrared near-field nanospectroscopy.

Significance and Impact

Researchers can now get a clearer picture into the terahertz gap, a difficult to capture frequency that will unlock relatively unexplored nanoscale and quantum material properties.

Research Details

- In many semiconductors, lower temperatures cause the band edge to shift to higher energies. For MCT, it shifts to lower energies.
- The detector performs well into the single-digit THz range and is currently implemented as a user program at NSLS-II.