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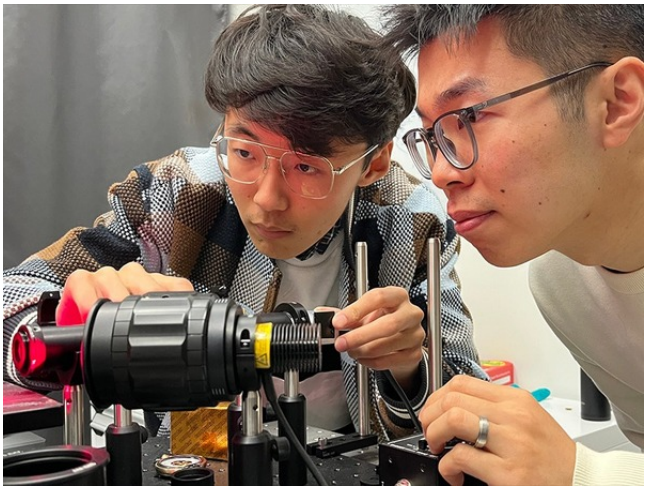
MetaHDR: single shot high-dynamic range imaging and sensing using a multifunctional metasurface



Technology ID

2024-GUO-70751

Category

All products

Artificial Intelligence & Machine Learning/Computer Vision & Image Recognition

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Researchers at Purdue University have developed MetaHDR, a single-shot high dynamic range (HDR) imaging and sensing system. MetaHDR system captures HDR images with a single or few exposures and creates multiple low dynamic range (LDR) images simultaneously. Current solutions for generating single-capture HDR images require specialized photosensors and circuitry. MetaHDR instead utilizes more conventional camera and sensor technologies. Single-shot HDR photography and videography with real-time sensing applications make MetaHDR particularly useful for surveillance, microscopy, and advanced manufacturing.

Technology Validation

This technology was validated through experimentation using a fabricated metasurface. Results show more than a 50 dB increase in dynamic range.

Advantages

-Captures multiple imagines simultaneously in a single shot

-All photodetectors have the same integration time

-Wide range of applications

-Improves dynamic range

-Multifunctional

Applications

-Surface Monitoring

-Surveillance and Security

-Microscopic Imaging

-Advanced Manufacturing

-Computational imaging

Publication Link: https://opg.optica.org/oe/fulltext.cfm?uri=oe-32-15-26690&id=553173

Keywords: Electrical Engineering, Civil Engineering, Single-shot capture, surface detection, metasurface lens, Computer Vision, high-dynamic range imaging