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A Sensor for Hyperspectral Imaging Based on a Metasurface-integrated Light Detector Array

A new compact and lightweight metasurface-based sensor delivers real-time, high-resolution spectroscopically resolved images for applications in fields like pharmacology and agriculture.

Hyperspectral imaging is a method of collecting and processing information from the electromagnetic spectrum. By having a sensor look at objects using a vast portion of the spectrum, various objects that leave spectral signatures are able to be picked up on and analyzed even more for further information. Hyperspectral imaging has applications in many fields, from agriculture and mineralogy to astronomy and physics. Improving hyperspectral imaging sensors will only further our understanding in these fields.

Researchers at Purdue University have invented a new sensor for hyperspectral imaging. This development is based upon the use of an electromagnetic metasurface with detector arrays. The metasurface is designed to spatially separate components when imaging, and directing them to different pixels of the underlying array. This strategy makes it possible to get real-time spectroscopically resolved images from sensors that are extremely small and lightweight, and so will find usage in fields such as biological sensing and pharmacology.

Advantages:

-Can image transient events

-More compact sensor

-Improved throughput and resolution

Potential Applications:

-Pharmacology

-DNA analysis

Technology ID

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Category

Agriculture, Nutrition, & AgTech/Precision Agriculture & Smart Farming
Materials Science & Nanotechnology/Nanomaterial Characterization & Imaging Tools
Biotechnology & Life Sciences/Analytical & Diagnostic Instrumentation

Authors

Rohith Chandrasekar
Alexander Anatolyevich Chubykin
Alexei Lagutchev
Vladimir Shalaev
Amr Mohammad E Shaltout

Further information

Will Buchanan
wdbuchanan@prf.org

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