Metasurface, Metalens, and Metalens Array with Controllable Angular Field-of-View

Tech ID: 33802 / UC Case 2021-677-0

ABSTRACT

Researchers at the University of California, Davis have developed an optical lens module that uses a metalens or a metalens array having a controllable angular field-of-view.

FULL DESCRIPTION

The technology uses a metalens or a metalens array to achieve high quality large field-of-view imaging with a compact device. Each metalens or metalens array uses a 2D array of meta-units where each meta-unit includes a nanostructure and a portion of a substrate that supports the nanostructure. Each meta-unit is configured with an angular-dependent transmission or reflection intensity that decreases with an increasing incident angle of an illumination. The metalens passes an incident light having an incident angle less than a cutoff angle and rejects an incident light having an incident angle greater than the cutoff angle. The metalens can be used as a base unit for constructing many different metasurfaces designed to achieve various 2D or 3D imaging goals.

APPLICATIONS

- Miniaturized imaging devices
- Light-field cameras
- Compact cameras
- Endoscopy
- Biomedical imaging
- Consumer electronics
- Surveillance

FEATURES/BENEFITS

- Design flexibility
- Angle-dependent transmission or reflection intensity
- Extended depth of view for light field imaging
- Solves the trade-off between in-focus imaging resolution and the depth of view
- Addresses signal ambiguities in single lens design

PATENT STATUS

Country	Type	Number	Dated	Case
Patent Cooperation Treaty	Reference for National Filings	WO 2023/283348	01/12/2023	2021-677

Patent Pending

CONTACT

Michael M. Mueller
mmmueller@ucdavis.edu
tel: .



INVENTORS

- Hu, Junjie
- Yang, Weijian

OTHER INFORMATION

KEYWORDS

metalens, compact and large field of view imaging, light field imaging, photonic device

CATEGORIZED AS

- **Optics and Photonics**
  - All Optics and Photonics
- **Imaging**
  - 3D/Immersive
  - Medical
  - Other
- **Medical**
  - Imaging
- **Nanotechnology**
  - Materials
  - Other
  - Tools and Devices
- **Sensors & Instrumentation**
  - Scientific/Research

RELATED CASES

2021-677-0

ADDITIONAL TECHNOLOGIES BY THESE INVENTORS

- Large Field-Of-View Two-Photon Miniscope with Compact Footprint
- Two-Photon Miniscope with Elliptical Point-Spread-Function and Temporal Focusing Scheme
- Fetal Oximetry Measurement via Maternal Transabdominal Spectroscopy
- Transabdominal Measurement of Fetal Oxygen Saturation and Blood Flow Index through Multi-exposure Time-of-flight Filtered Interferometric Diffusing-wave Spectroscopy

University of California, Davis
Technology Transfer Office
1 Shields Avenue, Mrak Hall 4th Floor,
Davis,CA 95616

Tel: 530.754.8649
techtransfer@ucdavis.edu
https://research.ucdavis.edu/technology-transfer/
Fax: 530.754.7620

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