PURDUE INNOVATES | Office of Technology Commercialization

Non-Magnetic Planar Magnifying Hyperlens for Subwavelength Imaging

An innovative planar metamaterial device enables enhanced-resolution imaging and subsurface sensing by overcoming common resolution limitations.

Due to the increasing need for wide, multiband functional devices, the metamaterials market expects to grow at a considerable rate in the coming years. Industry experts consider metamaterial technologies to be a breakthrough because of their ability to guide and control electromagnetic waves and material properties. There is a need for metamaterial technology with a high application potential.

Researchers at Purdue University have developed an innovative planar device that produces images in the far field with resolution better than the diffraction limit. It uses the property of hyperbolic dispersion metamaterials to extract subwavelength information and mold the flow of light. This device can be useful in situations where subsurface sensing is needed, especially when the object under study is sized below the wavelength of the illuminating light. The planarity of the device facilitates parallelism, which can be exploited for nanolithography and integration with existing microscopic imaging systems. This technology can be used in conjunction with existing conventional optics for enhanced resolution imaging. This technology overcomes resolution limitation, which is common in current systems.

Advantages:

-Images with resolution better than the illuminating wavelength

-Inverted to make objects visible in illuminating light appear invisible

-Used in conjunction with existing conventional optics

Potential Applications:

-Controlling the flow of electromagnetic waves

Technology ID

65208

Category

Materials Science & Nanotechnology/Nanomaterials & Nanostructures

Materials Science & Nanotechnology/Advanced Functional Materials

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-Using metamaterials in structures engineered to guide electromagnetic waves

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Intellectual Property:

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