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Spatially Encoded Polarization Modulation for Microscopy Applications

A novel polarization modulation technology enables fast, simple retrofitting of existing microscopes for comprehensive polarization analysis across various light and contrast mechanisms.

Polarization analysis is widely performed in both conventional and nonlinear optical microscopes to provide information on structure and orientation of anisotropic, or directionally dependent, objects within the field of view. Current approaches present unique challenges for retrofitting existing microscopes. Retrofitting is important because it allows for the reusability of currently existing microscopes. Typical polarization-dependent microscopy techniques are either slow, because the user must rotate fixed optics between acquiring each image, or require complex technology that is difficult to retrofit into existing microscopes.

Researchers at Purdue University have developed a technology that provides a novel method of polarization modulation for polarization analysis in microscopy. This technology provides a solution to retrofit the capability for polarization analysis into users' existing microscopes. It can be applied to a variety of microscopy techniques including those using visible, near infrared, and infrared light, and this technology is compatible with a variety of contrast mechanisms. This technology has been demonstrated and proven to be compatible with broad classes of microscopic techniques.

Advantages:

-Can be integrated into existing microscope systems

-Faster image acquisition than current solutions

Potential Applications:

-Polarization-dependent nonlinear optical microscopy

-Analysis of crystals prior to X-ray diffraction

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Category

Materials Science & Nanotechnology/Nanomaterial Characterization & Imaging Tools
Biotechnology & Life Sciences/Analytical & Diagnostic Instrumentation

Authors

Fengyuan Deng
Changqin Ding
Garth Jason Simpson
James Ulcickas

Further information

Clayton Houck
CJHouck@prf.org

View online

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