All-in-One High Resolution 3D Optical Microscope Imaging System

Powerful, precise, high-resolution 3D imaging for advanced microscopy using diffraction limited low resolution optical signals.

Advantages
Comprehensive enhancements made by researchers at the University of Central Florida improve imaging function and resolution beyond the diffraction limit of current systems. This new system combines existing imaging techniques - measuring birefringence, profilometry, confocal microscopy, and spectral microscopy - creating one system that implements the multiple methods simultaneously. This unique combination allows for unparalleled measurement of samples not previously possible while achieving high-resolution 3D imaging, by exceeding the classical diffraction limit using novel opto-mechanical techniques and software to enhance the resolution. This is particularly beneficial in bioimaging applications where samples can be observed with non-destructive optical imaging, keeping the cell alive while measuring the sample with greater clarity and resolution than existing techniques, including internal cell structures. The innovation can also be applied to liquid lens apparatuses for stabilization and reduced imaging aberration.

Technical Details
High-resolution 3D imaging is obtained by interpolating separate images taken of an object on each of its axes. The object is rotated and flipped in 90 degree increments, or the angle of illumination is rotated and flipped to achieve the individual 2D images. The interpolation process is applied to any 3D wave-based imager, including ones using electromagnetic waves and ultrasonic waves. The computational algorithms have been fully developed, tested, and implemented on a prototype device. The range of additional features, including measurement of birefringence, profilometry, confocal microscopy, and spectral microscopy can be combined in the form of a multi-function microscope for comprehensive imaging at high resolution.

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Benefits
• Multi-function microscopy
• High-resolution imaging

Applications
• 3D imaging
• Bioimaging
• Nanotechnology inspection

Tech Fields
Bioimaging, Nanotechnology, Optics and Lasers, Software

Keywords
3D imaging, microscopy, signal processing, birefringence, profilometry, confocal microscopy, spectral microscopy, liquid lens, ultrasonic, biomedical imaging, nanotechnology inspection

If you or your company are interested in this opportunity, Contact:
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