

OPTICAL PHASE RETRIEVAL SYSTEMS USING COLOR-MULTIPLEXED ILLUMINATION

Tech ID: 25799 / UC Case 2016-149-0

PATENT STATUS

Country	Type	Number	Dated	Case
United States Of America	Issued Patent	11,022,731	06/01/2021	2016-149

BRIEF DESCRIPTION

Light is a wave, having both an amplitude and phase. Our eyes and cameras, however, only see real values (i.e. intensity), so cannot measure phase directly. Phase is important, especially in biological imaging, where cells are typically transparent (i.e. invisible) but yet impose phase delays. When we can measure the phase delays, we get back important shape and density maps.

Researchers at the University of California, Berkeley have developed a new method for recovering both phase and amplitude of an arbitrary sample in an optical microscope from a single image, using patterned partially coherent illumination. The hardware requirements are compatible with most modern microscopes via a simple condenser insert, or by replacing the entire illumination pathway with a programmable LED array, providing flexibility, portability, and affordability, while eliminating many of the trade-offs required by other methods. This enables quantitative imaging of phase from a single image, using partially coherent illumination, and in a way that is flexible and amenable to a variety of existing microscopy systems.

SUGGESTED USES

- » Microscopy

ADVANTAGES

- » requires only a single image to recover both amplitude and phase
- » achieves the same phase contrast images as conventional phase microscopies but with minimal hardware requirements
- » cost effective
- » twice the resolution compared to coherent phase retrieval techniques
- » may be used in conjunction with a wide-variety of computational imaging techniques

ADDITIONAL TECHNOLOGIES BY THESE INVENTORS

- ▶ Compressive Plenoptic Imaging
- ▶ Partially Coherent Phase Recovery By Kalman Filtering
- ▶ Hyperspectral Microscopy Using A Phase Mask And Spectral Filter Array

CONTACT

Terri Sale
terri.sale@berkeley.edu
tel: 510-643-4219.



INVENTORS

- » Waller, Laura

OTHER INFORMATION

KEYWORDS

microscopy, LED, imaging, phase contrast

CATEGORIZED AS

- » **Imaging**
- » Medical
- » **Medical**
- » Imaging
- » **Research Tools**
- » Other

RELATED CASES

2016-149-0



University of California, Berkeley Office of Technology Licensing

2150 Shattuck Avenue, Suite 510, Berkeley, CA 94704

Tel: 510.643.7201 | Fax: 510.642.4566

ipira.berkeley.edu/ | otl-feedback@lists.berkeley.edu

© 2016 - 2021, The Regents of the University of California

[Terms of use](#) | [Privacy Notice](#)