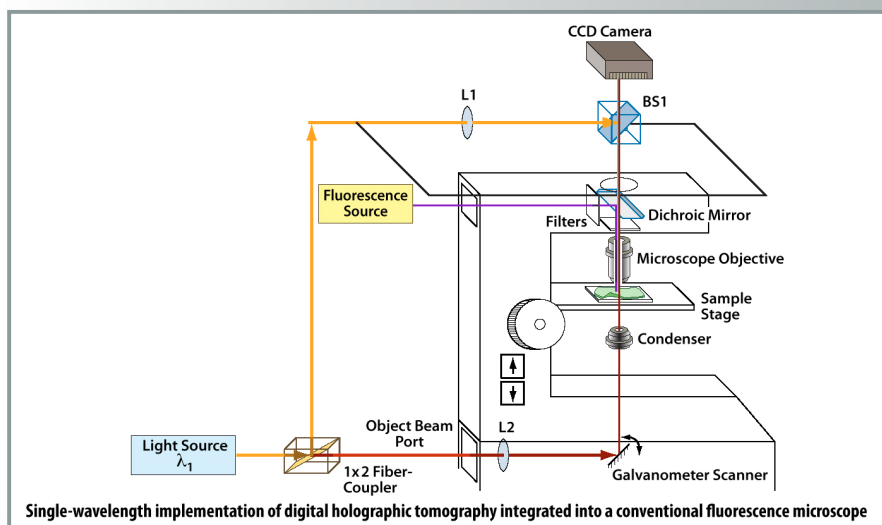


Quantitative Phase Imaging by Digital Holographic Tomography

UT-B ID 200802154



Advantages

- Minimally invasive, real-time study
- Fast image acquisition
- High precision, consistent results
- Decreased experimental and processing complexity

Potential Applications

- Quantitative phase tomographic microscope
- Imaging of live cells
- Measuring internal structures of a specimen
- Can be integrated with epi-fluorescence to identify structures and functional details

Patent

Christopher J. Mann, Phillip R. Bingham, and Shaun Gleason, *Quantitative Phase Imaging by Digital Holographic Tomography*, U.S. Patent Application 12/405,063, filed March 16, 2009.

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Technology Summary

ORNL researchers invented a tomographic microscope that can obtain noninvasive, quantitative information about the 3-D position of structures within a sample. Accurate, full-field measurements of living organisms are useful for diagnostics, treatment, and prevention of disease. This invention can provide these measurements quickly. The microscope can also be integrated with epi-fluorescence for enhanced identification of structures and functional details.

The invention's innovative tomography design is based on digital holography, which uses an object beam rotation instead of physically rotating the sample. It also relies on hierarchical multiple wavelength holography, so that only a single digital image is required at each angle projection through the sample. This single-shot capability dramatically reduces the image acquisition time.

