

PHOT Oral

Quantitative Phase Imaging Upgrade on a Standard Microscope

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Quantitative Phase Imaging (QPI) of cellular samples has been an increasingly popular technique due to its label-free, noninvasive, fast, comprehensible, and quantitative nature [1]. Most commonly, a microscopy setup with phase shifting or slightly off-axis interferometer schemes are constructed to acquire quantitative phase information. Purchasing of a specialized quantitative phase or digital holographic microscopy system may also be another route for researchers interested in QPI. A third approach is to upgrade an existing microscopy system with some optical elements. Numerous approaches have been proposed to realize such an upgrade [2-4]. For some implementations, a region outside of the field of view acts as the reference beam of the interferometer. In others, a duplicate of the object diffracted field is spatially filtered and recombined to form a digital hologram of specific type.

Here it is proposed to implement an off-axis holography layout that utilizes a single wedge prism. A wedge prism covering the half of the exit port of a commercial microscope is directly mounted on this port. A coherent source is attached underneath the trans illumination condenser. The digital camera with the pixel size of 6.5 μ m attached to the microscope is shifted away from the image plane so that an off-axis hologram is formed. Reconstructed holograms are numerically propagated to recover the phase and amplitude images of the sample. An USAF 1951 test target is imaged for the initial performance tests of the systems.

References

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