

Six pack off axis holography (Ramot)

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A method for multiplexing six off-axis holograms into a single multiplexed hologram, where the multiplexing can be done optically or digitally.

BACKGROUND

We present a novel technology, which is able to yield the thickness profile of metrological samples and stain-free biological samples in six times more information contents compared to the state-of-the art, without loss of data. Off-axis holography allows reconstruction of the quantitative phase profile of the sample from a single camera exposure by inducing a small angle between the sample and reference beams, creating the interference pattern of the hologram.

OUR SOLUTION

Prof. Shaked's group has developed a novel technology called six pack off axis holography (6PH), a method for multiplexing six off-axis holograms into a single multiplexed hologram, where the multiplexing can be done optically or digitally.

ADVANTAGES

1. The multiplexing allows optimized usage of the spatial frequency domain by compressing six cross-correlation terms (each containing a different complex wavefront) without overlap and, thus, reconstruction of all of them.
2. 6PH allows a great improvement of the spatial bandwidth consumption of more than 50% compared to the best method previously proposed, and we believe it represents the optimal spatial bandwidth consumption for optical hologram multiplexing.

APPLICATIONS

The multiple wavefronts multiplexed into a single camera exposure can be different fields of view of the sample, different wavelength channels, different angular projections, different z slices, etc. For example, if six sample's fields of view are multiplexed into the single off-axis hologram, it means that the same number of camera pixels can be used to obtain a six-fold improvement in the field of view captured in each camera exposure, allowing more rapid profilometry of extended samples, such as silicon wafers.

INTELLECTUAL PROPERTY

Patent pending

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