**Nanoobjects microscopy**

**New approach of a rapid digital hologram processing during the micro-objects study**

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Digital holographic microscopy (DHM) is a powerful tool for obtaining quantitative and quality information that are important in the study of the transparent and non-transparent micro-objects [1]. In digital holography useful information is obtained by reconstruction of the object wave complex amplitude using either Fourier or Fraunhofer transforms [2]. If the off-axis recording configuration is used for the hologram recording in DHM, then parts of the digital hologram spatial spectrum that contain useful signal will be located at a distance, proportional to the interference angle, from the coordinate center [3]. Then, to reconstruct the object field, one should perform filtration in the frequency domain, with the selection of the proper filtration window that has a significant impact on the quality of the obtained result.

In this work we propose a new algorithm for automatic determination the optimal shape of filtration windows for rapid reconstruction of the object field complex amplitude. The proposed algorithm combines a binary thresholding of the spectrum image with methods of binary objects shape recognition that are used in machine vision systems [4]. The implementation of this algorithm allows determining the coordinates center and size of the useful signal part much more accurately and as a result it possible to process series of digital holograms of various micro-objects obtained under different recording conditions.

The described algorithm allows automation of DHM methods during the study of different micro-objects. It can be used in combination with DHM for several applications, among them: microscopy of living cells, determination of surface roughness in mechanics, study of MEMS technology, and others.

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