Statistical properties of the phase difference in the developed speckle-modulated field and a method for reconstructing the image of an object from the speckle structure of its diffraction field

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Abstract

It has been shown experimentally in this work that the random component of the phase difference in two points of the developed speckle-field has a non-uniform probability density with maximums for the values of 0 and π rad. A method for reconstructing the image of an object from the recorded speckle structure of its coherent diffraction field is described and experimentally implemented. It is proposed to consider the phases of the neighboring speckles to differ by π radians for the purpose of restoring the information about the phase of the diffraction field lost during recording. Such a method can be applied to the objects with the intensity distribution described by the even function of the coordinates.

<u>*Keywords*</u>: speckle-modulated, image, speckle structure, diffraction field, reconstructing image.

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