Principles and Algorithms for Speckle Phase Retrieval

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The main advantage of speckle phase retrieval is the sufficient intensity variation which is essential for a non-stagnating iterative wavefront reconstruction. The method utilizes diffuse illumination of test objects and a reconstruction algorithm based on a wave propagation equation. The first part of the presentation will cover the method's basic principles, step-by-step implementation, as well as some applications in optical metrology. Due to object-related factors and sampling issues especially for smooth test objects, the convergence of the iterative algorithm may still be slowed down. The second part will discuss novel algorithms that maximize the utilization of the available intensity variation. Finally, possible topics for collaboration will be presented.

OCIS codes: (100.5070) Phase Retrieval; (100.3010) Image reconstruction techniques; (030.6140) Speckle; (060.5060) Phase Modulation; (230.1980) Diffusers.

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