Single to Multiple Digital Holograms: Phase analysis and Applications

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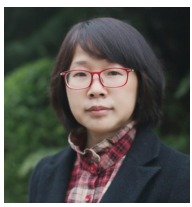
In the wrapped phase map that contains fringes, the target information and the fringes are independent of each other. For different applications, these two types of phase information behave differently, and therefore need specific treatments. In a single hologram, the axial information of the object is the phase, the numerical strategy focuses on eliminating or compensating for aberrations. Phase information is redundant in two or more holograms, in which the fringes contain information about frequency domain error, deformation, or movement. As the number of holograms increases, the phase information changes from undersaturation to supersaturation. Therefore, different countermeasures are needed to separate, quantify, and reverse the phase information. The topic is organized through the number of holograms. For a single hologram (obtained from on-axis/off-axis, static/dynamic or single/dual wavelengths), the topic is focused on the development in fringes as well as aberration separation, elimination, and compensation. For dual- or multi- holograms, we analyzed deformations produced by external excitations encoded by fringes. These regular deformations involve the detection of the physical properties of the substance (superficial, subsurface, and internal defects), motion detection, and calibration. The advantages and limitations of different methods are analyzed. The future direction with regard to phase analysis has also been discussed

Short Bio:



Wenjing Zhou graduated from Shanghai University in China with a doctoral degree. Now she is a professor of the School of Mechatronic Engineering and Automation of Shanghai university, and is deputy director of the Key Laboratory of Silicate Cultural Relics Conservation of Ministry of Education (Shanghai University), the deputy director of the Institute of Precision Mechanical Engineering and Technology at Shanghai University, the director of R&D Center of Precision Optics Engineering at Shanghai University. Her's research activities are focused on digital holography.