One shot profilometry using phase partitions

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Optics and Lasers in Engineering, Vol. 68, 111–120

doi:10.1016/j.optlaseng.2014.12.016

Abstract

Shape measurement using structured light systems involves the difficulty of detecting sharp discontinuities higher than one period of the projected fringe pattern; moreover, phase unwrapping becomes a problem. In this paper, a method to retrieve surface topography trough the projection of a single fringe pattern in gray levels is proposed. The correct phase is unwrapped through the use of Fourier methods and partition functions obtained from the phase. Experimental results show that the method can deal with the projection of high frequency fringes, being limited mainly by the resolution of the projector–detector system.