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理论研究

物光的偏振性对全息记录质量的影响

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摘要 通过对菲涅耳三维漫反射全息记录光路中物光与参考光偏振状态的实验检测，发现线偏振的激光被不同表面材料的物体散射和漫反射后变成“部分偏振光”，几乎所有目标物都有显著的消偏振现象，全息干板上实际记录的是线偏振的参考光与“部分偏振”的物光形成的相干度较低的干涉条纹。物光偏振度的大幅度下降影响干涉条纹的衬比度，并增加全息图的噪声。给出实验方案和检测光路，采用在参考光路中插入1/4波片的方法，可充分利用非偏振物光各个振动方向的光能，提高条纹的衬比度。

关键词 全息图 部分偏振光 非定域条纹 1/4波片

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Influence of polarization of object light on quality of holographic record

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Abstract

By investigating the polarization states of object light and reference light in Fresnel hologram, It is found that the linearly polarized laser becomes “partially polarized light” after it is scattered and diffusely reflected by the objects with different material surfaces. Almost all the targets have obvious depolarization phenomenon, and the coherence degree of interference fringes formed by the linearly polarized reference light and “partially polarized object light”, which is actually recorded on the holographic plate, are lower. The great decrease of object-light polarization degree influences the contrast of interference fringes and the noise of hologram. An experiment scheme and testing beam path are presented in this paper. A 1/4 wave plate was inserted into the reference beam path to make full use of the luminous energy of nonpolarized object light to enhance the contrast of fringes, eliminate the polarization effect of object surfaces and improve the quality of holographic record.

Key words hologram partially polarized light non-localized fringe 1/4 wave plate

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