

## 论文

### 一种改进型视角投影图像彩色计算全息术的三维重构算法

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#### 摘要:

本文提出了一种利用三维景物的二维视角投影图像合成计算全息图,并重构出彩色再现三维影像的方法.该方法基于利用视角投影图像获取景物的三维傅里叶频谱的理论,采用电荷耦合器件记录三维景物在白光照条件下横、纵两正交方向的一系列视角投影图像,并利用这些视角投影图像合成计算全息图,从而重构出三维再现像.通过采用在频谱面上的容余采样方法,提高了图像频谱信息的利用率,通过实验论证,证明了该方法的可行性.利用该方法使得视角投影图像的记录过程更加简单,节省了采样时间,提高了程序运行速度|能够在利用同等数量的视角投影图像的条件下,提高合成全息图的质量,使得重构的彩色再现三维影像更加清晰.

**关键词:** 计算全息 三维重构 三维傅里叶频谱 视角投影图像

### An Improved Algorithm for 3D Reconstruction Based on Color CGHs of 3D Objects Using Multiple Projection View Images

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#### Abstract:

A novel method for the acquisition of full-color three dimensional (3-D) images of real objects was proposed based on multiple projections.In order to improve sampling efficiency,an orthogonal scanning mode was presented,instead of conventional 2-D scanning mode,to capture a series of projection images by a color charge coupled device in both vertically and horizontally direction with an incoherent light source.The 3-D Fourier spectra were extracted by using the projection images.The computer-generated hologram (CGH) was synthesized and the numerical 3-D image was reconstructed.The experimental results show that the acquisition method of multiple projection view images has good performance,high efficiency.Moreover,a new extraction method was adopted to improve viewing quality of 3-D imaging by using the multi-circle sampling area.Comparison with experimental result shows that more available data is used to synthesize the CGH and a significant improvement in image definition.

**Keywords:** Digital holography Three-dimensional reconstruction 3-D Fourier spectra Projection image

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