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Displaying Real 3-D Object Images

Using a Computer-Generated Hologram

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ABSTRACT

The magic of an optical hologram that produced by optical system offer us a never ending sense of wonderment. The images reconstructed from an optical hologram exhibit all of the three dimensional properties with full, rich perspective effects, enabling us to catch sight of an object behind another by mere tilt of the head.

Computer-generated holograms, synthetic holograms and computer holograms are terms used to refer to a class of holograms that are produced as graphical output from a digital computer. It has been reported that a computer-generated hologram can also yield a three dimensional image. The main advantage of the computer-generated hologram is that it can used to generate a three dimensional image of an object that may not physically exist. But can a computer-generated hologram be used as a three dimensional display device?

This thesis examines the ability of a computer-generated hologram as a three dimensional display device. Many techniques have been used to produce computer-generated holograms. Mathematical descriptions of computer-generated holograms are discussed. The quality of the images reconstructed from these computer-generated holograms are examined. The computation time for producing these computer-generated holograms are compared.