

APPLICATION

Holography

Holography is a technology of an "imaging" using optical interference pattern. The interference pattern which is produced by interfering an object beam and reference beam is recorded on a film. And the film is illuminated by the reference light, and then the image in three dimensions is produced. The idea of the holography was first introduced in 1948 but it has become practical reality since 1963 with the advent of the laser.

A general configuration of holographic optics is shown in Figure 1-1. Normally when C.W. laser is used, optics are set on the optical table to avoid vibration.

(1) Production

Laser beam is split into two beams by half mirror. One beam illuminates the object. And the reflection or transmission beam from the object exposes a high resolution photographic film. And the other beam is reflected by a mirror and exposes high resolution photographic film. Those two beams are called "object beam" and "reference beam" respectively. The film can record the intensity of beam but not the phase of beam. So those two beams are interfered to record the phase information, i.e. the interferential pattern is converted into the intensity of beam.

(2) Reproduction

The state of producing the interference beam is shown in Figure 1-2 (a). When hologram is placed at the place where the film is placed in Figure 1-1 and illuminated by the reference beam, the object beam wave is reproduced through the hologram as shown in Figure 1-2 (b). At this time two images of the original are produced, one virtual and the other real, because the diffraction beam has two directions and one becomes divergent beam and the other becomes convergent beam.

APPLICATION

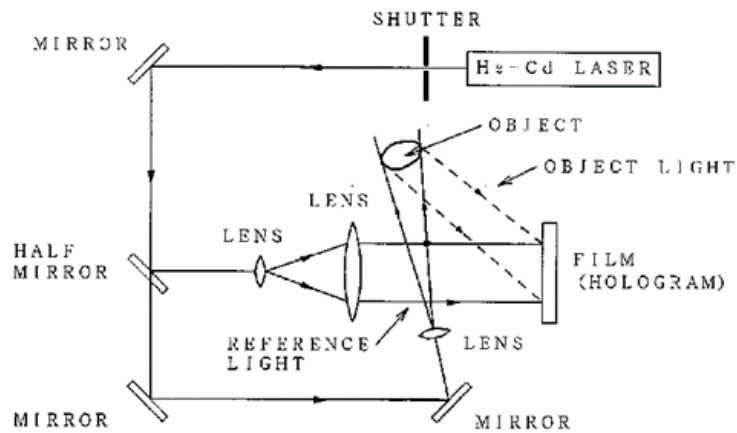


FIG. 1-1 HOLOGRAPHY OPTICS

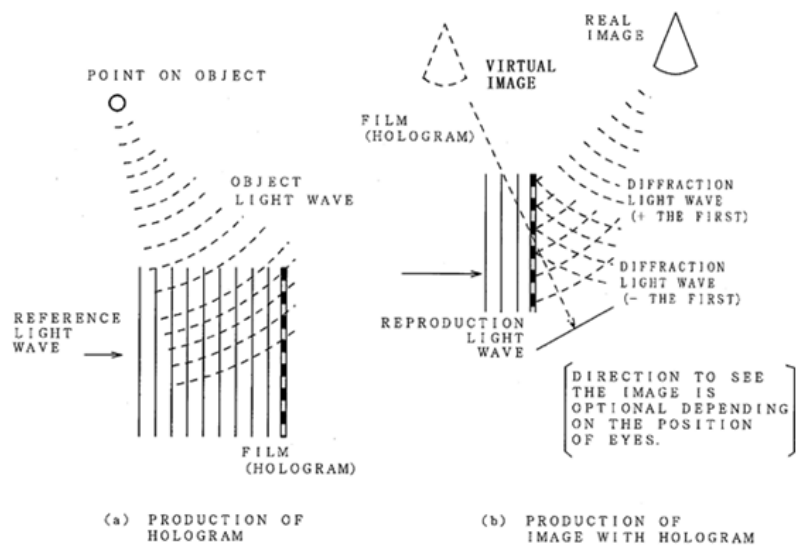


FIG. 1-2 PRINCIPAL OF PRODUCTION OF HOLOGRAM AND IMAGE