电子科技大学
格拉斯哥学院
Glasgow College, UESTC

Physics Experiment 05

Prelab Report

Experiment Title:	Laser Holography
Your Chinese Name:	张立澄
UESTC ID:	2017200602011
Instructor:	Jing Wu
Teaching Assistant:	Hao Wen
Date Performed:	2018.06.11
Final Mark:	

UESTC Student Number:2017200602011 Email:928023250@qq.com Date:2018.5.9

Score

Answers to Questions (20 points)

(1) Optical coherence is related to the stability of phase, that is to say, two waves maintain the same phase, and the same frequency. In general, coherence can be classified into temporal coherence and spatial coherence roughly.

To observe coherence pattern, the following conditions are required:

①The frequency and wavelengths of two waves should be equal;

②The amplitudes of two waves must be equal;

③Make sure every equipment stable as possible;

④Place every equipment in correct position with a suitable angle;

⑤The sources must be close to each other so that we can resolve fringes.

(2) In the double-slit experiment, we use Wavefront Splitting method, that is, when a beam of light is projected onto the boundary surface, it will be divided into two beams, converging and become the coherence with the same frequency.

While in laser holography experiment, the method is using the He-Ne laser to split the light into two separate paths, and then they will reach the medium and create interference which make us obtain two beams.

(3) The biggest difference is that the normal photography only records how the intensity of light change on the surface of the subject, which means only the amplitude of light is recorded. However, the holography records all light field information including amplitude (intensity) and phase, therefore it is called "holographic". Besides, the scene shown in normal photography is two-dimensional, but in holography is three-dimensional which means all sides of the scene can be seen in the holography.

(4) No, the laser used in holography can not be replaced by other light source. Since it should be monochromatic light who has good interference capacity so that coherence can be created, and only the laser can generate monochromatic light.