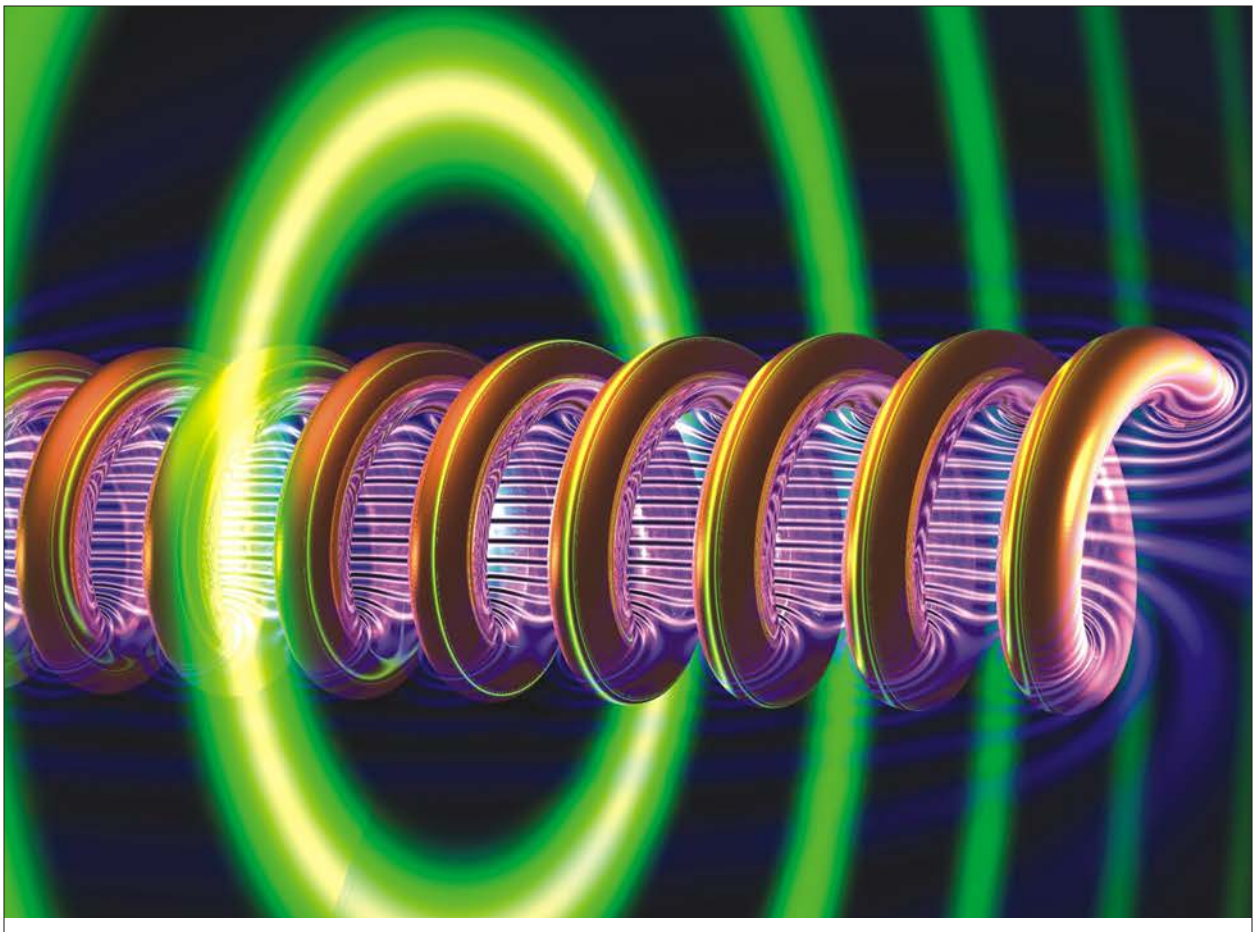

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Short Communication
Current Double-Slit Experiment Proves That There is No Light Interference

Liew Boon Hee

Engineering Council, London, United Kingdom

Abstract
In this study, a double slit experiment was carried out to verify whether there is a light interference, however after carrying out the testing, no light interference on the screen was found. It was due to numerous beams of light from the so-called coherent light source giving a diffraction grating effect pattern on the screen. Unfortunately, the listed reference materials do not match the current finding of "no light interference in a double-slit experiment". That is the reason why this experiment was carried out to prove that the current study findings are correct.

Key words: Double-slit experiment, light, interference, laser, diffraction grating

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Corresponding Author: Liew Boon Hee, Engineering Council, London, United Kingdom Tel: +60197728923

Competing Interest: The author has declared that no competing interest exists.

Data Availability: All relevant data are within the paper and its supporting information files.

INTRODUCTION

In 1801, Thomas Young presented a famous paper to the Royal Society entitled "On the Theory of Light and Color's which describes various interference phenomena. In 1803, he described his famous interference experiment: Young's experiment reflects sunlight (using a steering mirror) through a small hole and splits the thin beam in half using a paper card[1-3].

The author intends to make researchers aware that the lighting or emission sources are more than a ray/point in the double-slit experiment regardless of whether the sources are from the emission of electrons/atoms/molecules, sunlight and laser.

The current double-slit experiment method can prove that there is no light interference during light traveling. The author intends to establish the correct science for the current world through the findings.

MATERIALS AND METHODS

Study duration: This study was carried out in 2023 at the Laboratory in Malaysia.

Experimental procedure

Step 1: To make a coherent light source for the flashlight

Method: Use a single lamp flashlight and place a strip of tape/metal cover to divide the lamp in half, this is the method of how to divide the same source of light into two with the same coherent source. It is also possible to use more strips of tape to divide the same source of light into more lamps as long as it is achievable. Double head flashlight picture as shown in Fig. 1.

Step 2: To eliminate extra spots/ slits on the screen

Method: Please ensure the fabrication of the two slits/holes of the cardboard were with perfect rectangular shapes or round shapes, the distance of the slits/holes is about 1 mm, the width of the slits/diameter of the holes is about 1 mm, the length of the slits can be about or more than 1 mm as long as they are perfect rectangular shapes. Any imperfect slits/holes will lead to unnecessary diffraction and result in extra spots/ slits on the screen.

Proving no light interference method:

- Use a double head flashlight to shine on the double-slits/holes of the cardboard
- Look at the result on the screen: There are 4 spots of light as shown in Fig. 2
- Cover one head of the double head flashlight
- Look at the result on the screen: There are 2 spots of light as shown in Fig. 3

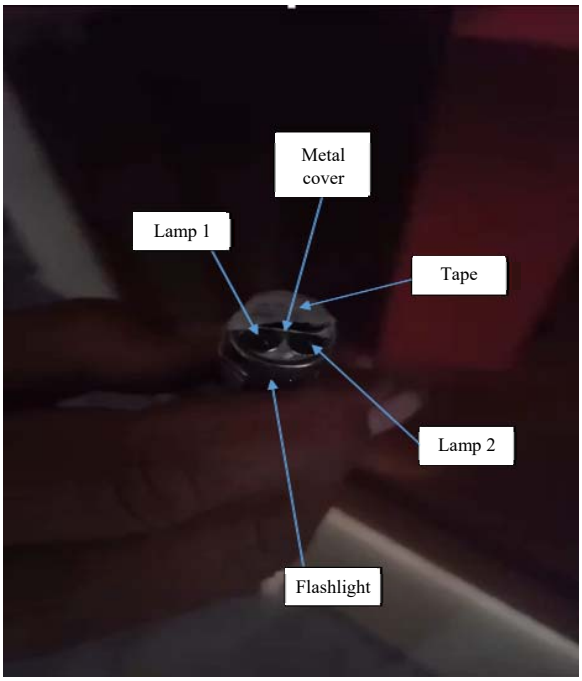


Fig. 1: Double head flashlight

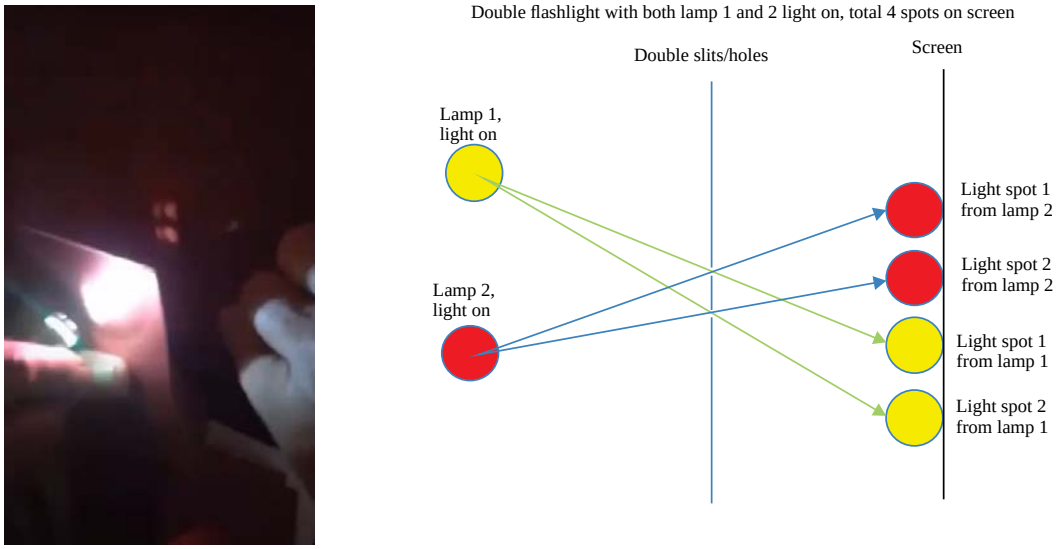


Fig. 2: Double flashlight with two lamp 1 and 2 are light on

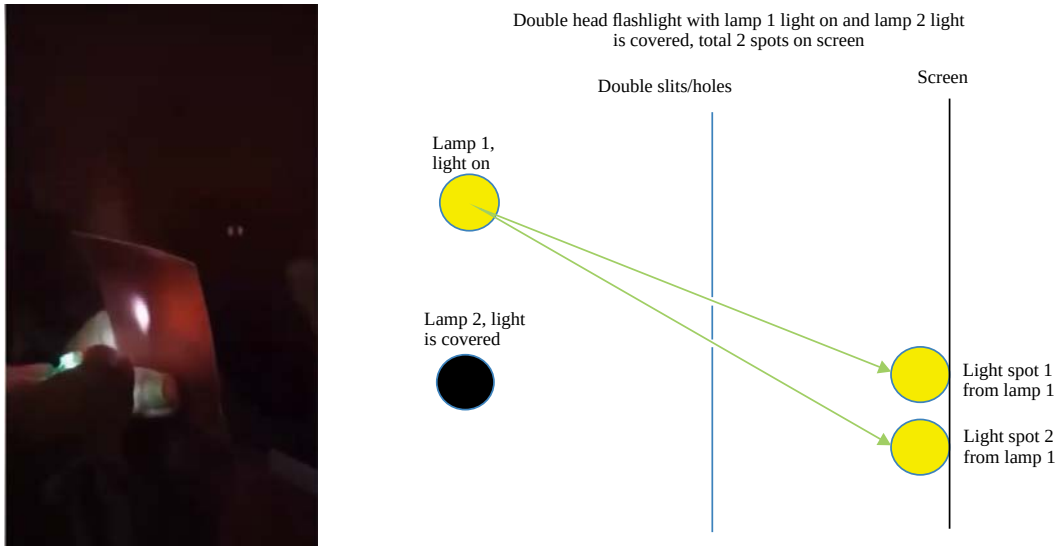


Fig. 3: Double head flashlight with lamp 1 light on and lamp 2 light is covered

RESULTS AND DISCUSSION

Result 1: Hence the experiment proves that there are diffraction grating effect patterns on the screen from two sources of light but there is no light interference pattern.

Proving laser is a bundle of many beams: To prove that a laser is not a single beam, but is made up of a bundle of many beams.

Methods:

- Slantingly shine the laser on the screen as shown in Fig. 4 many beams in the laser bundle can be observed
- Shine the laser to a magnifying glass and look at the light spots/rings on the screen, a bundle of laser spots/rings on the screen can be observed. No light interference pattern is observed due to the bundle of laser beams too, as shown in Fig. 5

Fig. 4: Many beams in the laser bundle can be observed

Fig. 5: Bundle of laser spots/rings on the screen can be observed

- Or slantingly shine the "bundle of laser beams" onto a wall and look at the reflection beams on the floor. Many light spots/rings on the floor can be observed, as shown in Fig. 6

Result 2: Laser is not a single beam; it is a bundle of many beams: By using a laser instead of a flashlight then many light spots can be seen due to the diffraction gratings effect of double-slit from a bundle of beams of the laser. This is to explain why there is no light interference in double slit experiment, as shown in Fig. 7.

Result 3: No light interference for light sources from far distance: Light sources from far distance also do not interfere with each other no light interference pattern is observed, as shown in Fig. 8.

Based on the extension of Einstein's equation to these systems is given by:

$$E_{rel}^2 - |p|^2 c^2 = m_0^2 c^4$$

$$E_{rel}^2 - (pc)^2 = (m_0 c^2)^2$$

or:

$$E_{rel} = \sqrt{(m_0 c^2)^2 + (pc)^2}$$

When a particle travels at the speed of light, mass is negligible. There is no chance for light to have interference. Light behaves like a particle when it is stopped completely, light gains mass (less than the original mass) immediately due to zero speed. A good example is when light touches the screen, a light spot on the screen can be observed.

Result 4: Diffraction from individual particles: Based on the experiment from Wikipedia, double-slit experiment[4], involves single-particle detection[5-8]. Sending coherent particles through a double-slit apparatus one at a time results in single particles being detected as white dots on the screen, a diffraction pattern emerges when these particles are allowed to build up one by one.

Reason: The source of producing particles has many points of emission. The point of emission is extremely small compared with the source. Hence each emission of particle is at a different point. This has resulted from many emission points giving different angles of diffraction and gradually forming a diffraction grating effect pattern. No light interference pattern is observed. Do not get into confusion between the light interference pattern and the diffraction grating effect pattern, as shown in Fig. 9.

Result 5: The uncertainty principle, also known as Heisenberg's indeterminacy principle does not apply to light interference patterns in double slit experiment[9].

Reason: There is no light interference pattern in a double slit experiment, uncertainty principle (Heisenberg's indeterminacy principle) does not apply to something that does not exist.

Result 6: How to measure light wavelength if there is no light interference pattern?

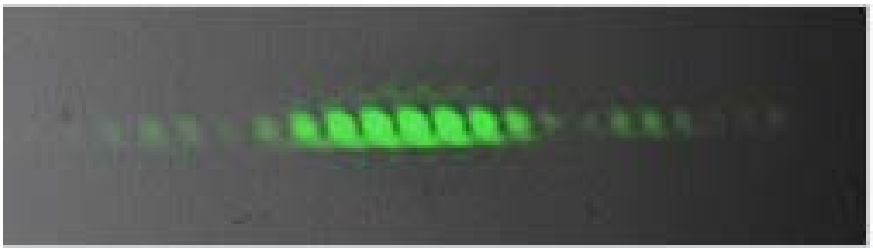
Unfortunately, the current diffraction grating effect method is the incorrect way to measure light wavelength due to no light interference pattern for measurement. It is an incorrect method to use an optical spectrometer, interferometer[10-14] or wavelength meter in the market as they are also using diffraction grating effect patterns or using a bundle of laser beams for reference. Hence it is also incorrect to use an interferometer to measure the speed of light.

So what is right?

We need an international body to standardize the diffraction grating effect equipment and method since there is no light interference pattern for reference.

A good example of standardization by the international body is Avogadro's number.

Fig. 6: Reflection of many light spots/rings on the floor can be observed from a bundle of laser beams



Light from a green laser passing through two slits 0.4 mm wide and 0.1 mm apart

Fig. 7: Picture extracted from Wikipedia, double-slit experiment [4], many light spots can be seen due to diffraction gratings effect of double-slit from a bundle of beams of the laser

Fig. 8: Light sources from far distance do not interfere with each other

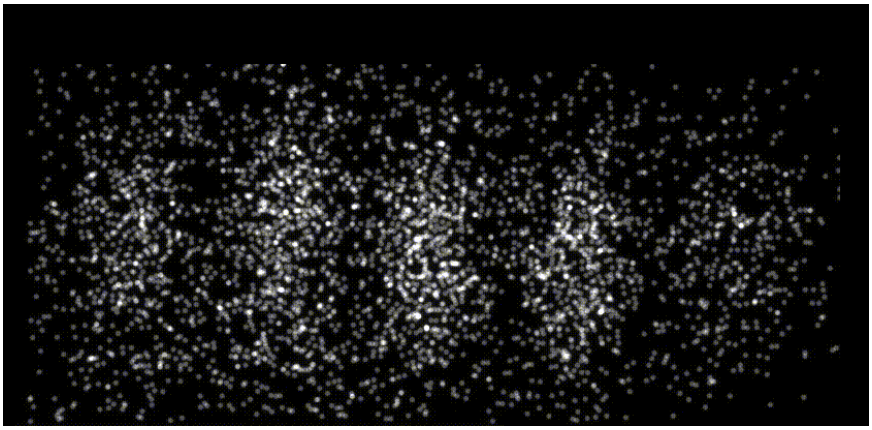


Fig. 9: Many emission points to give different angles of diffraction and gradually forming diffraction grating effect pattern

CONCLUSION

Since light is massless during traveling, it means nothing to hit/interfere against/with each other. Based on findings from the current double-slit experiment, it concludes that there is no light interference during light traveling. This analysis provides a future perspective on no light interference during light traveling affects quantum mechanics concept.

SIGNIFICANCE STATEMENT

This research paper proves that Thomas Young had misinterpreted the light diffraction grating pattern effect as light interference phenomenon. Based on the current finding, Thomas Young had neglected that there were more than 2 rays of light introduced from surroundings by using sunlight reflections and steering mirrors. In fact, double-slit experiment does not show light interference pattern. Numerous beams of light give a diffraction grating effect pattern on the screen.

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