The fringes of the double-slit experiment with changes in brightness and darkness

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Abstract:

We have always been using the theory of coherent waves to explain the double-slit experiment. Recently, I conducted an experiment with a redesigned double slit and obtained an unexpected result. By simultaneously and symmetrically adjusting the widths of the left and right slits and observing the fringes in the double-slit experiment, I noticed that as the slits gradually narrowed, the brightness of the fringes in the double-slit experiment underwent an uneven change with the middle part gradually getting darker and the two sides gradually getting brighter. This is very difficult to explain using the traditional theory of coherent waves.

Key- words: brightness、gravitation、light quantum、

Introduction:

The double slits used in the double-slit experiments we are conducting at the present stage can be classified into two types according to whether they are movable or not. One type is the double-slit experiment designed by Thomas Young. In this experiment, the widths of the double slits are fixed, and the spacing between the formed fringes is also fixed[1-4]. The other type is the double-slit experiment designed by Feynman. There is a baffle on the back of the double slits. This baffle can be moved left and right, resulting in an asymmetrical spacing between the fringes on the left and right[5-9].

Methods:

Based on these two ways of conducting the double-slit experiment, I made improvements to the double slits. A set of reduction gears drives a two-way screw to control the left and right baffles of the double slits, enabling the left and right slits to be simultaneously and symmetrically narrowed or widened. An independent filament is placed in the middle of the left and right baffles, and together with the baffles, they form the double slits. The width of the double slits can be randomly controlled between 0 mm and 10 mm (Figure 1). The dynamic change process of the fringes can be observed[10].

Results:

Through the experiment, I found that the fringes in the double-slit experiment are the result of the local magnification of the center of the diffraction fringes formed by a single filament by the left and right baffles. Moreover, when the double slits are narrowed from wide to narrow, I noticed that the central fringes of the double-slit experiment fringes gradually darken, while the fringes on both sides gradually brighten. Conversely, when the slits are gradually widened, the fringes on both sides gradually darken and the central fringes gradually brighten (Figure 2).

Discussion:

According to the theory of coherent waves, the secondary waves emitted from the left and right slits will form constructive and destructive interference between the double slits and the light screen. When the secondary waves spread around, they are uniform, and the brightness of the fringes should become brighter or darker as a whole with the change of the slit width (Figure 3). However, the experimental results are completely different from the inferences. This is an exciting and unexpected discovery.

It can be seen from the experimental results that when the slits are narrowed, the fringes at point B on both sides gradually brighten, while the fringes at point A in the middle gradually darken, and eventually form the double-slit experiment fringes with similar brightness among each fringe. Conversely, when the slits are enlarged, point A gradually brightens and point B gradually darkens. The brightness of the fringes changes unevenly with the change of the slits (Figure 4).

This phenomenon is difficult to explain using the traditional theory of coherent waves. On the contrary, it can be well explained by the particle theory. The double-slit experiment is a kind of gravitational experiment. The formation of alternating bright and dark fringes is the result of the changes in the gravitational forces exerted on photons by the left and right baffles and the filament of the double slits. Photons exist in discrete packets. The decrease in brightness is due to the reduction in the number of photons. When the baffles move closer to the center, the gravitational force exerted by the baffles on the photons increases, while the gravitational force exerted by the filament on the photons relatively decreases. Photons are pulled to the sides by the baffles one by one, causing the fringes at the center A to darken and the fringes at the two sides B to brighten (Figure 5). Conversely, when the slits gradually widen, the gravitational force exerted by the baffles on the photons weakens, while the gravitational force exerted by the filament on the photons relatively increases, resulting in the photons being pulled towards the center.

Summary:

By symmetrically adjusting the size of the double slits, I observed that the fringes in the double-slit experiment exhibited uneven changes in brightness. This phenomenon is difficult to explain using the current theory of coherent waves. However, introducing the concept of light quanta can well account for it. When the left and right baffles move closer to the center, the gravitational force on photons is increased, pulling the photons one by one to the sides and onto the next fringe, causing the central fringe to darken and the fringes on both sides to gradually brighten. The theory of coherent waves was proposed before Planck's quantization theory. As the quantization of microscopic matter has been confirmed by more and more experiments, the quantization theory has been widely recognized. It is urgent to abandon the current theory of coherent waves for the double-slit experiment.

Commitment：

The author pledges that this paper was completed independently by the author alone and is not subject to any form of dispute with others.
Data Availability Statement
The data used and/or analyzed during the current study are included within the article.

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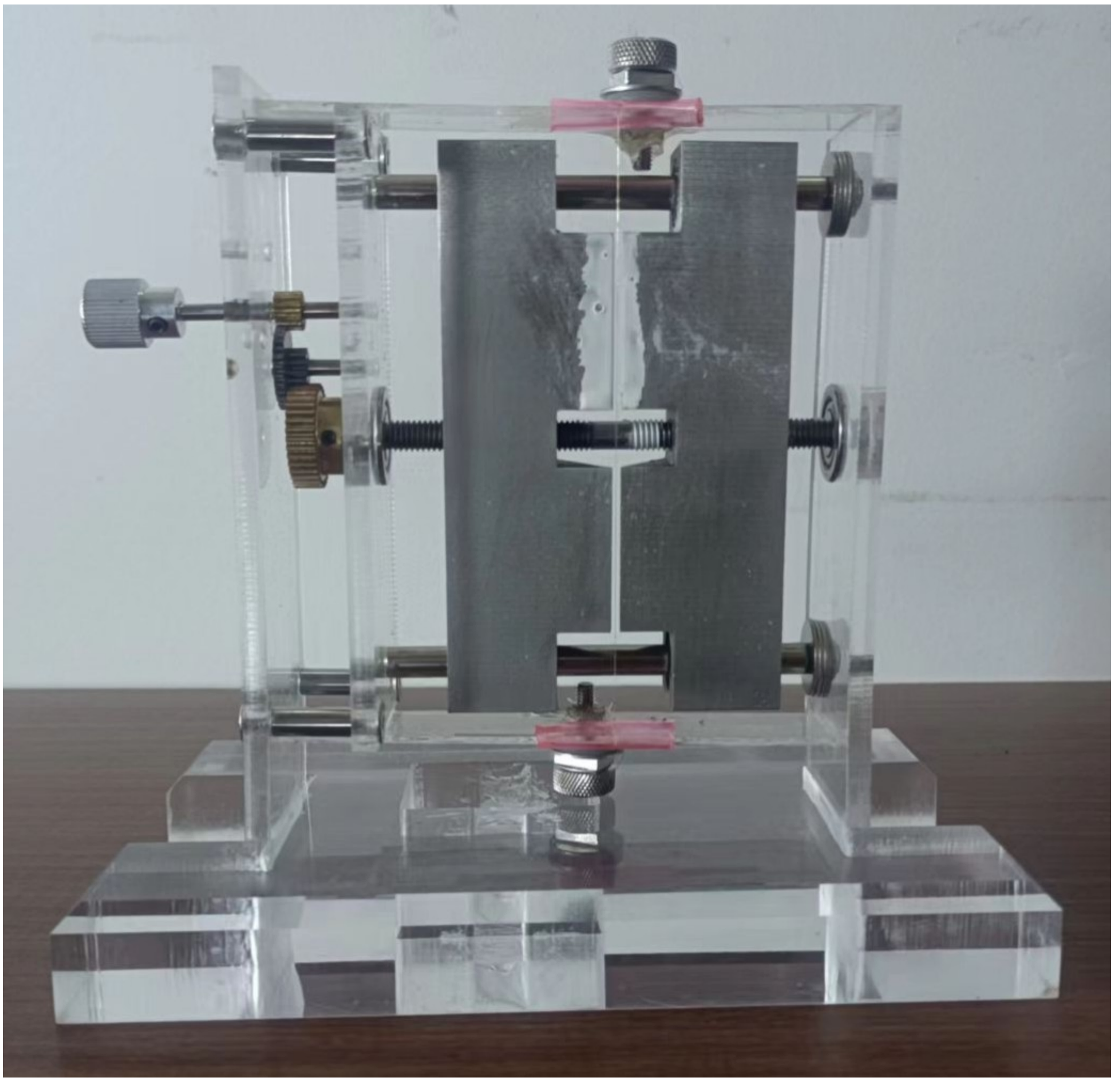
Figure 1

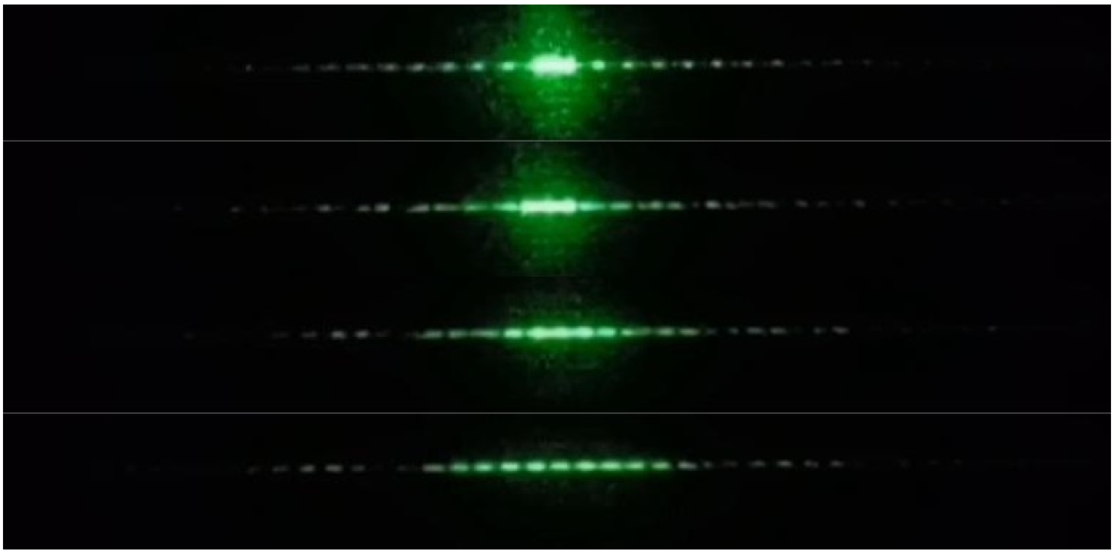

Figure 2

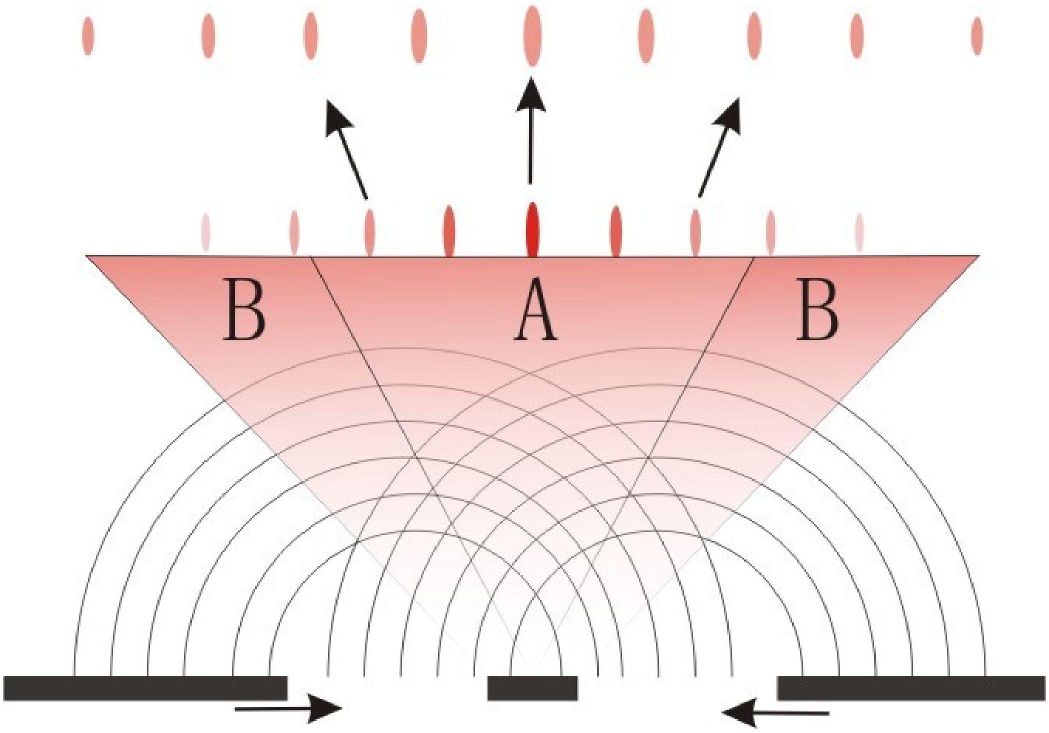

Figure 3: According to the theory of coherent waves, when the secondary waves propagate forward, they should spread uniformly, and the brightness of the fringes at points A and B should be uniform.

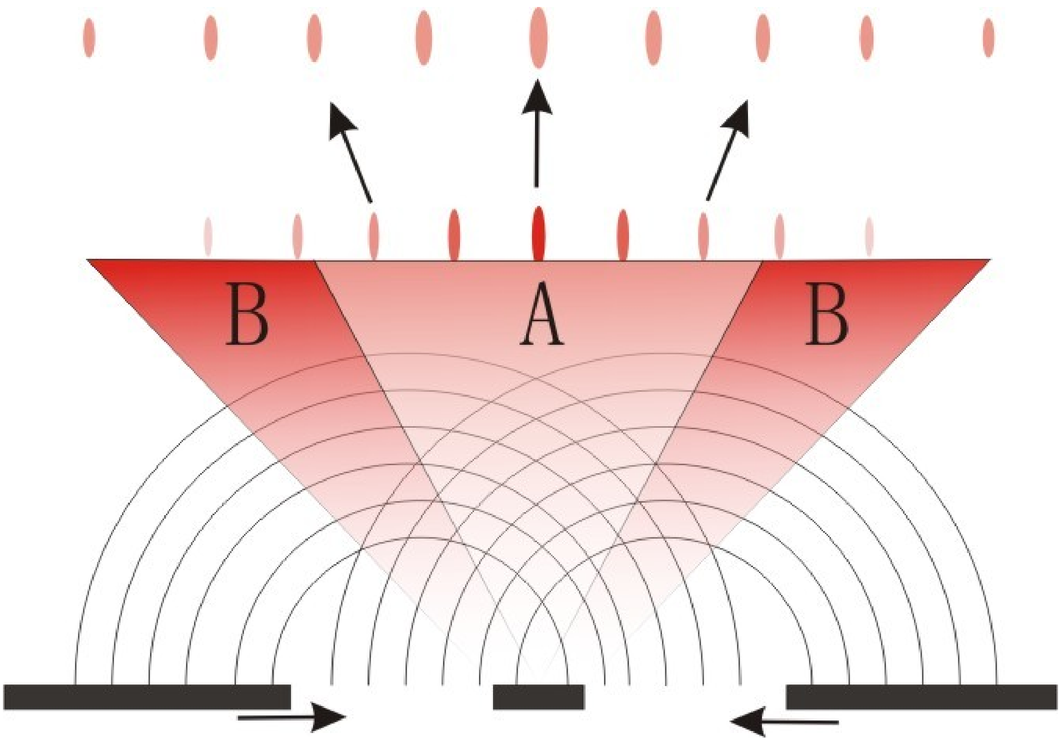

Figure 4: The experimental result shows that point A gradually darkens while points B on both sides gradually brighten, with the brightness showing an uneven change.

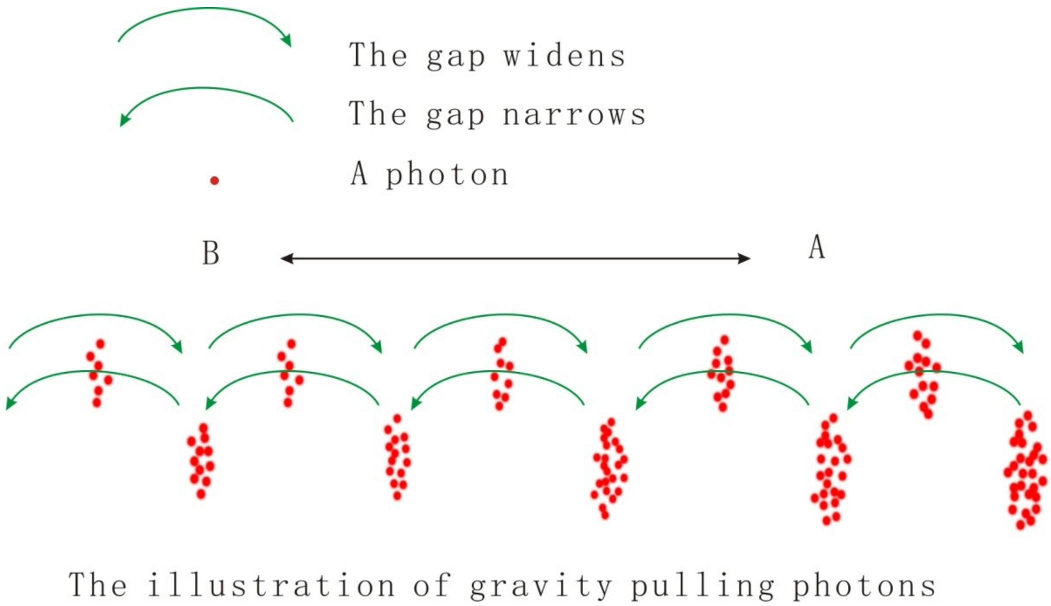

Figure 5: When the width of the double slits is narrowed, photons are pulled towards the outer fringes; when the width of the double slits is enlarged, photons are pulled towards the inner fringes.

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