

The Conclusion of the Double-Slit Interference Test Violates the Fundamental Rules of Quantum

Xia Ruhuai (✉ 2969169228@qq.com)

Research Article

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Abstract

The theory of light waves contains a number of errors that violate a fundamental principle of physics: photons can be subdivided indefinitely. Photons can multiply indefinitely. If the phase is shifted π , the electromagnetic, light, or matter waves become negative electromagnetic, negative light, or antimatter waves, respectively, which cancel themselves out. The wavelet sources of light waves are of unknown origin. Photons can be regenerated and reused. The conditions for light waves to interfere do not take into account the effect of polarization direction. The effect of the reflected wave is not represented in the interference fringe. The weak transmittance of the double-slit device will not stand up to close scientific scrutiny. Masks similar to double slit devices do not allow the lithography machine to function properly if the light waves interfere. The pattern of fringe deduced by mathematical model is different from that of double slit interference test. Light waves without bandwidth cannot be accommodated by the theory of electromagnetic waves.

The physics of light waves contradicts the principle of the Fourier transform. The spectrum of electromagnetic waves modulated by the transmitted information must produce modulation effect, but this effect does not occur in optical fiber communication. Because the size is much smaller than the wavelength, the photon is sampled equivalent to the light wave, but the corresponding physical properties are not represented by the photon. The wave-particle duality is incompatible with the Doppler principle. To sum up, the conclusion that light waves interfere with each other to produce fringes in the results of double-slit interference test is reached under the condition that most of the physical properties of waves are stripped away, and this conclusion is divorced from objectivity. The theory of light waves is not correct. In any case, light is not a wave. Light waves are misunderstood.

1. The Conclusion Of The Double-slit Interference Experiment Allows The Quantum To Be Divided And Multiplied Indefinitely

As shown in Fig. 1, the two slits on the double-slit test device are SL and SR. A light wave passing through a certain slit is named L_A , and the wave group of n light waves passing through another slit in chronological order is named L_B . where the value n is an uncapped positive integer. According to the principle that light waves from different slits must interfere with each other, each light wave L_A interferes with each light wave in a group of light waves L_B containing n light waves, and L_A and L_B produce n interference points, which form streaks on the screen. From this, the following conclusions can be deduced:

Each light wave L_A from one slit can generate n interference points with wave group L_B of n light waves from another slit.

If the light wave L_A is a wave group of m light waves passing through the slit in the time sequence, then the number of interference points generated is the product $m n$.

A single light wave L_A can interfere with each member of the L_B containing any number of light waves; that is, each photon L_A can be subdivided into any number of parts. Two subdivisions of light waves from different slits can interfere, and a new photon can be born at the interference point.

Each quantum can interfere with an infinite number of quanta from another slit and cause a single quantum to be multiplied into an infinite number of quanta.

As shown in Figure 1, the bulge of the light wave always precedes its interference region, i.e., . The head of the light wave always precedes its interference region to reach the screen. When the bulge of the light wave reaches the screen, it is imprinted with the label of the photon, indicating that it has been used by the screen. At the moment that the distance from the screen to the top of the interference point still has a distance, the distance is proportional to $|G|$. According to the conclusion of the double-slit interference test, the following inferences can be derived: the light wave without the head can still produce interference phenomenon; The head of the light consumed by the screen is only part of the light wave, not the whole light wave. This obviously contradicts the fundamental principle of quantum mechanics, that a light wave without a head cannot have a remainder and that it cannot use the remainder of a light wave to interfere with an infinite number of waves coming from another slit. Even light waves, because quanta are indivisible, have to collapse as a whole when they reach the screen. Therefore, the conclusion that light is a wave is incorrect.

2. Superposition Of Matter And Antimatter

Without loss of generality, the mathematical expression of the light wave can be set as $A\sin(\omega t + \theta_0)$, where A is the amplitude; $\omega = 2\pi f$, f is the frequency; t is time; θ_0 is the initial phase. Delay or advance π of the phase of the light wave, and the mathematical expression of the light wave becomes $A\sin(\omega t + \theta_0 + (2k \pm 1)\pi)$, where k is an arbitrary integer. Because:

$$A\sin(\omega t + \theta_0) + A\sin(\omega t + \theta_0 + (2k \pm 1)\pi) = 0 \quad (\text{for arbitrary integer } k) \quad (2)$$

So these two light waves are opposite each other. In engineering, it is easy to verify the correctness of expression (2) because the two light waves cancel each other, and the result is 0. In other words, the polarity of light waves can be interchangeable. According to mathematical models, they switch roles every half a cycle, and the role of light waves fluctuates over time between positive and negative light waves. Obviously, this applies not only to light waves but also to any matter wave, meaning that any matter is always periodically switching between matter and antimatter. Of course, this is not at all true! Getting antimatter can't be that simple!

3. The Results Of The Double-slit Interference Test Do Not Agree With The Conclusions Of The Mathematical Derivation Quoted

The mathematical model of the interference principle shown in Fig. 1 is inconsistent with the actual results of the double-slit test shown in Fig. 2(a). According to geometrical principles, double-slit interference can only produce a dark streak in the center of the two wave faces. The most obvious dark stripe in Fig. 1 is only one between the two target points TS and TR; however, according to the test results in Fig. 2(a), the center of the stripe is not the dark stripe but the brightest part of all stripes. The position of the dark stripe in the test results in Fig. 2(a) is not the position indicated in Fig. 1.

By comparing the interference results of the water wave, the bright fringe corresponds to the peak of the water wave fringe, and the dark fringe corresponds to the trough of the water wave fringe. With the transmission of water waves, the width of the peak fringe is almost constant, and the width of the trough fringe expands rapidly. In contrast, the experiment shows that with increasing distance Y , the width E of the bright fringe expands rapidly, while the width e of the dark fringe remains almost the same. When it is far enough away from Y , the width of the bright stripes E is much larger than that of the dark stripes e . However, given the spacing between the light waves, there is no mechanism for forming fringes in the interference schematic, and in particular, the dark fringes are purely nonexistent. The width of the bright and dark stripes is equal to that of the dark stripes, even if stripes can be generated in the small angle range of the front.

As shown in Fig. 3, when the attitude of double-slit device S_2 is rotated from Z_0 to Z_1 , the fringes of the double-slit test do not change.

4. The Medium Has Opposite Physical Effects On Light And Waves.

Without the need for any medium, including the aether, light can travel as fast as it can to infinity in an absolute vacuum with no matter at all. Any matter it encounters is an obstacle to the transmission of light. Although it is allowed to propagate in it, any transparent medium reduces not only the speed of light but also the distance it travels. The mass density of transparent medium is closely related to the allowable speed and distance of light propagation. The greater the mass density is, the slower the speed of light and the shorter the propagation distance in the medium. The smaller the mass density is, the faster the speed of light and the longer the propagation distance in the medium.

Mechanical waves can only travel through the medium, which is an indispensable condition, not an obstacle, to the propagation of mechanical waves. In general, the material density of the medium is closely related to the velocity and travel distance of the mechanical wave, but the relationship is the opposite of that of the light wave. The larger the mass density of the medium is, the faster the wave velocity of the mechanical wave propagated is and the longer the transmission distance is; conversely, the smaller the mass density of the medium is, the slower the wave velocity of the mechanical wave propagated is and the closer the transmission distance is.

Light travels at vastly different speeds in media with different mass densities. However, electromagnetic waves are thought to travel at the same speed whether they travel in a vacuum or in a conductor. Far infrared, for example, is a wave of light whose frequency is similar to that of high-frequency electromagnetic waves but whose physical properties are very different. In conductors, electromagnetic waves travel at the speed of light, and infrared rays travel very slowly.

5. The Probability Of Interference Is Negligible If The Polarization Property Is Considered

As shown in Fig. 2(a), the arrangement direction of fringe L_a in the double-slit interference test results is always perpendicular to the midline L_m of the double slit. This indicates that if the cause of fringe formation is explained as wave interference, the conclusion can only be drawn, which is different from that of the double-slit interference test:

5.1.1 Only light components with polarization directions perpendicular to the two-slit midline L_m were involved in the interference.

5.1.2 Light waves from different slits do not interfere with each other but with the wall of the slit through which they pass.

The vibration direction of a shear wave lies on the normal plane S of its propagation direction. The direction of water wave vibration is only perpendicular to the center of the earth; that is, the direction of water wave vibration is one-dimensional. Different from water waves, as shown in Fig. 6, the polarization direction of light covers plane S ; that is, the polarization direction of light has two spatial dimensions. The polarization angle α of a particular photon is a probability distribution, and α has more than two special orthogonal angle values of 0 and $\pi/2$. For example, because the horizontal direction of different points on the Earth's surface is different relative to the sun, the horizontal direction described does not have an absolute reference frame. The average polarization angle α is distributed in the range of $0 \sim \pi$. Because a beam contains photons of all polarization directions, a beam such as sunlight has no particular direction of polarization. The conditions for the interference of two light waves include not only:

5.2.1 The frequency of both waves must be the same;

5.2.2 The phase difference between the two waves must be constant;

5.2.3 The phase difference between the two waves must be constant;

Therefore, the conditions required for light waves to interfere are much more difficult than for water waves. For example, to watch a three-dimensional film, two visual signals, one horizontal and one vertical, are projected on the screen at the same time, but the two signals do not interfere with each other. Polarization glasses can correctly separate clear light signals. Therefore, for two light waves to interfere, the direction of polarization must be satisfied.

6. The Common Reflection Phenomenon Does Not Support The Light Wave Theory

Objects can be seen because they reflect light. A screen is a visible object that is not very reflective, so it can only reflect light to a certain extent. The reflected light wave must have the same physical properties as the incident light wave; that is, the reflected light wave can also produce interference phenomena. It is clear that reflected light would have produced a significant interference effect (see figure), but the results show that this effect did not occur.

7. Various Theories Of Light Waves Contradict Each Other, And The Source Of The Sublight Source Is Unknown

As shown in the figure above, above the interface is medium A, the speed of light is V_A , and the wavelength is λ_A . Below the interface is medium B, the speed of light is V_B , and the wavelength is λ_B . The index of refraction is just the ratio of wavelengths. According to Huygens' principle, the causes of refraction are light waves. Different speeds of light in different media result in different wavelengths of light waves. The medium includes a vacuum, and the principle states that light is a wave before or after refraction.

According to the principle of wave interference, only the wave generated in the subwave source from the same wave source can satisfy the condition of interference. Fig. 3, According to Thomas Yang, a light wave passing through gap a on single-slit device S1 and then passing through gaps b and c on double-slit device S2 becomes two coherent light waves, which interfere with each other to produce fringes in the double-slit test results. That is, light is always a wave, whether in front or behind a double-slit device.

According to the principle of Doppler, the wavelength of the closed source is shortened, forming the phenomenon of blueshifting; the faster the wavelength is shortened, the slower the wavelength is shortened less. The wavelength of the departing source is stretched, resulting in a redshift; the faster the wavelength is stretched, the slower the wavelength is stretched less. The color of the stars in the binary system does not change at all whether they are near or away from Earth, leading to the conclusion that the speed of light is constant and independent of the reference frame. Because the farther away an object is from the Earth, the more redshifted it is and hence Hubble's Law. The common requirement of these two laws is that light must be a wave.

In the "double-slit interference test", if no observation is introduced, the test results are multiple "interference" fringes with light and dark alternations; otherwise, if observations are introduced, the test results will be fringes of the same shape as the slits of the double-slit device. According to Einstein, light is both a particle and a wave, a state known as wave-particle duality, and the state of light passing through a slit in a double-slit device is the superposition of a particle and a wave. Obviously, this conclusion contradicts the foregoing conclusion.

The medium for water wave propagation is fluid. If there is no obstacle, the wave will propagate smoothly in the medium. Otherwise, when the water wave encounters a hard enough obstacle, its normal propagation path will be blocked, and a new subwave source will be generated at the obstacle in the medium. Since the energy of the water wave is evenly distributed on the wave front, the water wave after encountering an obstacle will form a subwave source with the same frequency, wavelength and wave speed as the source but with a phase difference of π and produce reflected waves. The water wave generated by the subwave source can pass through the gap, and the water wave from different subwave sources can interfere at the intersection. Note that the energy of the water wave is propagated by the medium water. When the normal propagation path is blocked, the water wave is converted to the subwave source to satisfy the energy conservation law. In other words, the double-slit interference of water waves completely obeys the relevant physical laws.

The propagation of light requires no medium. The light source is the radiation phenomenon during the transition of the electronic energy level. The physical properties of light irradiated by different substances are different. In reality, there is no test to support the formation of a new sublight source in the slit, and the origin of the sublight source is unknown. The reasons include: 1. Because the double-slit test can be completed in a vacuum environment where there is nothing in the slit, there is no material needed to generate radiation in the slit, so the sublight source is created out of nothing. 2: Because different substances radiate light with different physical properties, the sublight source in the slit cannot radiate the same light wave as the light source. 3. Since all light sources start from the light source to diffuse around, if a new light wave is generated at the slit, the light wave cannot propagate in the same direction as the light source without any other direction.

8. The Ability Of Double-slit Devices To Transmit Light Waves Is Too Weak

If light is a wave, it must be able to pass through at least one slit, whether it is aimed or not. However, the experimental results show that the intensity of incident light is much greater than that of the transmitted fringe of the double-slit device, and the light reflected by the double-slit device is much greater than that transmitted by the double-slit device. Thus, only a small amount of light in the experiment managed to pass through the slit. They were just the light that passed through the slit in its moving path. Most other light rays cannot pass through the double-slit device because they are not aimed at any slit and can only be reflected or absorbed by it.

As shown in Fig. 2(a), the arrangement direction of the fringes in the double-slit interference test results, L_a , is always perpendicular to the midline L_m of the double slit. This indicates that the cause of striation is closely related to the slit wall.

9. The Lithography Machine Will Not Work Properly If The Light Waves Passing Through The Slit Interfere With Each Other.

Both double-slit devices and masks have similar optical properties in their slits. According to the conclusion of the double-slit interference test, the light waves interfere with each other to produce fringes, then the mask will inevitably produce countless interference fringes due to the numerous slits, and it will be impossible for the lithography machine to reduce the patterns on the mask to the wafer clearly.

10. Light Waves Can Explain The Speed Of Light In Different Media But Not The Distance Traveled

In this picture, L1 and L3 have the same speed of light, they're both the speed of light in air; The speed of light in L2 is the speed of light in glass, which is lower than the speed of light in air.

The mass density of glass is higher than that of air. When light enters glass from air, the speed of light changes from high speed to low speed, and when light enters air from glass, the speed of light changes from low speed to high speed. According to the theory of light waves, the wavelength jumps in proportion to the speed of light.

Another more scientific explanation is that since the energy of a photon is a quantum state, the energy of the quantum state is indivisible and independent of the velocity. According to formula (1), the energy of the quantum state is determined by the frequency. The energy of the photons is the same constant regardless of which medium they are in, so the denser the glass is, the slower the light travels.

Although a photon's energy cannot be partially consumed, it can be wiped out altogether. As the distance the photons travel in the medium increases, once the energy consumed reaches a threshold, the photons will be wiped out as a whole. As long as the distance traveled is long enough, all the photons will be wiped out en masse. The slower the speed of light in the medium, the faster the energy of the photons is consumed, so the distance the light travels is shorter. The faster the speed of light in the medium, the slower the energy of the photons is consumed, so the longer the distance the light travels. As light moves from a less dense medium to a denser medium, it decreases the speed of light. As light moves from a denser medium to a less dense medium, it increases the speed of light.

11. Different Factors Determine Energy

The factor determining the energy of electromagnetic waves is the amplitude, which has nothing to do with the frequency or wavelength, and because the amplitude is adjustable or limited, the energy of electromagnetic waves is adjustable. The amplitude of the electromagnetic wave can be partially cut off, which will generate an additional spectrum. Quantum theory holds that the energy of quantum is determined by the frequency; it cannot be separated, and it can only be absorbed as a whole or remain unchanged. Therefore, its frequency cannot be changed during quantum existence; otherwise, it is another quantum.

12. The Modulation Effect Is Not Presented By Optical Fiber Communication Technology

In optical fiber communications, the transmitted digital signal has a spectrum base band whose bandwidth is proportional to the communication rate. Theoretically, the spectrum bandwidth of the digital signal is infinite. If light is a wave, it is a carrier.

Without loss of generality, let the carrier be $\sin(\omega_c t)$ and the digital signal be $\cos(\omega_s t)$. Then, ω_c is a single-frequency constant, and ω_s is not a single-frequency constant but a range. The modulation results:

$$s(t) = \sin(\omega_c t) \cos(\omega_s t) = [\sin(\omega_c + \omega_s)t + \sin(\omega_c - \omega_s)t] / 2 \quad (3)$$

The resulting spectrum is a conjugate spectrum of $\omega_c + \omega_s$ and $\omega_c - \omega_s$ centered on the carrier frequency ω_c . This means that the frequency of the photon is changed from one to two conjugated spectra of the same width as the base band of the signal. Since photons of different frequencies are different photons, modulation changes photons of one frequency into a series of photons of different frequencies. This obviously violates the fundamental principles of quantum mechanics, and in fact, it does not happen in fiber-optic communications. Moreover, the spectrum in the baseband is continuous, but not every frequency spectrum exists.

13. The Principle Of Fourier Transform Does Not Agree With Light Waves

Quantum mechanics states that any quantum has only one frequency and that different frequencies point to different quanta. In real life, lasers have only one frequency. That is, the spectrum of the quantum and laser has only one line and no bandwidth. However, although it is a basic physical parameter of wave frequency, according to the Jean Baptiste Joseph *Fourier* transform principle, because of the limited time and space of waves at both the starting point and end point, start or finish must undergo a transition process to reach steady state, so no waves exist only in the limited time, and space waves may be only one frequency and must be a band. This conclusion has been confirmed by wireless communications technology and is regarded as a basic principle that high-tech companies such as Qualcomm, Apple, Huawei and Samsung have to follow. Otherwise, if there were zero bandwidth electromagnetic waves, the glorious achievements of radio communication technology would not be worth mentioning.

14. Shape Of Magnetic Induction Line

Magnetic inductance lines are closed loops, and no corresponding physical form can be found in the light.

15. Focusing Principle

Waves propagate infinitely in all directions. If light is a wave, it does not explain the focusing principle.

16. Photons Are Analogous To The Sampling Of Light Waves

The wavelength of a photon is larger than its own size, and it can hold many photons in one wavelength.

If light is a wave, then the diameter ε of the photon is much smaller than its period λ , and the number of photons u that can be contained in a single period of light wave is huge, $u = \lambda/\varepsilon$. Because multiple photons can occupy the same space at the same time, the number of photons that can be held in a single period is much greater than u . In Fig. 10 below, a single photon occupies only a negligible period of time in the whole cycle. Therefore, a photon is equivalent to only one sample of the light wave, and the sampling frequency f_s is the product of the basic frequency f of the photon and the number of photons u in an entire period, $f_s = u * f$. The spectrum of the photon is the sampling spectrum, which contains abundant frequencies, among which the fundamental frequency is the sampling frequency f_s . Although the quantum is single-frequency, the sampling of light waves has a rich spectrum and is not just single-frequency. The fundamental frequency of a light wave is very different from its sampling frequency.

Only the spectrum of complete and perfect waveforms does not show rich harmonics, so the photons that make up a ray must satisfy:

16.1 The photons that make up a period must be a set in which the members have the same fundamental frequency.

16.2 Let the fundamental phase difference between photons be δ ; then, the phase difference between any two photons be $k \delta$, and k is an integer. The order of photons in the light wave is $k > 0$, and k ranges from small to large. That is, the phase difference between the neighboring photons is δ . The photons are arranged in order of phase.

16.3 The phase of a photon does not change with time as it moves.

16.4 When u is an integer, the ray repeats periodically.

17. Frequency Lower Limit

The frequencies of electromagnetic waves can be as low as zero, and the frequencies of photons cannot be too low.

Conclusion

In summary, light is neither wave nor wave-particle duality, and light is just a particle. However, the new quantum particle model must conform to the results of the double-slit experiment. Therefore, Thomas Young's double-slit experiment remains a great physical experiment.

Instructions

1. The physical significance of quantum parameters such as frequency, wavelength and period

Although not waves, quanta still have physical parameters such as wavelength, frequency and period. These parameters are used to describe the basic characteristics of quantum, such as the period of transition and the fluctuation of size.

According to photoelectron theory, all atoms are composed of the nucleus and the electrons outside the nucleus, and the electrons rotate around the nucleus in their own fixed orbit. According to the lowest energy principle, the electron is always first in a stable ground state in a lower energy orbital. If the electron gains the extra energy that allows it to break free of the nucleus, it makes the transition to a higher energy orbital, where the electron is in an unstable excited state. As the electron lowers its energy back to the ground state, it radiates out a photon whose energy is equal to the energy difference between the two orbitals. In general, the motion pattern of photons in a vacuum is considered to be uniform and straight. According to the authors, another mode of motion cannot be ruled out. The photon produced by the electron energy level transition may always be moving in a transition rather than a constant speed, the instantaneous velocity of the transition is not constant but periodic, and the period of the transition is constant with its corresponding frequency. Although the transition spacing is a fixed value in time, it can be changed according to the environment in which they live. In vacuum, the photon has the longest transition spacing. The higher the density of the medium, the shorter the transition spacing leads to the slower speed of light; the lower the density of the medium, the longer the transition spacing leads to the faster speed of light.

The size of the quanta may also fluctuate periodically.

Although the energy of a quantum is constant, the spatial distribution of its energy density may fluctuate periodically.

2. The light

Just as current is a directional flow of charge, light is a flow of photons. In any case, light never expresses the properties of waves. All the conclusions about light waves are a distortion of the relevant experimental results.

3. There is no collision or energy exchange between intersecting rays

Since photons have zero resting mass, they are transparent to each other, and no photon prevents others from using the space they occupy. Quantum theory also suggests that multiple photons can occupy the same space at the same time. Therefore, the cross-moving photons collide without any change, neither the energy exchange between the photons nor any change in the direction of motion of the photons.

An object with a nonzero rest mass can change the motion of a photon with a zero rest mass. When contact occurs, the object can change the direction of the photon or make it disappear.

4. The ultimate observer of the test results is the human eye

In the double-slit interference test, the test results before the introduction of observation are multiple stripes alternating between light and dark, as shown in Fig. 11(a). According to the results of the experiment, the following conclusions can be drawn: light waves and interference waves produce interference fringes. If an observer is introduced, the result is only two bright fringes with a dark fringe between them, as shown in Fig. 11(b). According to the results of the experiment, the following conclusions are drawn: light is a particle, and there is no light interference phenomenon. The reason for the two different results was determined to be whether the results were observed. If so, the messy logic follows: it is the human eye that observes the phenomenon that the observer changes the result of the experiment. Observed by the human eye without introducing the interference phenomenon of the observer, the particle phenomenon after the introduction of an observer is also observed by the human eye. The human eye is constantly observing whether the observer is participating in the experiment. When the human eye observes the phenomenon of "whether the observer changes the test result in the double-slit interference test", if the observation of the observer can affect the test result, can the observation of the human eye also affect the test result?

If only the first observation can cause the wave-particle duality to collapse into a state, then the true first observation is the observation before the "introduction observation." At that time, the observation did not cause the wave-particle duality to collapse into waves; otherwise, the result of the double-slit test producing "interference" fringes would not have been observed.

If observed or not leads to different collapse results, why must the rule of collapse for the superposition of waves and particles be followed: when not observed, they collapse into waves, and when observed, they collapse into particles and not vice versa?

If the light that has collapsed into particles is used as a source of light and projected onto another double-slit device, can the "interference" fringe be generated again?

5. The conclusion that the speed of light is constant is questionable

The observation that the color of the binary star is constant leads to the conclusion that the speed of light is constant and independent of the reference frame. However, because light is not a wave, the Doppler effect is not possible, so the color of the binary star remains the same.

6. Dark matter cannot exist in the solar system

Derived from Hubble's law: the expansion of the universe, the Big Bang, dark matter and dark energy and other theories. If it is correct, the solar system will not work because Kepler's three laws of planets are the

result of the absence of dark matter and dark energy. After all, Uranus and Neptune were found using these three laws.

Declaration

Competing interests: The authors declare no competing interests.

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Figures

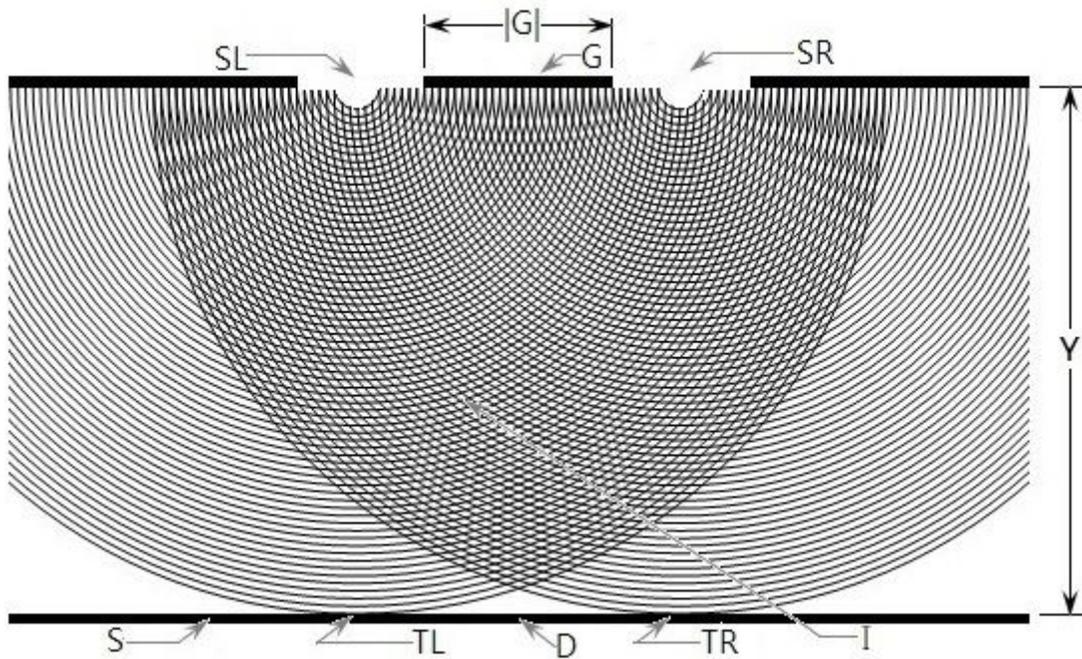


Figure 1

G: The space between two slits. It is located between two slits on the double-slit device. The width is recorded as $|G|$. S: Screen. Where the light is imaged. I: Interference area. Y: The distance between the double-slit device and the screen. SL: left slit on double-slit device. SR: right slit on double-slit device. TL: Left target in double-slit test, the contact point of left wave surface on the screen. TR: Right target in a double-slit test, the contact point of the right wave surface on the screen. D: The midpoint between the left and right targets. Schematic diagram of double-slit interference test principle

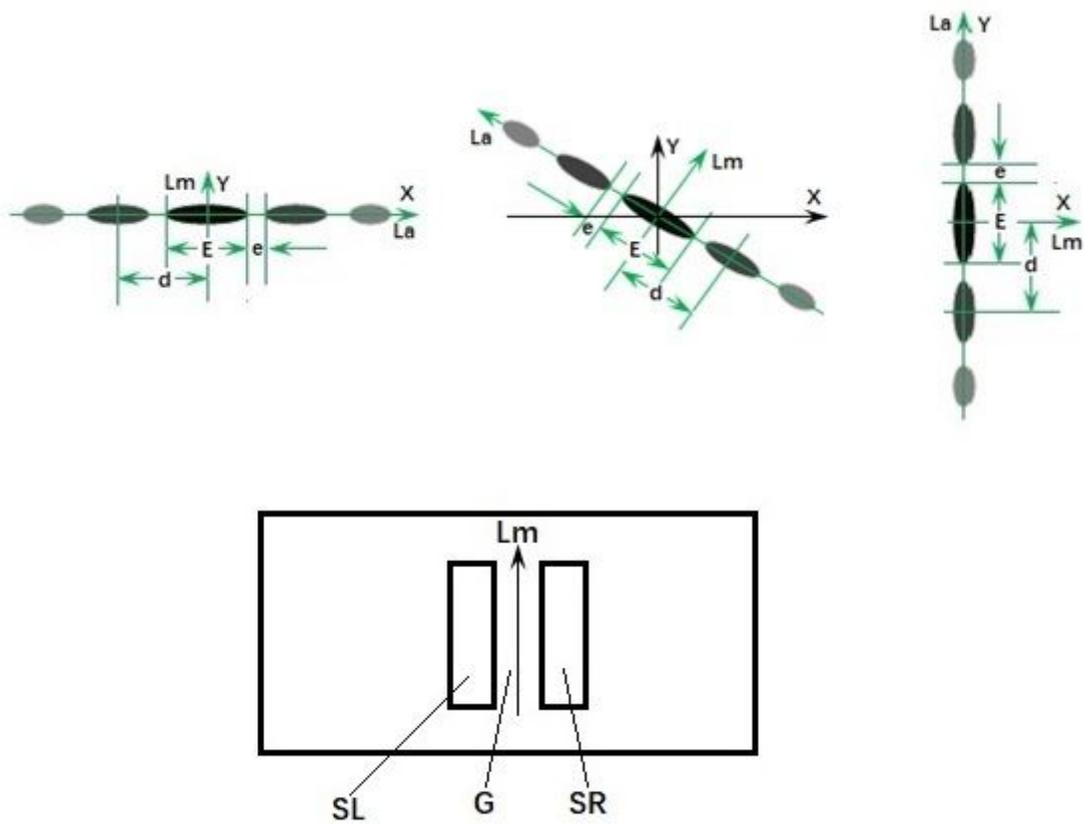


Figure 2

Double slit test results and device X: Horizontal direction. Y: Vertical direction. Lm: double-seam center line. La: the arrangement direction of stripes, La is perpendicular to Lm. d: Fringe spacing. E: The width of the bright stripe. e: The width of the dark stripe. (a) Double slit test results Lm: Double slit center line. SL: Left slit. SR: Right slit. G: the gap between the two slits, width for $|g|$. Width of slit is $|g|$, Height of slit is $|h|$. (b) Double-slit device

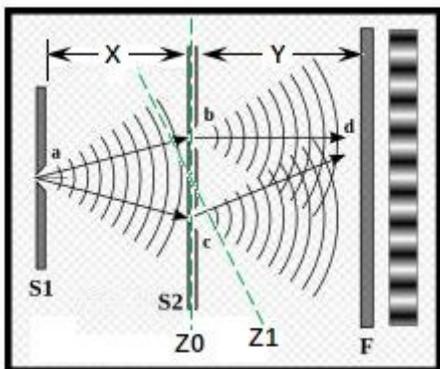


Figure 3

Principle of double-slit interference

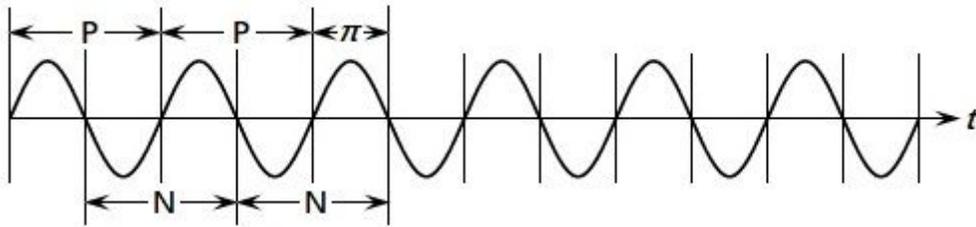


Figure 4

P: Matter cycle N: Antimatter cycle Matter and antimatter waves

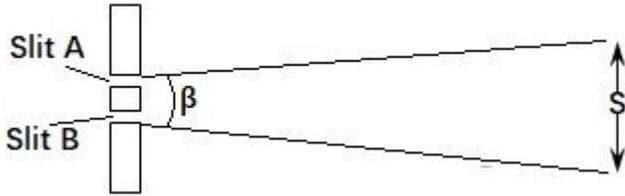


Figure 5

β : The divergence angle of double-slit test results. S: The range of fringes in double-slit test results.
divergence angle of double-slit test results

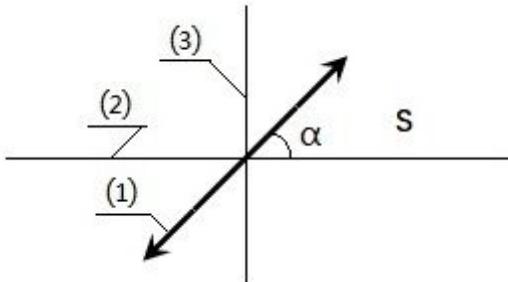


Figure 6

S: The normal plane of the direction of light propagation (1)The polarization direction of photon. (2) Horizontal direction, which is perpendicular to the propagation direction of light. (3) Vertical direction, which points to the center of the earth. α : The polarization direction of the photon, which is the angle between the vibration direction of the photon and the horizontal direction (2). A cross section diagram of the horizontal path of a photon

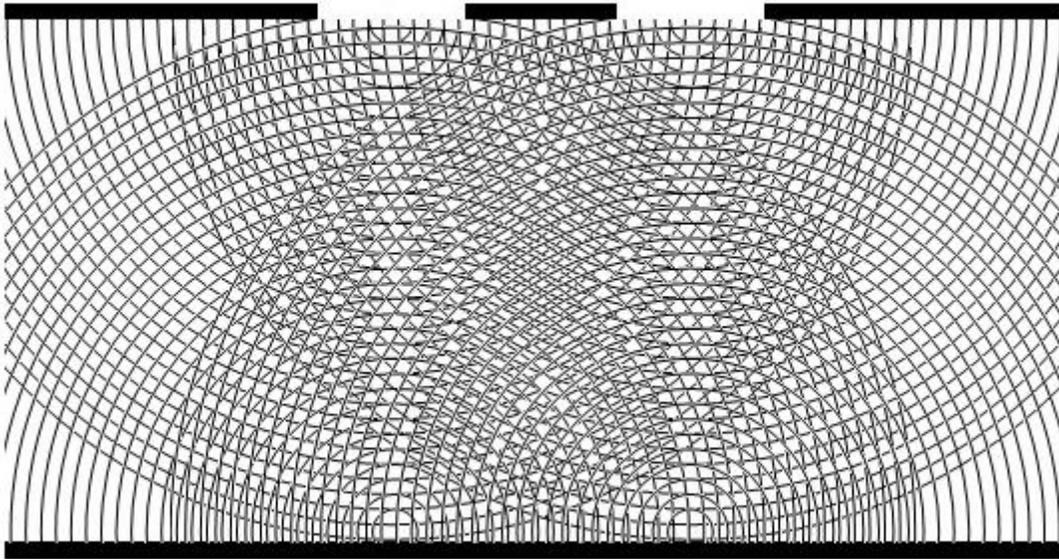


Figure 7

Interference from the light reflected by the screen

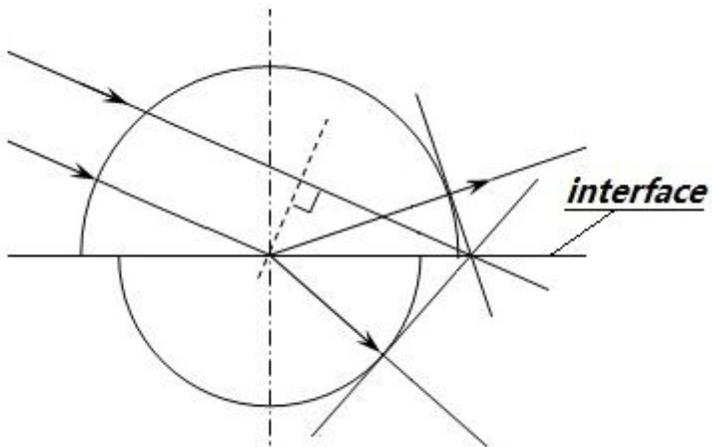


Figure 8

Refraction of light, Huygens' principle

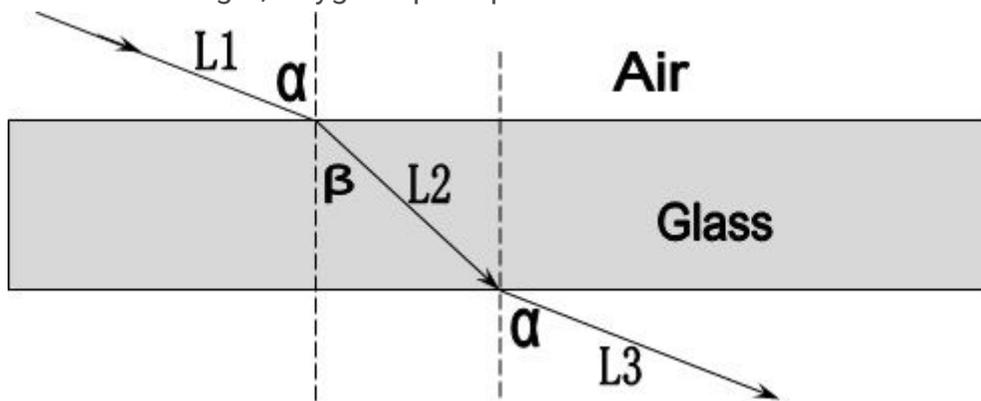


Figure 9

Light passing through glass

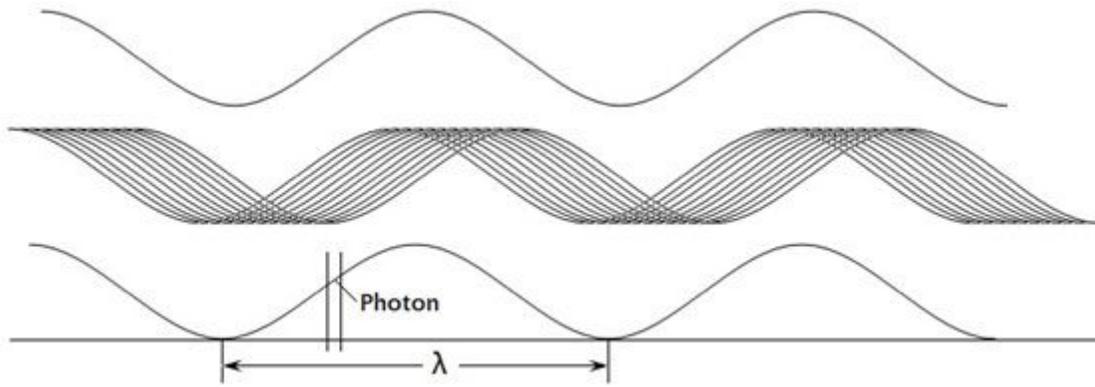


Figure 10

Above image: Single light wave Middle image: Multiple light waves in different phases Below image: Size relationship between photons and light wave period Light waves



Figure 11

(a) Test results that do not introduce observations (b) The experimental results after the introduction of observations Double slit test results with or without observation