Calculation of the Wavelength of Diffracted Waves in the Blockage Theory of the Double-Slit Experiment

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Abstract

In the paper "A New Theory of the Double-Slit Experiment," we introduced a new theory for the double-slit experiment—Blockage Theory, which redefines the double-slit experiment. This article mainly discusses the calculation of the wavelength of diffracted waves in the Blockage Theory.

Introduction

In the paper "A New Theory of the Double-Slit Experiment[1]," we introduced a redesigned experimental setup that allows for the symmetrical adjustment of the widths of the left and right slits while ensuring they remain consistent. This setup maintains the dynamic and symmetrical nature of the fringe data. Through the Blockage Theory, we explained the formation principle of the double-slit experiment: photons form diffracted waves at the incident surface of a single filament, which then bend around to the back of the filament. The left and right barriers stretch the single-filament diffraction fringes to the sides, forming the double-slit experiment fringes.

Calculation of the Wavelength of Diffracted Waves

According to the Blockage Theory, after photons leave the double slits, they concentrate on the peaks and troughs of the diffracted waves and propagate in a straight line to the screen. Therefore, point BD is the center point on the first wave peak and coincides with the central axis (Figure 1). Point AC is the center point on the second wave peak. Point AB is the endpoint of the diffracted wave, representing the peak value and the starting point of the straight-line propagation from the double slits to the screen. Point CD is the endpoint of the straight-line propagation from the double slits to the screen. Points AB and CD lie on the same plane, with AB parallel to CD and perpendicular to BD. By drawing a perpendicular line AE from point A to CD, AB represents the first wavelength of the diffracted wave, and AB equals ED. Using the following formula, we can calculate the first wavelength of the diffracted wave AB:

Tan∠C=AE/CE=AE/(CD-AB)

Tan∠C*(CD-AB) =AE

AB = CD-AE /Tan∠C

λ = x-L /Tan∠C

It is important to note that λ here represents the wavelength of the diffracted wave, not the wavelength of the light wave. x is the sum of the first and second fringe spacings, and L is the distance from the double slits to the screen.

Conclusion

This article reports the reasoning and calculation methods for the wavelength of diffracted waves in the Blockage Theory of the double-slit experiment. The wavelength of the diffracted wave can be calculated using the formula λ = x-L /Tan ∠C.

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.

References

1 Lai, J. Starting from the Nested Fringes of the Double-Slit Experiment. *Space SS J* **1**, 1-10 (2024).

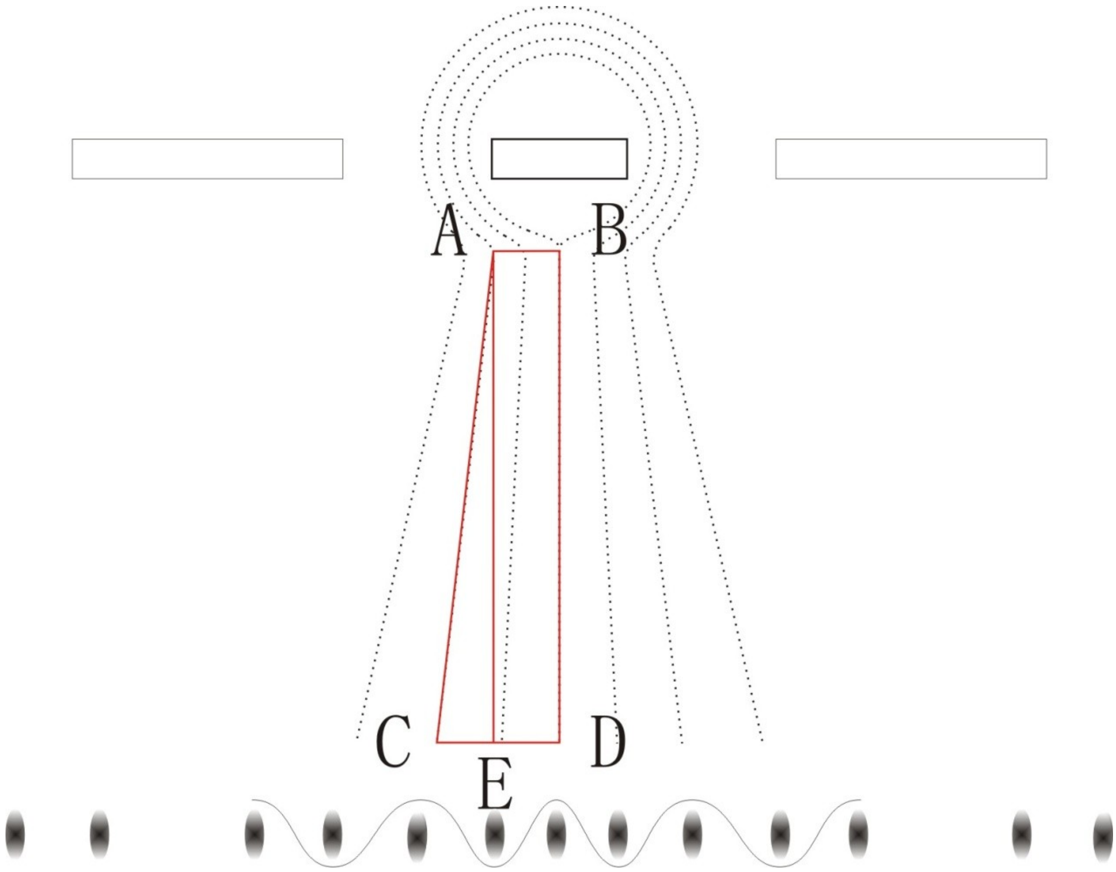

Figure 1