Diffraction experiment demonstrates photon's path

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Abstract

Wave models of light suggest the waves from a slit expand like a fan and interfere with other waves through the slit. A photon model of light with a computer simulation suggests the photons through a slit cross to the other side of centerline to reach the screen. A diffraction experiment is performed with a light filter that reduces the intensity of light on one side of a slit. This experiment demonstrates that the reduced intensity caused by the filter appears on the side of the image opposite to the side with the filter. Therefore, the crossing pattern predicted by a photon computer simulation is supported and the traditional wave models are rejected.

keywords: diffraction, light, photon

1 INTRODUCTION

A model was formed to explain the observations of cosmology (Hodge 2018). A Universal Equation was developed.

The application of the universal equation to galaxy redshift and discrete redshift suggested light is photons (Hodge 2006). The photon concept was expanded and a computer simulation was developed using the Universal Equation (Hodge 2012). The model suggests photons have a definite position and direction at all times and the photon's movement causes waves in a plenum (ether, spacetime, quantum vacuum, etc.). These waves are the pilot waves of the Bohm Interpretation of quantum mechanics. The simulation was applied to a single photon (Hodge 2015) and an experiment performed that rejected wave models of light (Hodge 2019).

Figure 1 shows the simulated path followed for a single photon at a time through a single slit. A notable feature of the photon's path is that the path's cross. The photons through the slit at the top are redirected to the bottom of the screen. Those photons through the slit at the bottom are redirected to the top of the screen. Traditional wave models suggest the light spreads out like a fan from the slit (Jenkins and White 1957).

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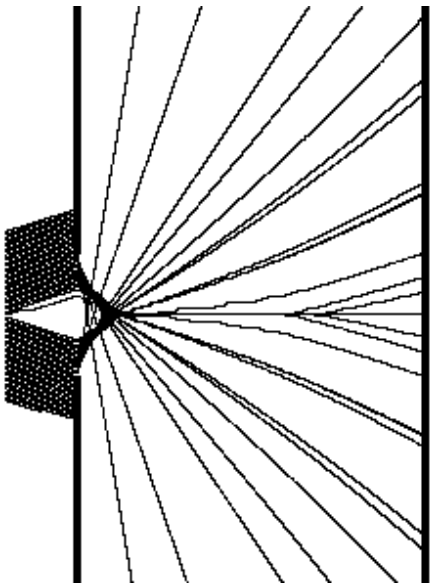

Figure 1: Plot of the trace of the paths of a single photon at a time through a single slit mask using the computer simulation. [Reprinted from Hodge (2015, Figure 2:) with permission of the copyright holder.]

This Paper suggests a test for the screen pattern that the photon simulation predicts. The description of the experiment is in section 2. The Discussion and Conclusion are in section 3.

2 THE EXPERIMENT

The diagram in Figure 2 shows the experimental setup.

The laser was from a 5 mW, 635nm pointer. The mask was 15 cm from the laser. The first mask slit was 0.508 mm wide as determined by feeler gauge and was 0.33 mm thick aluminum sheet. The screen was 6.6 m from the mask.

Figure 3a is a photograph of the image on the screen of the laser light through the slit without the filter.

The filter was a 0.2 mm thick red plastic. Light on one side of the slit passed through the filter then through the slit. Light on the other side passed through the slit. The filter reduced the light intensity slightly. The filter was attached to one side of the mask to make the mask assembly. It was positioned to leave a 0.254 mm gap as determined by feeler gauge.

Figure 3b is a photograph of the image on the screen of the laser light through the mask assembly with the filter on the right side. Note the weaker intensity on the left of the image on the screen.

The mask assembly was then turned to position the filter on the left side

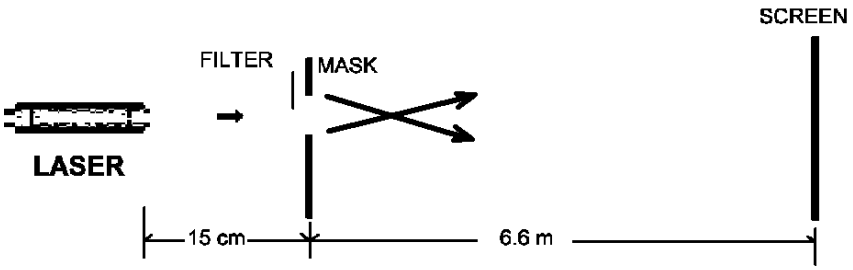

Figure 2: Diagram of the experimental fixtures.

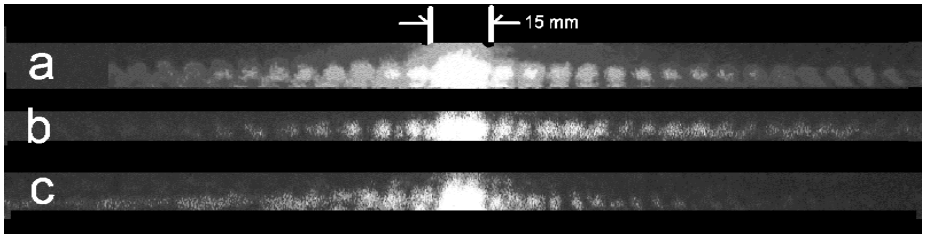

Figure 3: The photographs of the screen images in grayscale for printing: (a) The screen diffraction pattern without the filter. (b) The screen pattern with the filter on the right side of the slit. (c) The screen pattern with the filter on the left side of the slit.

the slit. Figure 3c is a photograph of the image on the screen of the laser light through the mask assembly with the filter on the left side. Note the weaker intensity on the right of the image on the screen.

3 DISCUSSION AND CONCLUSION

This experiment should be repeated with a photon counter.

An experiment was performed with a light filter that reduces the intensity of light on one side of a slit. This experiment demonstrated that the reduced intensity caused by the filter appeared on the side of the image opposite to the side with the filter. Therefore, the crossing pattern predicted by the photon computer simulation was supported and the traditional wave models were rejected.

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