

Newton was right
The photon is a particle



Experiments with laser
and
different formats of slits

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Explanatory introduction to “Experiments with didactic lasers.”

Carrying out the experiments does not need more than didactic lasers, which are low-power, and protective goggles. One red one and one green one is used. Apart from the apertures–slits of all the experiments. The results are photos of the screen on which they are projected. The screen is a white card or sheet of paper. They are visible to the naked eye and it is not necessary that the laboratory (room) be in semi-darkness but it is advisable.

The camera flash may not be used.

The work and its comments are easily understandable and there is no cause to repeat them in this introduction.

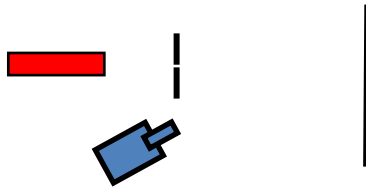
In summary, it does no more than confirm the results of all the work:

Newton was right. “The photon is a particle.”

Y... Newton was right

EXPERIMENTS WITH LASER

The lasers that I'm going to use, with protective goggles, are didactic, low-powered and wavelengths: red and green. Apparatus used: laser, slit-aperture, screen and digital camera. The setup is as I indicate in the diagram.



On carrying out the experiment, we have to place them in a place and in such a way that we can obtain the resultant photos.

It is not necessary for the laboratory to be in semi-darkness due to the intensity of the laser source.

Red laser

The laser used, is of a green wavelength. Projected on a screen, we obtain a slightly elliptical light patch and its major axis we make vertical or horizontal. *Unpolarised light.*

Photos on a white screen and flash. Digital camera.



Vertical position (Vp)



Horizontal position (Hp)

The photographic results of the apertures-slits experiments are independent of the Vp and the Hp. The format is the same, the differences are minimal and therefore we shall use the Vp.

☺ **Slit in metal (0.5mm)**



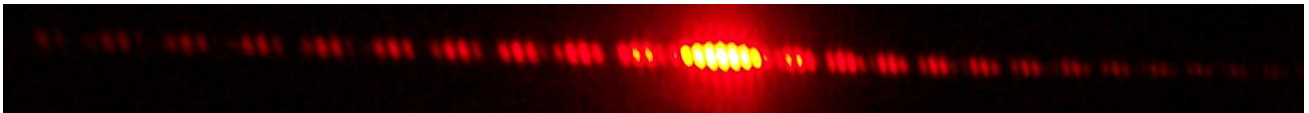
☺ **Double slit in metal (0.5mm)**



☺ **Slit in metal (0.1mm)**



☺ Double slit in metal (0.1mm)



Green laser

The laser used, is of a green wavelength. Projected onto on a screen we see a vertical compact strip (Vp) which is a little wider in its central part (a). If we rotate it 90°, we have a horizontal strip with the same characteristics (b).

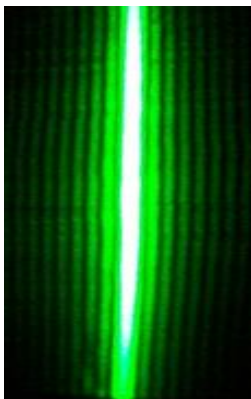
Position (a): vertical position (Vp) #||| Position (b): horizontal position (Hp) ==

The slit-aperture, always in vertical position, the foregoing refers to the orientation of the laser. The photographic results of the apertures-slits experiments depend on both positions. Therefore, we shall specify it in the photos.

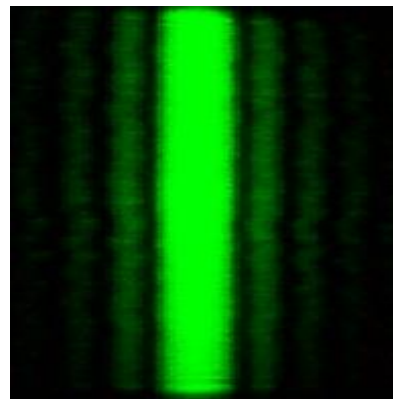
- ◆ Case (a) is the diffraction through a slit of a linear laser source. The result are vertical strips on the screen and photographs.
- ◆ Case (b) is diffraction through a slit of the intersection of the linear laser source (Hp) with the vertical slit (Vp) [□]. The result are circles/ellipses, diffraction of the rectangles through the slits, on the screen, which we can see in the photographs.

Photographic results. Vertical position (Vp)

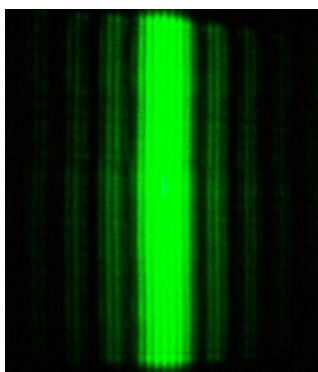
☺ Single metal slit (0.5mm).



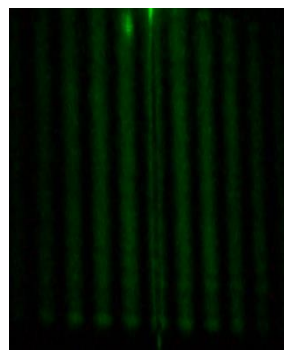
☺ Single metal slit (0.1mm).



☺ Double metal slit (0.1mm).

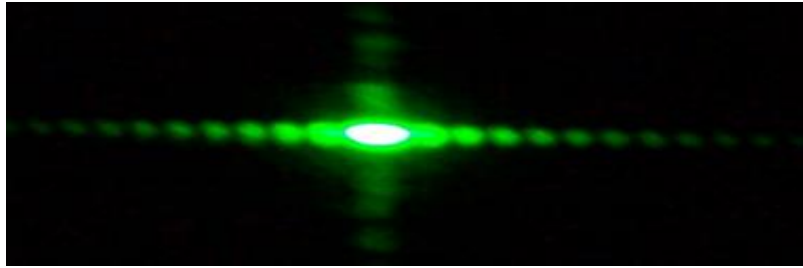


☺ Double aperture on plastic (0.1mm).

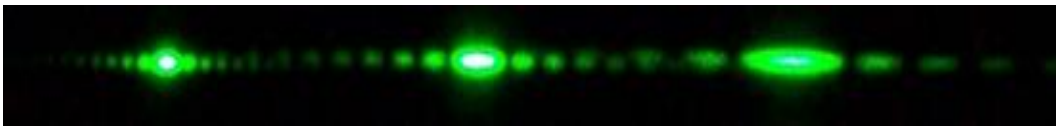


Photographic results. Horizontal position (Hp)

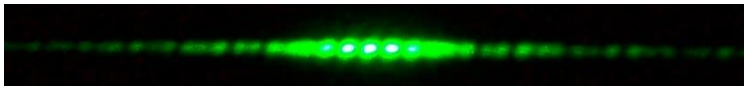
☺ Single metal slit (0.5mm).



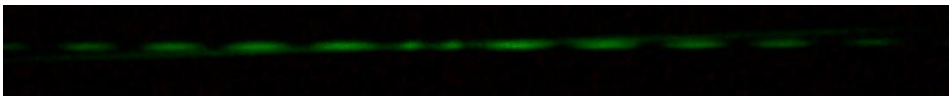
☺ Single parallel and separated metal slits (0.5mm/0.25mm/0.1mm)



☺ Double metal slit (0.1mm).



☺ Double aperture on plastic (0.1mm).



Theoretical disquisitions about the results.

☺ *The photos resulting from the experiments carried out tend to confirm what is set out in Volumes I-II-III-IV-V and in the book “Experiments with LCD and CRT screens....”*

☺ *Repetition of the image that reaches the slits-apertures to the right and left of a wider central one, with the characteristics of diffraction. Or, the image that results from the intersection of the image source with the orientation of the slits-apertures.*

☺ *In the single slits for the illumination and diffraction, in the double ones due to the fusion of the images of both slits. This is perfectly visible regardless of the light sources used, in this one, too. I develop the theory in Volumes I-III-IV.*

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