LDA Exercise

For determining the fringe spacing in the interference pattern, magnification is utilized using a lens. For determining the magnification factor the following equation is used:

For the first experiment, it is known the two beams interests from the lens. This image is shown on a wall placed from the lens. This gives a magnification of

The fringe spacing is measured with an average of maximums on the image, giving a measured fringe spacing of This is magnified so the actual measured fringe spacing is

This can be compared to the theoretical fringe spacing calculated with

Where is the wavelength of the plane wave and is the angle between the incoming waves. The wavelength of the used laser is . The angle is through geometry

Here is measured to be 3 and is measured to be . This results in a angle of

Then the theoretical fringe spacing is

Now the experimental setup is changed, so that the spacing between e.g. the two lenses is new. Now the new values of and is and respectively. This gives the angle

The wavelength of the of the laser is still , leading to a theoretical fringe spacing of

The distance between the object (interference pattern) and the lens is still but now the distance between the image (wall) and the lens is . This gives an magnification of

The measured fringe spacing shown in the image is . This gives a measured fringe spacing of