

In this experiment, we're going to determine a laser light's wavelength using double-slit interference, also known as Young's Slit experiment.

For this you will need: a laser with double-slit slide. A Screen or clear surface to project the laser on to . A tape measure with 1 cm (or 0.01 metre) spacing, and a ruler.

Set up the equipment as shown with the laser pointed at the screen, and the ruler set up so that it is lined up with the middle of the central point of light.

Use the measuring tape to measure the distance from the slits to the screen and note the reading uncertainty.

Switch on the laser. The double-slit splits the laser into two coherent beams of light. These diffract through the slits, producing an interference pattern that can be seen on the screen.

There is a bright point in the middle. This is the central maximum. More points of light spread out to either side. These are also maxima. The points of light are less and less intense as they spread out from this middle point.

With the ruler lined up with the middle of the central maximum, you can measure the distance between the central maximum and the middle of the other maxima.

Record these measurements in a table with columns for maximum and distance from central maximum in millimetres.

Calculate the wavelength using the equation: $d \sin \theta = m \lambda$.

Where d is the distance between the slits, θ is the angle between one of the maxima and the incident beam, m is the order of constructive interference and λ is the wavelength.