Results

Diffraction and Interference Experiment

In this this experiment you measured the wavelength of a Helium Neon laser which has a wavelength of 632.8 nm (i.e., 632.8 X 10^{-9} m).

Although you quantified the uncertainty for each of your 8 measured wavelengths you did not do so for the average of all of your individual measurements.

A sophisticated way to quantify the uncertainty of the average wavelength is to use statistical methods. **You will not do that here (mainly because of the low number of measurements you made).** The method you will use is outlined below.

Results

Single slit wavelength $\lambda \pm \delta\lambda$

Double slit wavelength $\lambda \pm \delta\lambda$

Where $\delta\lambda = \frac{\lambda_{high} - \lambda_{low}}{2}$

Example 1- single slit. If you measured **four different single slit wavelengths** with an average value of 725 **nm** (sig figs are given before uncertainty is known) and a high value of 750 nm and a low value of 500 nm, the wavelength with correct number of sig figs is as follows:

725 nm $\pm$ $\frac{750-500}{2}$ nm = 725 nm $\pm$ 125 nm.

Since **uncertainties should always** *(with one exception)* **be rounded to one sig fig**, correct answer is

(700 $\pm$ 100) nm or **700 $\pm$ 100 nm** (parentheses are implied)

Example 2- double slit. Average of **four double slit wavelength is 635.8 nm** with high and low values of 640 and 625 nm, respectively. Tentative answer is **(635.8 $\pm$ 7.5) nm.** The correct answer (with proper number of sig figs) is

(636 $\pm$ 8) nm