The experiments yielded great results consistent with the theoretical values. The distance between the slits was found to be 0.243 mm with a 4.2% uncertainty. The percent difference from the theoretical value of 0.250 mm was 2.9% which is within the margin of error. Using the results from experiment 1, the wave length of an “unknown” laser was found to be 534.3 nm with a 6.5% uncertainty. The percent difference from the theoretical value of 543.5 nm was 1.7% which is within the margin of error. Finally, the inner-width of the slits was found to be 0.041 mm which has a 3.6% difference from the theoretical value 0.040 mm.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Exp. | Theoretical | Experimental | % Uncertainty | % Difference | Within Error Marg. |
| 1 | 0.250 mm | 0.243 mm | 4.2% | 2.9% | YES |
| 2 | 543.5 nm | 534.3 nm | 6.5% | 1.7% | YES |
| 3 | 0.040 mm | 0.041 mm | X | 3.6% | X |

Since small angle approximation is used, the major sources of error include the distance uncertainty between the slits and screen as well as the distance uncertainty between the central maxima and other fringes. The experiment could be improved by increasing the distance between the slits and the screen, thus in-turn increasing the distance between fringes. The greater distances would consequently lower the uncertainty, decreasing the absolute error to value ratio. To further improve the experiment, a type of photographic film could be used as the screen to capture the double slit interference and single slit diffraction patterns. Once captured, the distances between the central maxima and fringes could be more easily and accurately measured.

Spectroscopist – The study of spectra, especially experimental observation of optical spectra or mass spectra, to determine the properties of their source.

Spectroscopy is used in physical and analytical chemistry because atoms and molecules have unique spectra. As a result, these spectra can be used to detect, identify and quantify information about the atoms and molecules. Spectroscopy is also used in astronomy and remote sensing on Earth. - Wikipedia