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Physics 208-CC3

Lab 3 - Diffraction Grating and Interference

**Procedure**

In this experiment using the following Equipment:

* Spectrometer, Diffraction grating, Mercury arc lamp, Board for mounting glass plates, Two plane parallel plates of glass, Aluminum stand equipped with a lens, a mirror inclined at 45◦, an index, Sodium lamp, and Metric ruler (30 cm).

A useful tool was vernier scale we used that to find the angle in which we found the light spectrum. First we saw a light and as you shifted the eyepiece you saw more colors. For every color seen the angle was recorded we did it for a couple of colors. We also observed interference fringes between two glass pieces and small piece of paper and then with a steel piece. The main idea was to measure very thin lines through aluminum stand with lens and mirror for reflection of light onto the glass piece. Also it was a great explanation on light wave and interference.

**Organized Data/Calculation**



|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Color | λ (nm) | ° | ° |  |
| White | --- |  | 0 | 0 |
| B. Violet | 404.7 | 110.5 | 14.42 | 0.249 |
| Violet | 407.8 | 109 | 15.44 | 0.266 |
| Blue | 435.8 | 108.5 | 16 | 0.275 |
| Dull Green | 491.6 | 108 | 18.44 | 0.316 |
| B. Green | 546.1 | 105 | 19.42 | 0.332 |
| Yellow 1 | 577.0 | 104 | 20.14 | 0.344 |
| Yellow 2 | 579.1 | 103.5 | 20.99 | 0.358 |

**Analysis/Discussion**

In our experiment, we recorded the grating constant as approximately 14520 lines per inch and our central angle was ◦. The objective of the lab was to use n\*λ = sin (θ) to see whether we an accurate value for the wavelength of the colors. By using λ =2t/nL, similar wavelength values were obtained. After each color, we used this formula to calculate wavelength. But, the wavelength was found was like violet wavelength. The only exception was the Yellow light, since the values were not like the actual wavelength. This could have been a parallax error.

Overall the values obtained from the color lights were like their actual wavelength. There may have been some discrepancies but not enough to impact the experiment. Some discrepancies include human error, inaccurate reading and not adjusting the equipment correctly. But in general, the experiment went well.