

PHY 1402 LAB. REPORT

EXPERIMENT 04

THE WAVELENGTH OF LIGHT; THE DIFFRACTION GRATING

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SECTION: 01 .

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1. EXPERIMENTAL PURPOSE:

State the purpose of the experiment. (5 points)

The purpose of this experiment is to observe the diffraction of light through a diffraction grating and to use the resulting spectra to determine the wavelength of monochromatic light. This experiment provides evidence that light behaves as a wave, as demonstrated by the formation of spectra through interference and diffraction. The relationship between the grating constant, the order of diffraction, and the angle of deviation is used to calculate the wavelength of light.

2. EXPERIMENTAL PROCEDURES AND APPARATUS:

Briefly outline the apparatus used and the general procedures adopted. (5 points)

The experiment utilizes a discharge tube powered by a high voltage supply, a spectrometer, and a diffraction grating with 600 lines per millimeter. The spectrometer's telescope is first adjusted to focus on the slit image, and the diffraction grating is placed so that the incident light is normal to it, creating a central image. The telescope is rotated to observe the diffracted light, particularly the green spectral line, and the grating is adjusted to achieve the position of minimum deviation.

After aligning the cross-hair with the spectral line, the angular positions of both the first and second-order spectra are recorded for both sides of the central image. These measurements are then used with the diffraction equation to calculate the wavelength of the light in Angstroms.