UCD School Of Physics

PHYC30170 Physics with Astronomy and Space Science Lab 1; CCDs and Spectroscopy

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Daragh Hollman

Abstract

The aim of this experiment was to calibrate a CCD for spectroscopy and determine the resolution of a spectrograph. This was done by comparing the emission spectrum of a mercury arc lap to reference values... INSERT RESULTS.

1 Introduction

2 Theory

A diffraction grating is used to split incident light into its separate wavelengths. As a diffraction grating is an array of very narrow and evenly spaced slits, the diffraction pattern from each slit interferes such that the light disperses by a angle θ as described by equation 1[1].

$$n\lambda = dsin\theta \tag{1}$$

where d is the spacing between the slits, λ is the wavelength of the incident light, θ is the angle which the light is diffracted by and n is a positive integer.

Diffraction grating and equation + figure, what is the spectrograph setup, arc lamps + emission lines

3 Methodology

3.1 Apparatus

Photo of experimental setup + focal lengths of all pieces, Atik 314L+ CCD

3.2 Determining the Readnoise and the Gain

3.3 Wavelength Calibration

3.4 Determining the Resolution of the Spectrograph

4 Results and Analysis

5 Conclusion

References

[1] GeoSci Developers. *Attenuation and Skin Depth*. 2018. URL: https://em.geosci.xyz/content/maxwell1_fundamentals/harmonic_planewaves_homogeneous/skindepth.html.