

UCD School Of Physics



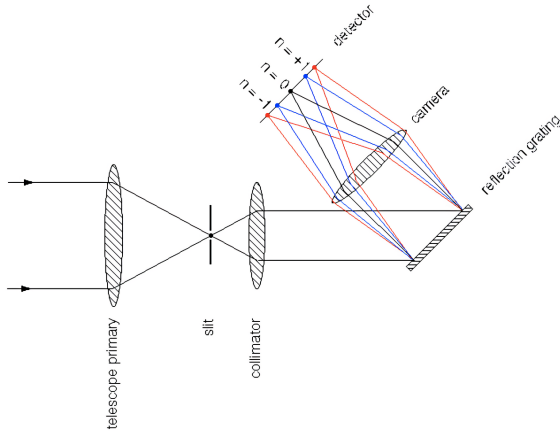
PHYC30170 Physics with Astronomy and Space Science Lab 1;
CCDs and Spectroscopy

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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 lamp 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 an angle θ as described by equation 1^[1].

$$n\lambda = d\sin\theta \quad (1)$$

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. This process is the primary component of a spectrograph.

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 Read-noise and the Gain

3.3 Wavelength Calibration

3.4 Determining the Resolution of the Spectrograph

4 Results and Analysis

5 Conclusion

References

- [1] Hugh D. Young et al. *Sears and Zemansky's university physics: with modern physics*. Pearson Education Limited, 2020.