Waveoptics

FYS2150 Lab Report

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Abstract

1 Introduction

2 Theory

3 Experimental Procedure

3.1 Zeeman effect

4 Results

4.1 Spectral Lines

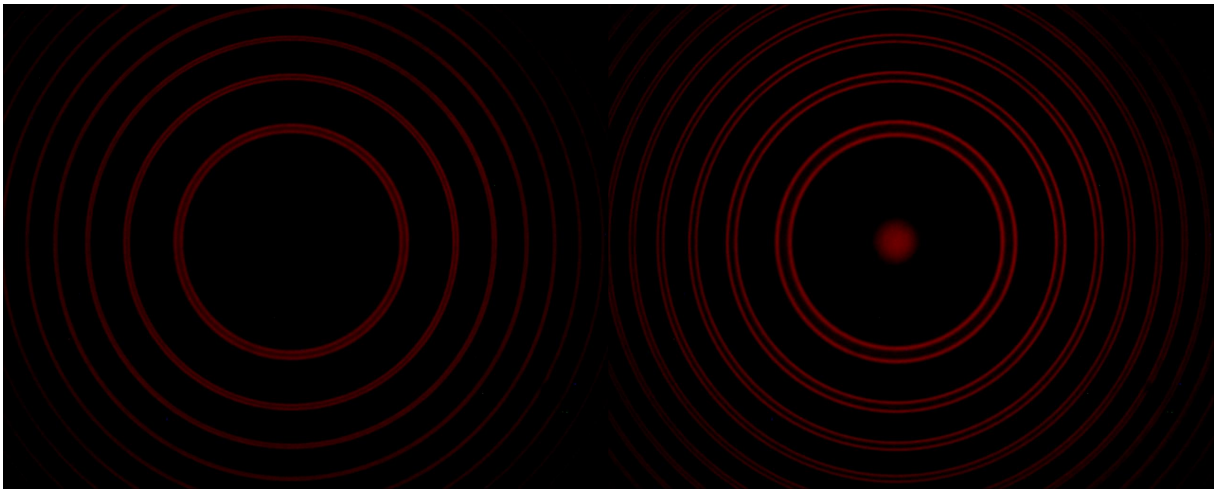
Table 1: Hydrogen Lines

α_v	α_h	θ	λ [nm]
$167.40 \pm 0.01°$	$228.80 \pm 0.01°$	$30.70 \pm 0.01°$	432.28 ± 5.17
$163.10 \pm 0.01°$	$223.30 \pm 0.01°$	$30.10 \pm 0.01°$	424.63 ± 5.20
$146.10 \pm 0.01°$	$248.80 \pm 0.01°$	$51.35 \pm 0.01°$	661.25 ± 3.82

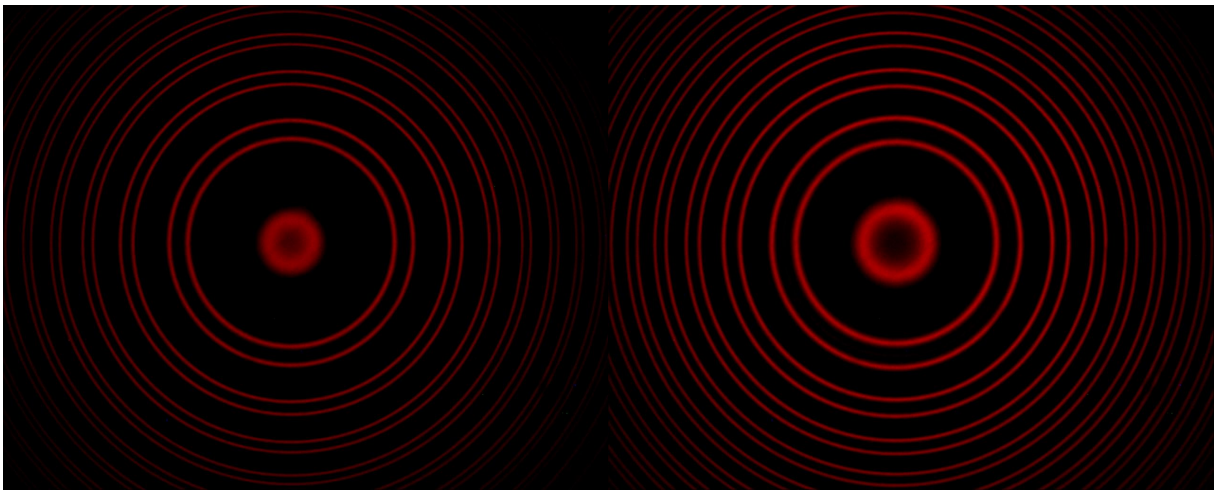
Table 2: Helium Lines

α_v	α_h	θ	λ [nm]
$144.40 \pm 0.01°$	$248.70 \pm 0.01°$	$52.15 \pm 0.01°$	668.57 ± 3.76
$152.80 \pm 0.01°$	$240.90 \pm 0.01°$	$44.05 \pm 0.01°$	588.70 ± 4.36
$160.40 \pm 0.01°$	$233.70 \pm 0.01°$	$36.65 \pm 0.01°$	505.42 ± 4.84
$160.60 \pm 0.01°$	$233.40 \pm 0.01°$	$36.40 \pm 0.01°$	502.45 ± 4.86
$161.50 \pm 0.01°$	$232.70 \pm 0.01°$	$35.60 \pm 0.01°$	492.88 ± 4.90
$163.20 \pm 0.01°$	$231.00 \pm 0.01°$	$33.90 \pm 0.01°$	472.24 ± 5.00
$165.20 \pm 0.01°$	$229.10 \pm 0.01°$	$31.95 \pm 0.01°$	448.06 ± 5.11

4.2 Zeeman Effect



(a) $I = 1\,\mathrm{A}$ (b) $I = 2\,\mathrm{A}$



(c) $I = 3\,\mathrm{A}$ (d) $I = 4\,\mathrm{A}$

Figure 1: Split difraction lines due to σ-transitions for different magnitudes of magnetic field

5 Discussion

6 Conclusion