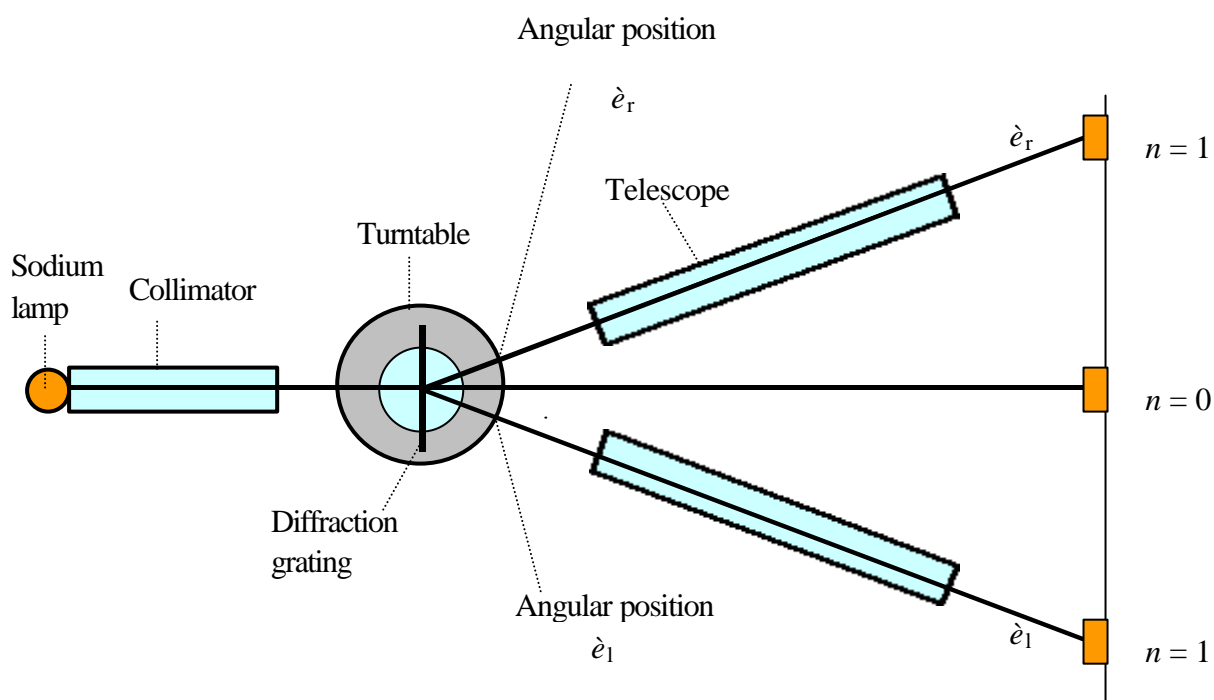


# MEASUREMENT OF THE WAVELENGTH OF MONOCHROMATIC LIGHT

## Apparatus

Sodium lamp, spectrometer and diffraction grating (300 lines per mm).



## Procedure

1. Adjust the eyepiece of the telescope so that the crosswires are sharply focused.
2. Focus the telescope for parallel light using a distant object. There should be no parallax between the image seen in the telescope and the crosswires seen through the eyepiece.
3. Place the sodium lamp in front of the collimator.
4. Level the turntable of the spectrometer if necessary.
5. Looking through the telescope, focus the collimator lens and adjust the width of the slit until a clear narrow image is seen.
6. Place the diffraction grating on the turntable at right angles to the beam.
7. Move the telescope to the right until the cross wires are centred on the first bright image. Take the reading  $\theta_r$  from the scale on the turntable. (To see the scale more easily shine a lamp on it and use a magnifying lens).
8. Move the telescope back through the centre and then to the first bright image on the left.
9. Take the reading  $\theta_l$  from the scale.
10. Calculate  $\lambda$  using  $\lambda = \frac{\theta_r - \theta_l}{2}$ .

11. Calculate the distance  $d$  between the slits using  $d = \frac{1}{N}$  where  $N$  is the number of lines per metre on the grating.
12. Calculate the wavelength  $\lambda$  using  $n\lambda = d \sin \theta$ .
13. Repeat this for different orders ( $n$ ) and get an average value for the wavelength.

## Results

$n$	$\theta_r / ^\circ$	$\theta_l / ^\circ$	$\theta = \frac{\theta_r - \theta_l}{2} / ^\circ$	$\lambda / \text{m}$

Average  $\lambda =$