

## Experiment No. 6

### RESOLVING POWER OF A TELESCOPE

**Aim:** To determine the resolving power of a telescope and hence to compare it with the theoretical value.

**Apparatus:** Sodium vapour lamp, Photo film (or plate) on which two lines separated by short distance are drawn, telescope, adjustable slit, travelling microscope, meter scale, etc.

**Principle:** Resolving power of a telescope is its ability to resolve two very close lines as distinctly separate.

**Formula:**

$$a/\lambda = D/d \text{ where } a = |a_1 - a_2|$$

Telescope aperture is completely closed. While opening the aperture of the telescope:

$a_1$  is the width of opening of the telescope when the light just appears.

$a_2$  is the width of the opening of the telescope when the light sources are just resolved.

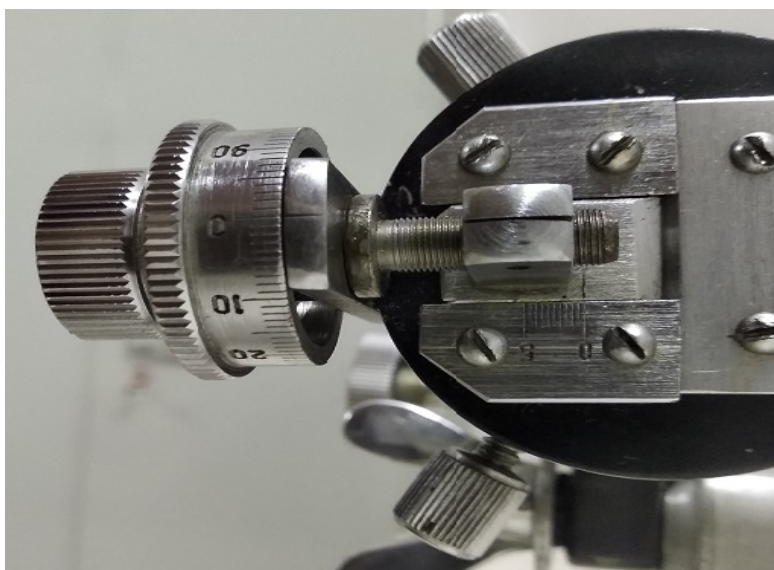
$a$  = aperture of the telescope in (m)

$\lambda$  = wavelength of sodium light. (589.3 nm)

$d$  = distance between the lines (object). (0.6 cm)

$D$  = distance between the object and the telescope (cm)

$$LC = \frac{\text{value of 1MSD}}{\text{No of division on VS.}}$$



### Procedure:

1. A pair of lines drawn closely on a photo film or a ground glass plate and is illuminated by sodium light source S. These are the two light sources ( $S_1$  and  $S_2$ ) for which the resolving power of the telescope has to be determined.
2. The telescope is focused to infinity.
3. Now the telescope is kept at a large distance (say 1 m) from the sources ( $S_1$  and  $S_2$ ).
4. Closed the aperture of the telescope completely.
5. Now, open the slit slowly with the help of screw attached.
6. While opening the aperture of the telescope note down  $a_1$  and  $a_2$ .
7. Using the above given formula calculate.

### Observation Table:

$$TR = MSR + (VSR \times LC), LC=0.5/100=0.005mm$$

Sr. No.	D (cm)	d (cm)	$a_1$			$a_2$			$a= a_1 - a_2 $ (m)
			MSR (mm)	VSR	TR (mm)	MSR (mm)	VSR	TR (mm)	
1	75	0.6	0	54	0.27	0	68	0.34	$7 \times 10^{-6}$
2	100	0.6	0	58	0.29	0	77	0.385	$9.5 \times 10^{-6}$
3	125	0.6	0	48	0.24	0	71	0.355	$1.15 \times 10^{-6}$

**Calculation:**

Sr. No.	D (cm)	d (cm)	a	$a/\lambda$	$D/d$
1	75	0.6	0.07	118.7mm	125
2	100	0.6	0.095	161.2mm	166.67
3	125	0.6	0.0115	19.5	208.33

**Result:** The theoretical and experimental values for the resolving power of the telescope are compared and approximately same.