To determine the resolving power of telescope.

Materials Required

1. Telescope
2. Variable slit
3. Na light source
4. Power supply for Na lamp

Formula Used

Resolving power of telescope (R.P.) = dD /1.22 a * b rad^{-1}
Where:
D = distance of slit of light source and objective of telescope
d = Diameter of objective of telescope
a = Width of slit mounted on the objective of telescope in the position of just resolution
b = Separation between the two strips of the slit of light source

Procedure

1. Take the Na light source, connect it with its Power Supply and switch on the Power Supply.
2. Insert the slit with separation between the strips (width of strip is 1mm) into the light source.
3. Place the telescope in front of the light source at a distance 4-5 meters. Take care that the axis of telescope is horizontal and height of telescope is in line with the strips.
4. Note the least count of the micrometer screw provided with the rectangular slit.
5. Now open the rectangular slit completely and focus the telescope on the strips so that the distinct image of strips is seen in the field of view.
6. Now gradually decreases the width of slit by the micrometer screw till the separate visibility of the strips just disappear i.e. two strips just appear as a single strip.
7. Note the micrometer screw reading at this position.
8. Now again rotate the micrometer screw in the same direction until there is complete darkness in the field of view.
9. Again note the reading of micrometer screw.
10. Take the difference of two readings of the micrometer screw, this gives the width of the rectangular slit a1 in the position of just resolution of the two strips.
11. Now the slit is completely closed and then opened gradually. As we get light in the field of view, the reading of micrometer screw is noted.
12. Then the micrometer screw is turned in the same direction till the two strips just appear to be separated from each other.
13. Again the reading of micrometer screw is noted.
14. The difference in the two readings of micrometer screw gives the width of the rectangular slit a2 in the position of just resolution of two strips.
15. Record all the readings in the observation table given below.
17. Repeat the same experiment for the different slits of separation.
16. Find the diameter d of objective lens with the help of vernier calipers of the telescope after removing the slit from it.
17. Measure the distance D from the slit of light source to the objective of telescope, using measuring tap.

S. No.	Reading of micrometer screw while closing the slit gradually			Reading of micrometer screw while opening the slit gradually			Mean width of slit
	When resolution just ceases x_1 cm	When field of view becomes dark x_2 cm	Width of slit $a_1 = x_1 \sim x_2$ cm	When the light just enters in the	When resolution on just stats x_2' cm	Width of slit $a_2 = x_1' \sim x_2'$ cm	$a = (a_1+a_2)/2$ cm
1. 2. 3.							

Observation Table

1. For the width (a) of the slit at just resolution:
Pitch of the micrometer screw =..... cm
Total number of divisions on the circular scale = ...
Least count of micrometer screw = Pitch / total number of divisions on the circular scale
2. For the separation (b) between the strips:
Least count of vernier calipers = ... mm
Total reading between the two strips = M.S.R. + V.S.R. = ... mm
3. Diameter d of objective of telescope = ...mm
4. Distance of slit of light source and objective of telescope D = ...cm
5. Wavelength of Na light source λ = ... A^{o}

Result and Calculations

Resolving power of telescope = dD /1.22 a * b rad^{-1}
Theoretical value of resolving power = d/1.22 * λ = ... rad^{-1}