Schuster's Method

Schuster's is the best method of focusing the telescope and the collimator for parallel / paraxial rays within space available in the dark room.

Place the prism on the prism table with its center coinciding with the center of the table and with its refracting edge vertical. Rotate the prism table so that one of the refracting faces of the prism is directed towards the collimator and the light from the collimator is incident on the retracting face at an angle of about 45 degrees to the face. Look through the other refracting face of the for the refracted beam which is bent towards the base of the prism.

You will see with the naked eye the image of the slit formed by refraction through the prism. Slightly rotating the prism table, first in one direction and then in the other, you will also see that the image moves. Now turn the prism table in the proper direction so that the image of the slit moves towards the direct path of rays from the collimator and reaches the position of minimum deviation. At this position of the prism, the image will move away from the direct path of rays in whatever direction the prism table is turned. Next bring the telescope between the prism and the eye and move it slightly this way or that so that you can see the image of the slit in it. Slightly rotate the prism table so that you find the image through the telescope exactly at the position of minimum deviation. ~~Display~~ Displace the telescope from this position in a direction away from the direct path of rays. For this position of the telescope, the image of the slit can be brought on the cross-wires for two positions of the prism. In one position, the angle of incidence of the prism is larger that that at minimum deviation and in the other position it is smaller. In the former position of the prism is called the slant position and latter position is called the normal position. Next perform the following operations:

① Bring the image on the cross-wires of the telescope by rotating the prism table in such a way that the refracting edge of prism is nearer to you (the prism is at the slant position) than at

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minimum deviation. Focus the image by rack and pinion arrangement of the telescope, i.e. the instrument nearer to you. The image now becomes very narrow.

② Next rotate the prism table in the opposite direction. The refracting edge of the prism will move away from you. Go on rotating the prism table ~~untill~~ until the image, moving towards the position of minimum deviation, turns back and reaches the cross-wires again. Keeping the prism at this position, i.e. at the normal position, focus the image by the rack and pinion arrangement of the collimator, i.e., the instrument away from you. The image is now wide.

Repeat the operations 1 and 2 several times in succession till the image remains sharp for both the positions of the prism. The telescope and the collimator are then focused for parallel rays.

▨ Mnemonic: The operations in Schuster's method can be easily remembered as follows: When the refracting edge of the prism is nearer to you, focus the image by the telesope, i.e. The instrument nearer to you. When the refracting edge of the prism is away from you, focus by the collimator, i.e. the instrument away from you. Or simply, near-near, away-away. Alternatively, the operations can be remembered by nothing that when the image is board, focusing is done by the collimator. When the image is thin, focus by the Telescope. Easy way to remember, b-c, t-t.

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