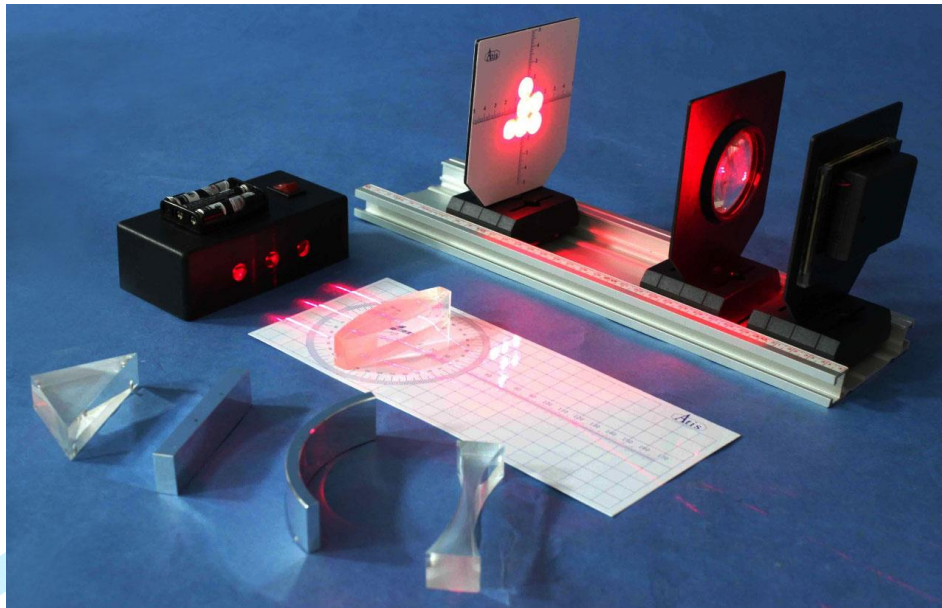


The Basis of Geometrical Optics



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➤ Accessory :

1. 3 beams of parallel laser light source (with shield plug)	9. Slide equipment x 3
2. Laser geometry optical demonstration board	10. LED light source
3. Cylindrical flat mirror	11. with concave lens +75
4. Cylindrical convex concave mirror	12. attach convex lens with handle
5. Cylindrical convex lens	13. attach screen with handle
6. Cylindrical concave lens	14. attach half of screen with handle
7. Cylindrical prism	15. lens secure box
8. Aluminum slide track (350mm) (with connector)	16. aluminum secure box

1. Reflection of flat mirror

Reflection law of light. It means when the light hits an interface, Incident light and reflected light create the same angle.

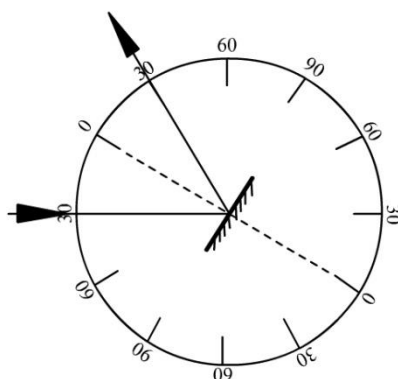


Image 1-1 Image of reflection law of light

➤ Experiment accessory :

1. 3 beams of parallel laser light source	3. Cylindrical flat mirror
2. Lacer geometry optical demonstration board	

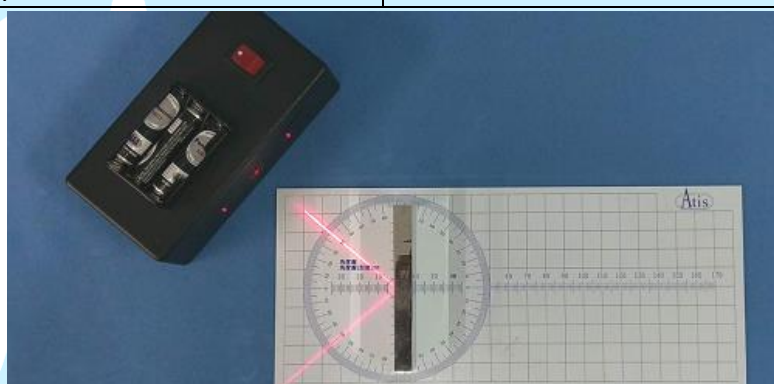


Image 1-2 Image of operation.

➤ Experiment operation :

According to image 1-2 of operation, we use light-proof sticker to cover laser source port and remind one light of laser source. We set in 0° ~ 30° ~ 45° ~ 60° ~ 90° with different angle and observe to record.

➤ Experiment record :

angle of laser light source	angle of flat mirror	angle of incidence	angle of reflection

➤ Experiment question :

What is the relation between normal line and the angle of the flat mirror?

Describe what is angle of incidence and angle of emergence?

2. Focal spot measurement of concave mirror

There is a parallel light to main axis. After reflection, the light will gather in one spot (called focal spot). Oppositely, a light starts from focal spot, and it is reflected by a concave lens. It will also shoot out parallelly with the axis. We call this appearance as reversibility of light.

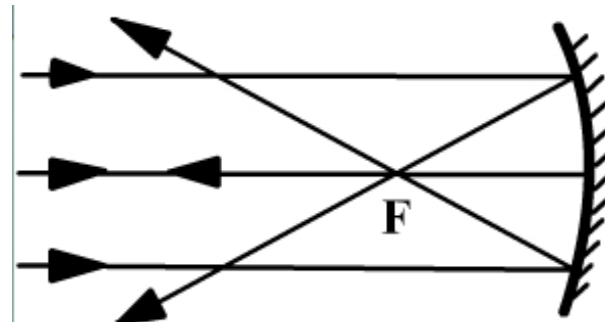


Image 2-1 Image of the focal spot with optical path of concave mirror

➤ Experiment accessory:

- | | |
|---|--------------------------------------|
| 1. 3 beams of parallel laser light source | 4. Cylindrical convex concave mirror |
| 2. Laser geometry optical demonstration board | |

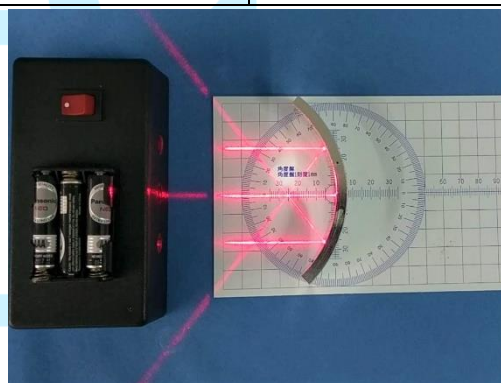


Image 2-2 Image of the focal spot with convex mirror.

➤ Experiment operation: We use parallel laser light source and make the center of light source aim to center line on the demonstration board as image 2-2. We draw the optical path and find out the focal spot of the concave mirror in the blank below. The focal spot will cross on the center line.

3. Virtual focus measurement of convex mirror

A convex mirror is a curved mirror that reflects the light from the surface to the light source. This mirror can only create a virtual image because the focal spot F and center of curvature $2F$ are both in the inside of the mirror. This virtual point does not exist actually. A beam of collimated parallel light is reflected by convex mirror and then diverges. Thus, the normal lines in the surface of mirror are in the different directions.

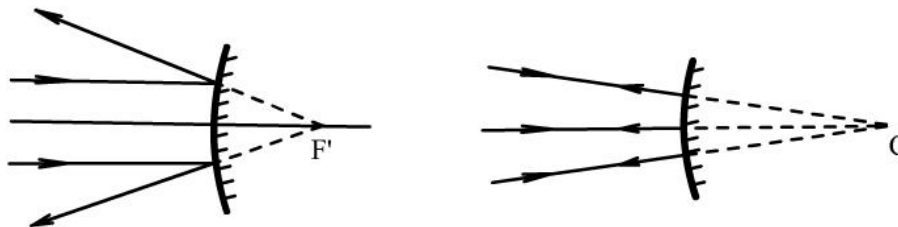


Image 3-1 Image of comparing to convex mirror and spherical mirror.

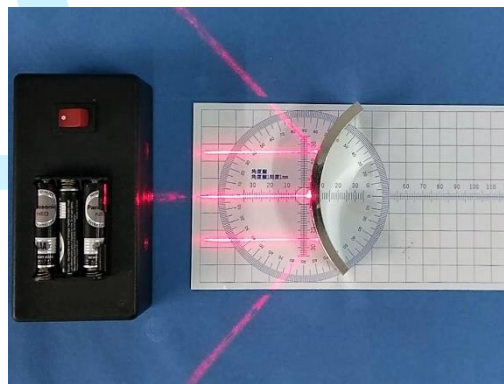


Image 3-2

➤ Experiment accessory:

- | | |
|--|--------------------------------------|
| 1. 3 beams of parallel laser light source (with shield plug) | 4. Cylindrical convex concave mirror |
| 2. Lacer geometry optical demonstration board | |

➤ Experiment operation:

According to image 3-2, we aim to the demonstration board with the center of light source in the laser. We extend the laser path to the cross point behind the concave mirror and find the focal spot. We draw the focal spot from the convex mirror in the blank below.

4. Focal spot measurement of convex lens

Light will focus on one point after a parallel light is refracted by a convex lens that we call focal spot, so we also call the lens as focusing lens. When the light starts from the focal spot through the convex lens, the light will appear parallel light.

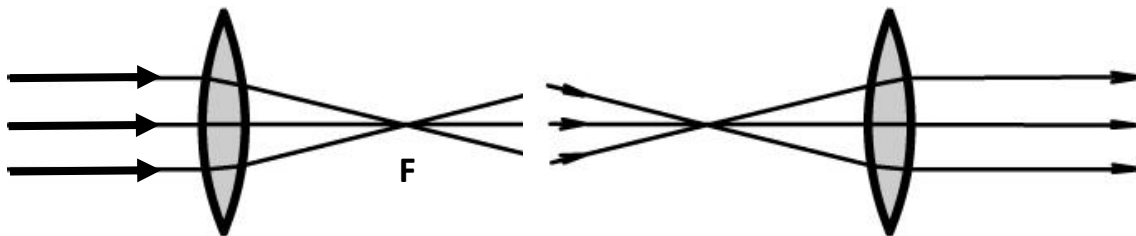


Image 4-1 Image of refractive path in convex lens.

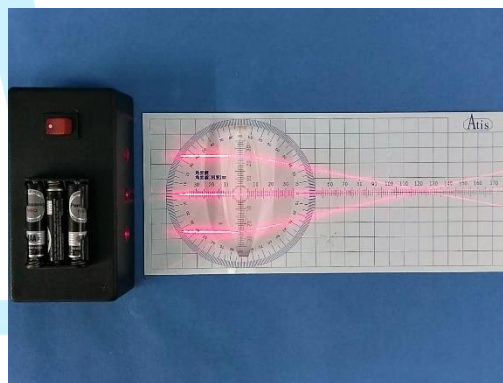


Image 4-2 Image of focal spot in convex lens.

➤ Experiment accessory:

- | | |
|--|----------------------------|
| 1. 3 beams of parallel laser light source (with shield plug) | 5. Cylindrical convex lens |
| 2. Laser geometry optical demonstration board | |

➤ Experiment operation:

According to the image 4-2, we aim to the center line on the demonstration board with the center of light source in the laser and find the focal spot through the lens. This focal spot will cross on the center line. We draw the focal spot from the convex lens in the blank below.



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