

XAVIOUR'S- LAWS OF REFLECTION

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Abstract:

“Xaviour’s- laws of reflection” is my new three laws in physics. It explains the characteristics hide in the reflection. It is completely different from the current reflection laws. From these laws, if we know the angle of incidence ($i\theta$) then it is easy to obtain the angle of reflection ($r\theta$). Similarly, if we know the angle of reflection then it is easy to know the angle of incidence. Also, by knowing only the angle of incidence, it is very easy to calculate the angle between the incident ray and the reflected ray ($X\theta$) can be calculated easily. This is the specialty of Xaviour’s Laws of Reflection.

Xaviour’s- Laws of Reflection:

First Law: -

The angle of incidence and the angle of reflection is numerically not equal. ($i\theta \neq r\theta$)

Second Law: -

The addition of angle of incidence and angle of reflection is always 180° . ($i\theta + r\theta = 180^\circ$)

Third Law: -

The intermediate angle ($x\theta$) of Incident ray and reflected ray will be comes from the subtraction of 180° and doubled incidence angle. ($X\theta = 180^\circ - 2i\theta$)

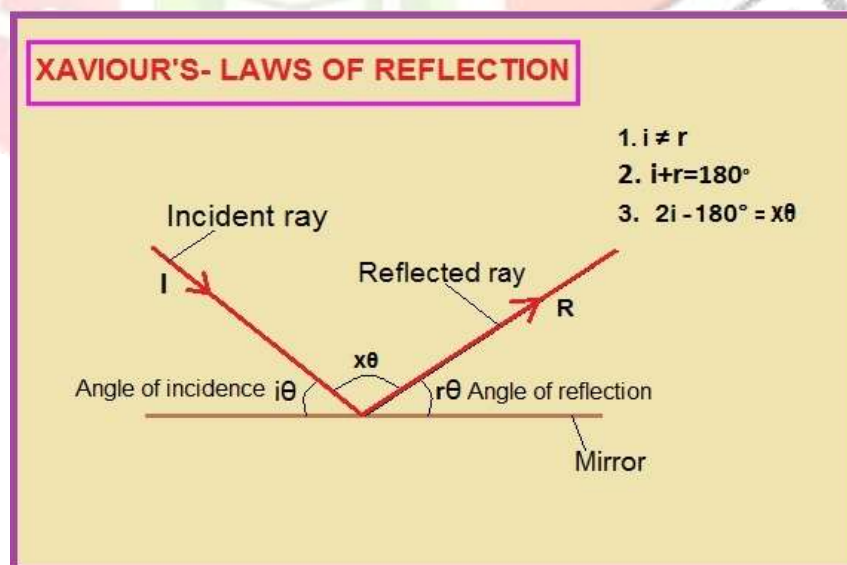


figure-1: xaviour’s laws of reflection

Explanation:

Ancient Greek mathematician Euclid described the prevailing law of reflection in about 300 BCE. This states that light travels in straight lines and reflects from a surface at the same angle at which it hit it. Light is reflected in the same way that a ball would bounce off of a frictionless surface, and so Euclid claimed that light travels in rays that are discrete, like atoms, not continuous, like waves. This may mean that some of the objects in our visual field will always remain unilluminated and therefore undetected. Unlike Ancient Greek philosopher Aristotle, Euclid thought that light is emitted in rays from the eye.

According to Euclid's thesis:

1. The Angle of Incidence and the Angle of Reflection is equal.
2. Incident ray, Reflected ray and point of reflection (NORMAL) all lie in the same plane.

In these laws, the vertical line (NORMAL) is a fictional line; the angle between the Incident ray and the normal is said to be the Angle of Incidence; the angle between the reflected ray and the normal is said to be the Angle of Reflection.

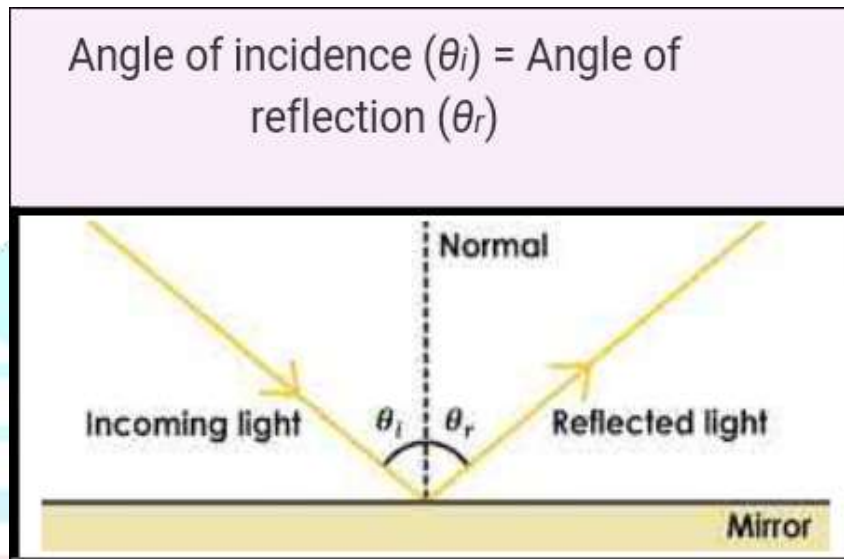


figure-2: euclid's law of reflection

But my **Xaviour's Law of Reflection** entirely differs from this. Xaviour's law of reflection does not have any fictitious vertical lines (NORMAL). In Xaviour's law of reflection, Angle of Incidence means the angle between the Incident ray and the Plain mirror. Similarly, the Angle of Reflection means the angle between the reflected ray and the Plain Mirror. Also, the angle between the Incident ray and Reflected ray is $x\theta$. For example, Let us assume that the Light rays are passed on the Plain mirror at 10° angle and if so, we can calculate the Angle of reflection using **Xaviour's Law of Reflection**, in the following manner:

Solution:

Given, the angle of Incidence ($i\theta$) = 10°

According to the Xaviour's Second Law of Reflection;

$$i\theta + r\theta = 180^\circ$$

$$10^\circ + r\theta = 180^\circ$$

$$r\theta = 180^\circ - 10^\circ$$

$$r\theta = 170^\circ$$

Therefore, at 10° incidence angle, the angle of reflection ($r\theta$) on the Plain mirror seems to be 170° . Since the Angle of Reflection is 170° , it is proved that the Angle of Incidence and the Angle of Reflection are not equal ($10^\circ \neq 170^\circ$). Hence, Xaviour's First Law of Reflection is true. In another example, when the reflected ray is falls on the plain mirror at 40° angle, then its Angle of Reflection and the angle between the Incident ray and the reflected ray can be calculated using the Xaviour's Law of Reflection in the following manner:

Solution:

From the given example,

Angle of Incidence ($i\theta$) = 40°

Angle of Radiation ($r\theta$) = ?

The Angle between the Incident ray and reflected ray ($x\theta$) = ?

According to Xaviour's second law of reflection:

$$i\theta + r\theta = 180^\circ$$

From this,

$$r\theta = 180^\circ - i\theta$$

$$r\theta = 180^\circ - 40^\circ$$

$$r\theta = 140^\circ$$

The angle of reflection is $(r\theta)140^\circ$

According to Xaviour's third law of reflection:

$$X\theta = 180^\circ - 2i\theta$$

$$X\theta = 180^\circ - 2(40^\circ)$$

$$X\theta = 180^\circ - 80^\circ$$

$$X\theta = 100^\circ$$

So, the angle between the Incident ray and the Reflected ray is $x\theta=100^\circ$

Difference between Euclid's law of reflection and Xaviour's laws of reflection:

Euclid's law of reflection	Xaviour's laws of reflection
The angle of incidence is equals the angle of reflection. ($i\theta = r\theta$)	The angle of incidence is numerically not equals the angle of reflection. ($i\theta \neq r\theta$)
The angle of incidence is the angle between the normal line and the incident ray.	The angle of incidence is the angle between the plane mirror and the incident ray.
The angle of reflection is the angle between the normal line and the reflected ray.	The angle of reflection is the angle between the plane mirror and the reflected ray.
Incident ray, reflected ray and the normal at the point of incidence lie in the same plane.	Only incident ray and reflected ray lie in the same plane. No normal line.

Conclusion:

The light rays are reflected when it falls on the upper surface of the Plain mirror. These reflections have some specificity and regulations. This is what is explained by **Xaviour's laws of reflection**. These laws are completely different from the current reflection laws. From these laws, if we know the angle of incidence then it is easy to obtain the angle of reflection. Similarly, if we know the angle of reflection then it is easy to know the angle of incidence. Also, by knowing only the angle of incidence; it is very easy to calculate the angle between the incident ray and the reflected ray can be calculated easily. This is the specialty of Xaviour's Laws of Reflection.

Experiment:

Objective:

The purpose of this experiment is to prove that xaviour's-laws of reflection is true.

Material:

- Protractor
- Laser light
- Plain mirror

Procedure:

Xaviour's laws of reflection can be easily understood by doing the following Simple experiment. Take one Protractor and fix it on the board firmly, so that it does not be moved. Take a plain mirror and fix it at the base of the 90° of the vertical line of the protractor. Then, take a laser lamp should be placed on the contour of protractor. Now, consider a laser ray incident on a

plane mirror, right below 90° , as shown in below figure. When a light ray strikes a plane mirror, the light ray reflects off the mirror. Reflection involves a change in direction of the light. For example, if the laser rays strikes on the mirror at the 30° , its reflective angle is exactly 150° . This is what is explained by the second law ($i\theta + r\theta = 180^\circ$) of Xaviour's laws of reflection. Similarly, in the same experiment, if we measure the angle between the incident ray and the reflected ray, it would be exactly 120° . This is what is explained by third Law ($x\theta = 180^\circ - 2i\theta$) of Xaviour's laws of reflection. So, from this experiment we can understand the true essence of the Xaviour's Law of Reflection.

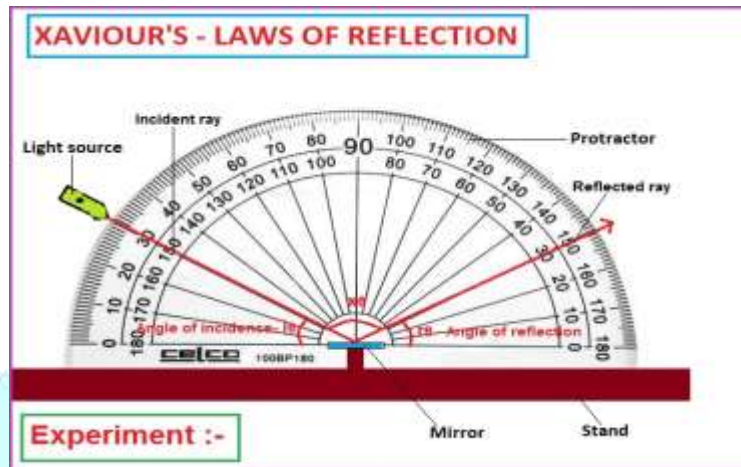


Figure-3: Experiment for Xaviour's laws of reflection

If we do this experiment for every 10° , then the result will be in the following manner:

ANGLE OF INCIDENCE ($i\theta$)	ANGLE OF REFLECTION ($r\theta = 180^\circ - i\theta$)	ANGLE BETWEEN INCIDENT RAY AND REFLECTED RAY ($x\theta = 180^\circ - 2i\theta$)
0°	180°	180°
10°	170°	160°
20°	160°	140°
30°	150°	120°
40°	140°	100°
50°	130°	80°
60°	120°	60°
70°	110°	40°
80°	100°	20°
90°	90°	0°

Result:

From this experimental result, we can understand that "Xaviour's laws of reflection" is correct.

References

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