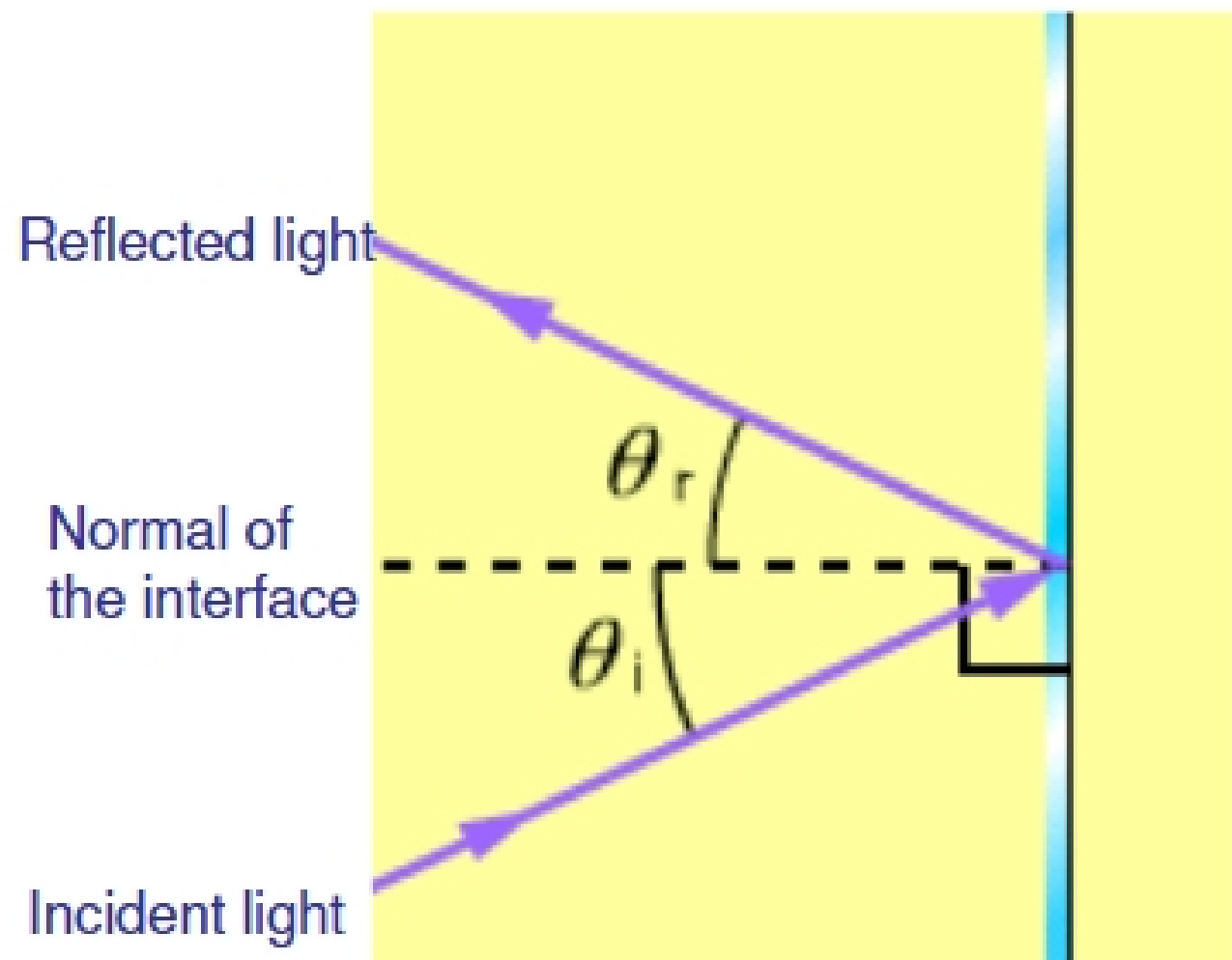


## Geometric optics

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- Light in geometric optics is discussed in rays and represented by a straight line with an arrow indicating the propagation direction.
- Light propagates in straight lines in homogenous medium.
- Light reflects on interface of two media, following the law of reflection:



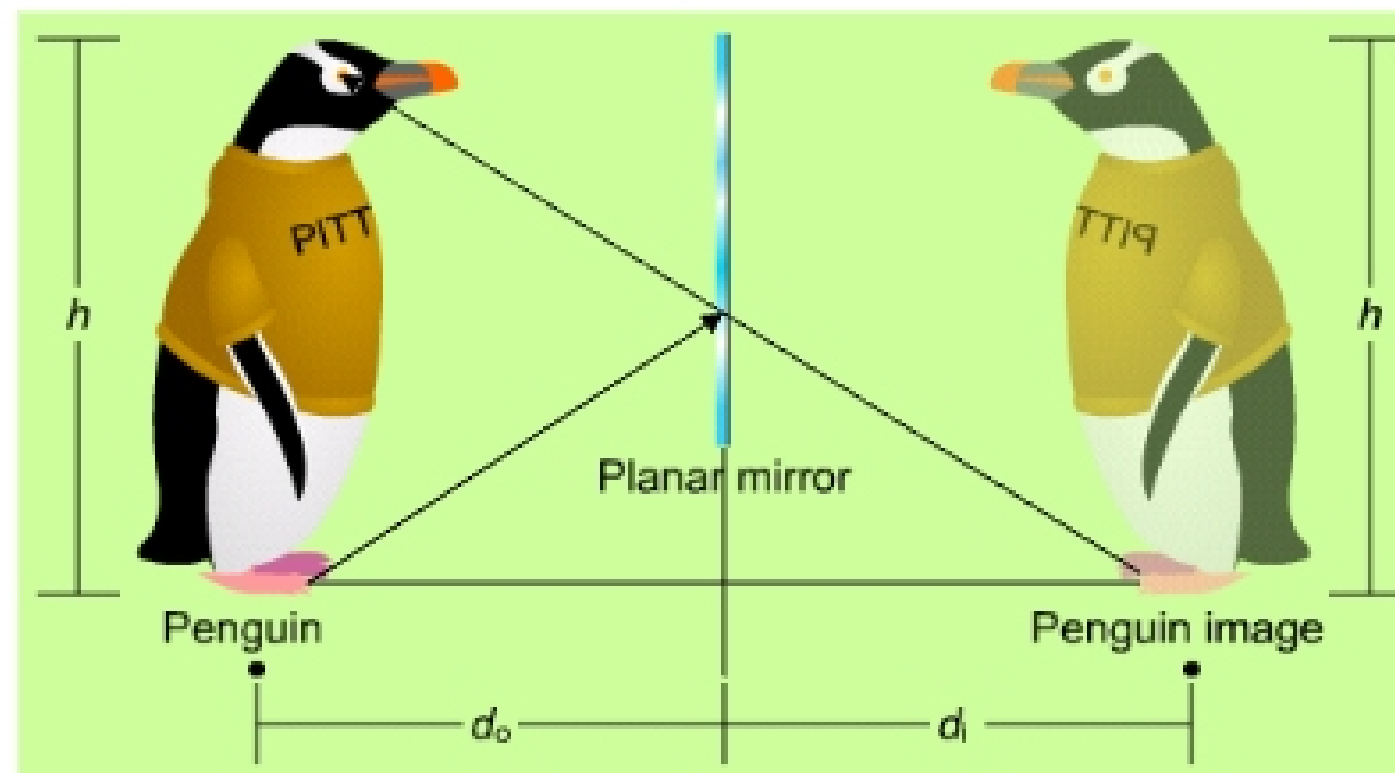
$$\theta_r = \theta_i$$

$\theta_i$  = angle of incidence with respect to the normal of the interface.

$\theta_r$  = angle of reflection with respect to the normal of the interface.

## Planar mirror

- The principle for one sees an image in a planar (flat) mirror is
  - ❑ The eyes see the reflected light from the object by the mirror.
  - ❑ The brain constructs the image by back tracing two light rays from the same object and use the point these two light rays meet as the image of the object. The two light rays are: the ray that emits from the object, reflects on the mirror and reaches the eye; the ray that emits to the normal of the plane in which the mirror sits.
  - ❑ The result: the image is always on the other side of the mirror, virtual, right side up and with equal distance (called the image distance  $d_i$ ) to the mirror as the distance of the object to the mirror (called the object distance  $d_o$ ). The image has the same height as the object.
  - ❑ The word “virtual” means that this image is not “real”, but constructed by your brain instead.
- Example 1: a penguin sees its toe in a mirror.



## Planar mirror

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- Example 2: what is the mirror is not parallel to the penguin?

