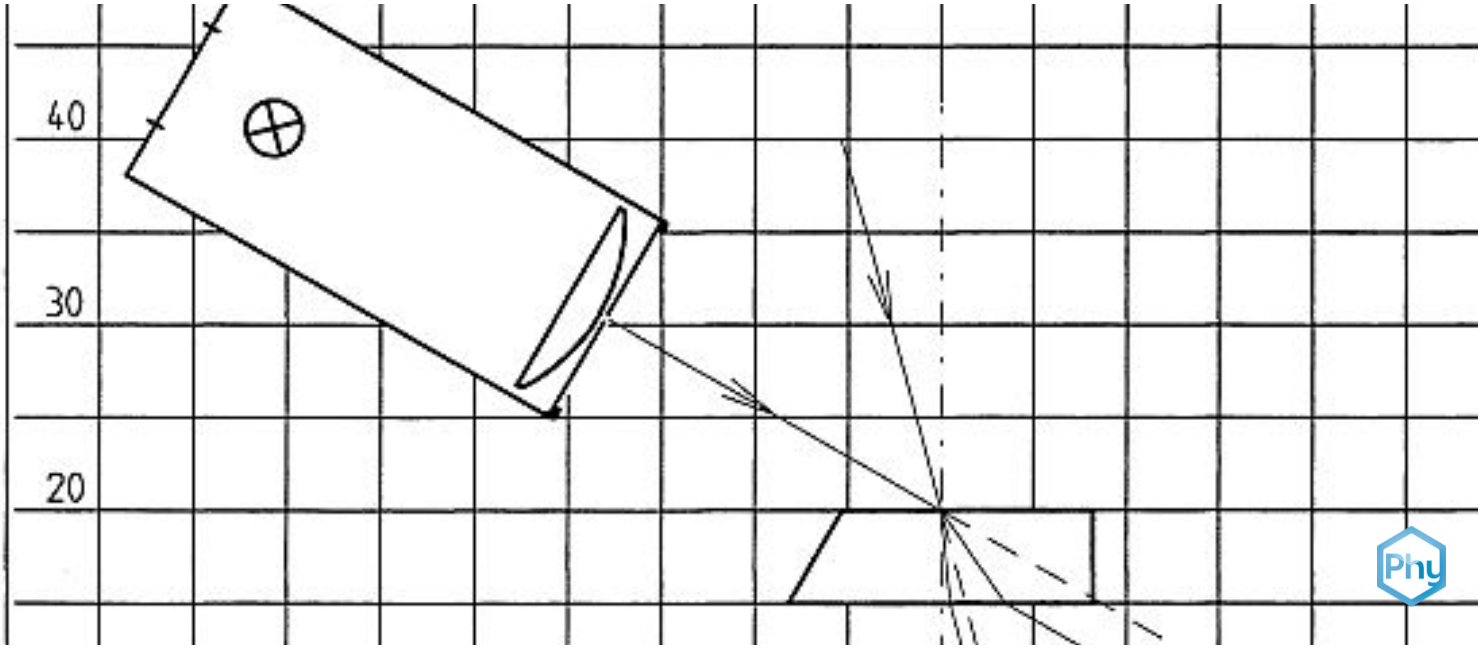
Passage of light through a planoparallel glass plate



Physics | Light & Optics | Reflection & refraction of light

Difficulty level	Group size	Preparation time	Execution time
easy	-	10 minutes	10 minutes

This content can also be found online at:

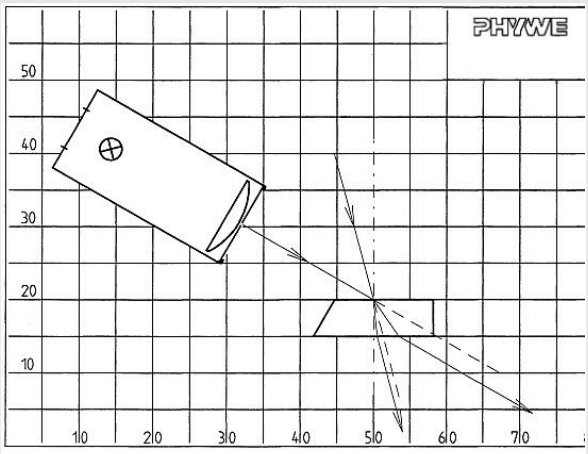
http://localhost:1337/c/642876315e30a7000275eb0c

PHYWE

Teacher information

Application

PHYWE



Experimental set-up:

Light beam through parallel plates

In order to be able to technically use the refractive index, light beams can be refracted twice with the help of two plane-parallel plates to create a parallel beam to the original beam.

The fact that the refractive index reaches into both sides creates a parallel beam.

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Other teacher information (1/2)

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Prior knowledge

Students need prior theoretical knowledge about the straight-line, ray-shaped propagation of light. They should have learned about light refraction and refractive indices.

Principle

Demonstrate the path of a light beam that strikes a plane-parallel plate at an angle.

Other teacher information (2/2)

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Learning objective

The students should observe that when light crosses two parallel media transitions, it is also refracted twice. If the final medium is also the initial medium, the beam is parallel.

Tasks

The students should observe the experiment and understand that light is refracted twice when it passes through a pane.

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Additional teacher information

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Note

To clarify the parallel shift, the incident beam and its extension can also be drawn in beforehand.

Safety instructions

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- The general instructions for safe experimentation in science lessons apply to this experiment.

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Student information

Motivation

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By now you have learned a lot about reflection and refraction.

Light is refracted when it passes from one medium to another, but how is it that we can still look through glass without any problems. shouldn't light be refracted and distort our vision?

This question is to be clarified in the present experiment.

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Equipment

Position	Material	Item No.	Quantity
1	PHYWE Demo Physics board with stand	02150-00	1
2	Halogen lamp for experiments, 12V/50W, with magnetic base	08270-20	1
3	Opt. block,trapeze, magnet held	08270-05	1
4	PHYWE Multitap transformer DC: 2/4/6/8/10/12 V, 5 A / AC: 2/4/6/8/10/12/14 V, 5 A	13533-93	1
5	G-clamp	02014-00	2

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Set-up and Procedure

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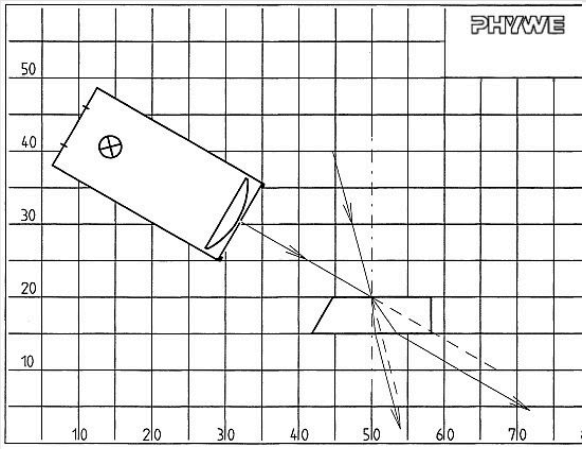

1-slit aperture on trapezoidal body

- Draw a horizontal line to mark the interface approximately in the middle of the lower half of the adhesive board; erect incidence plumb bob
- Attach model body trapeze
- Position the luminaire with a 1-slit diaphragm so that the light beam runs along the incidence slit and therefore no refraction occurs; readjust the model body if necessary.
- Set different angles of incidence by moving the luminaire and observe the course of the rays (the picture shows two settings; dashed lines to illustrate shifts)

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Report

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Task 1

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Fill in the blanks!

If a _____ hits a _____ plate at an angle, it is refracted _____ and then continues to run parallel _____.

The greater the angle of incidence, the _____ the parallel shift.

greater
beam of light
shifted
twice
plane-parallel

Check

Task 2

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When light passes through a plane of glass it is....

- broken once.
- broken twice.
- broken differently often depending on the medium.

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Slide	Score / Total
Slide 12: Light beam on plane-parallel plate	0/5
Slide 13: Light transition through glass pane	0/2

Total 0 / 7

Solutions Repeat

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