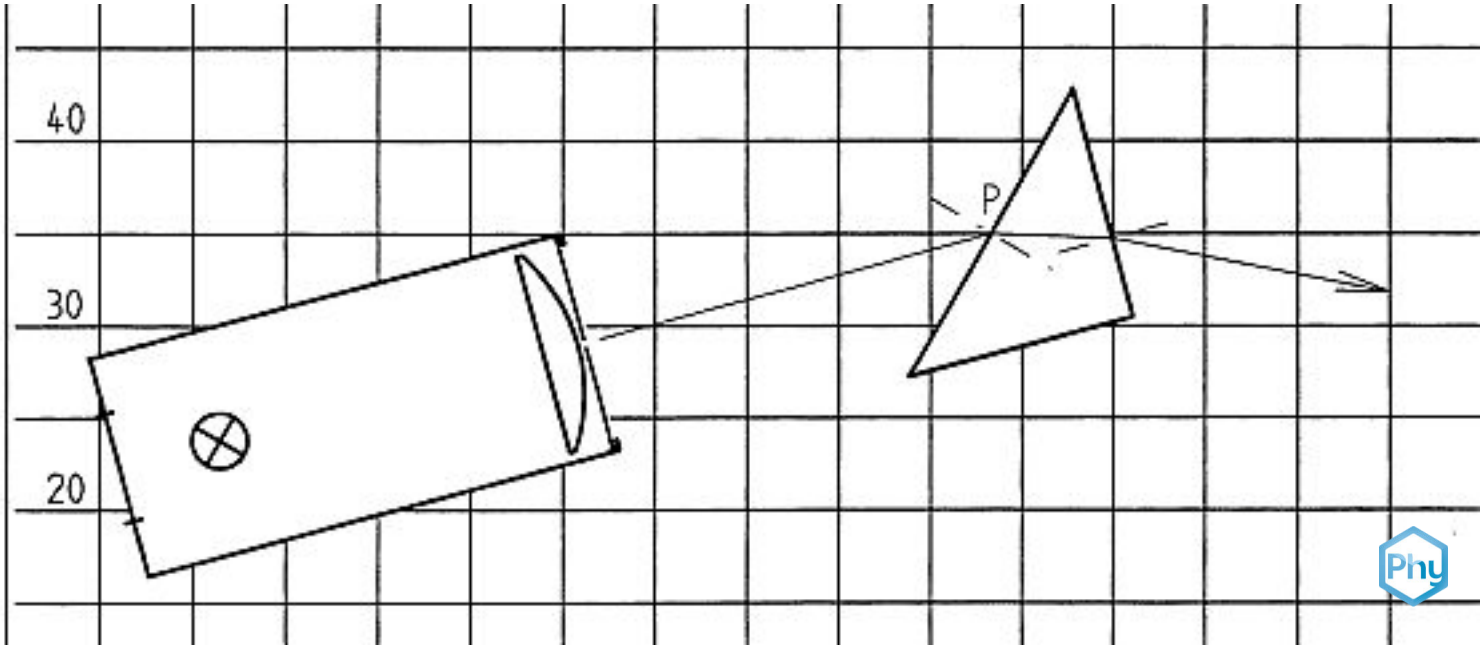
Refraction by a prism



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/642877cd5e30a7000275eb14

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Teacher information

Application

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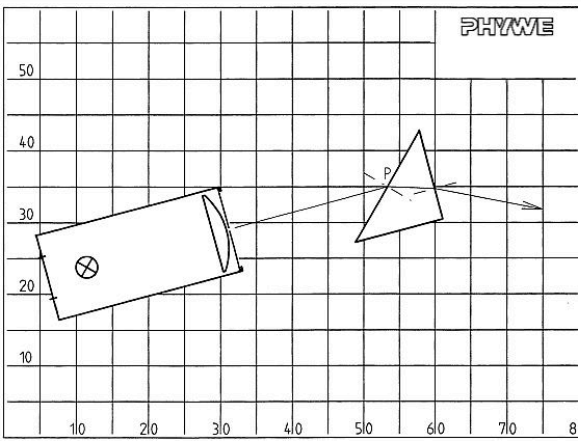

Experimental set-up:

Refraction of light at prism

After the students have learned how a light beam behaves when passing through two parallel transitions, this experiment is intended to draw attention to the behaviour at different angles.

The refractive index always describes the refractive behaviour perpendicular to the transition surface.

Due to the different spatial directions of the prism walls, the light beam is also refracted differently.

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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

The aim is to show how a beam of light passes through a prism.

Other teacher information (2/2)

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Learning objective

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

Tasks

The students should observe the experiment and realise that passing through mutually inclined planes also leads to a tilting of the light beam.

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Additional teacher information

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Note

In this experiment the refractive angle is 45°. If you want to show that the total deflection is also dependent on the refractive angle, then the experiment can be repeated with the model body trapezoid (08270-05), which contains an angle of 60°.

The fact that after the refraction of the light beam at the prism, colour appearances also occur due to dispersion should not be emphasised at this point.

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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The picture opposite is a symbolic image.

This experiment deals with the refraction of a light beam passing through a prism.

Unlike the parallel glass pane, the light is refracted here depending on the angle of the prism side.

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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,triangular,magnet held	08270-06	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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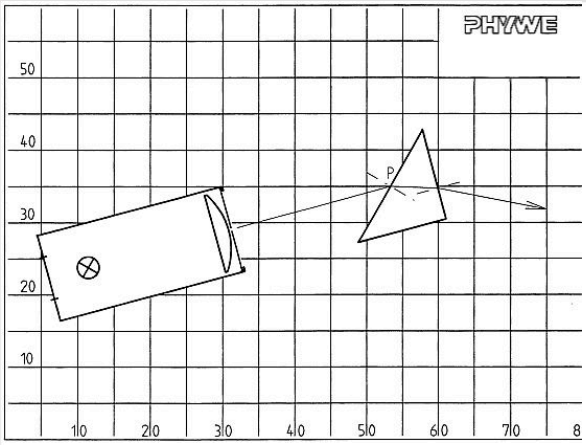

1 slit diaphragm directed towards prism

- Place the prism (model body right triangle) on the adhesive board approximately as shown.
- Aim the adhesive luminaire with 1-slit diaphragm at the prism; mark the point of incidence of the light beam (P)
- Move the luminaire to another position, whereby the light beam should always hit P, or rotate the prism around the point P.
- Observing the course of the light beam at different angles of incidence

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Report

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Task 1

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Draw the correct words into the gaps!

The light beam is refracted towards the _____ as it enters the prism and away from the _____ as it leaves.

The _____ of the light beam twice results in a _____ that depends on the angle of incidence.

The total deflection is _____ when the beam passes through the prism _____.

perpendicular
incident perpendicular
smallest
symmetrically
refraction
total deflection

Check

Task 2

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The prism used has an angle of ....

45°
180°
60°

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Task 3

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The shape of a prism is unimportant for the refraction behaviour of light.

○ True ○ False

Check

The refractive indices depend on the incidence slot of the prism side

○ True ○ False

Check

Slide	Score / Total
Slide 12: Light entering prism	0/6
Slide 13: Angle prism	0/2
Slide 14: Multiple tasks	0/2

Total 0 / 10

Solutions Repeat

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