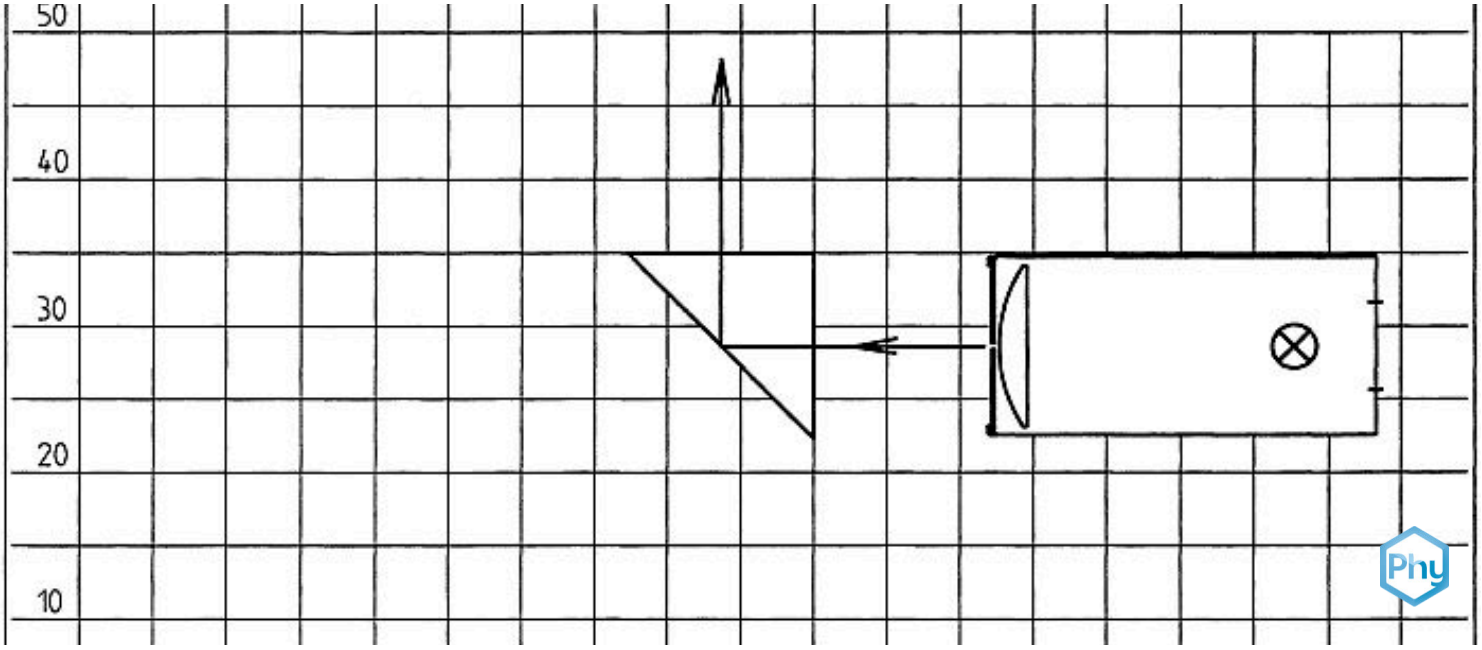
Light path of through a deviating prism



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/64287d5c880a590002a653a7

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Teacher information

Application

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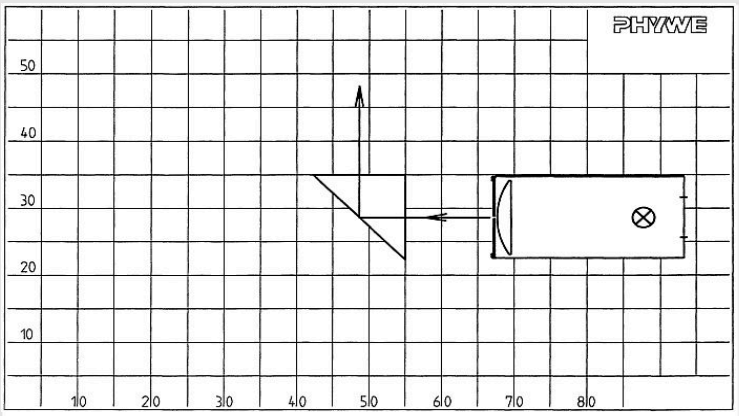

Experimental set-up:

Beam path perpendicular to cathetus of inverted prism

An inverted prism has different areas of application, depending on the orientation and angle of entry, it can be used in different ways.

The experiment is to show that the perpendicular impact on the cathetus breaks the ray by 90° and the perpendicular impact on the hypotenuse throws the ray back parallel.

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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 gained experience about light refraction and refractive indices.

Principle

The aim is to demonstrate how light rays travel when they impinge on a right-angled isosceles prism, perpendicular to its hypotenuse and cathetus.

Other teacher information (2/2)

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Learning objective

The students should observe how an inverted prism can be used and which rules apply for which case of entry.

Tasks

The students should observe the experiment and understand what effects an inverted prism has on the beam path.

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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

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Motivation

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Reflex camera

The so-called inverted prism is characterised by its rectangularity and isosceles shape.

It is used in SLR cameras and microscopes because it is able to turn an image upside down.

In different positions, the light can be refracted differently with the help of the reverse prism.

The present experiment is intended to show what other variants there are to pure reversal.

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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 (1/2)

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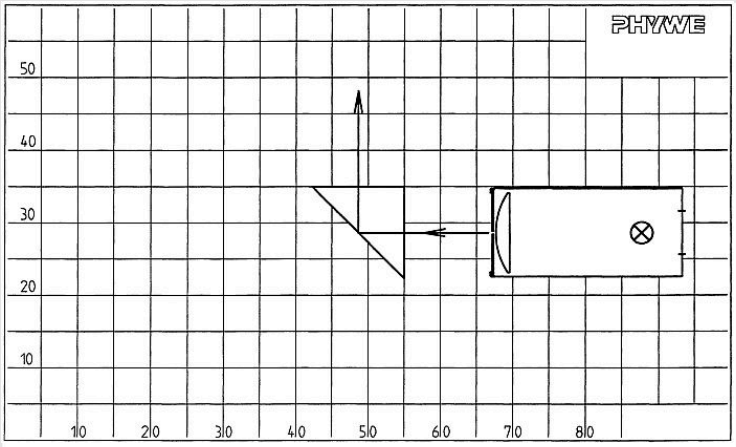

1-slit aperture directed perpendicular to cathetus

- Place the prism (model body right triangle) approximately in the middle of the adhesive board.
- Position the luminaire with 1-slit aperture so that the light beam hits one cathetus perpendicularly.

Set-up and Procedure (2/2)

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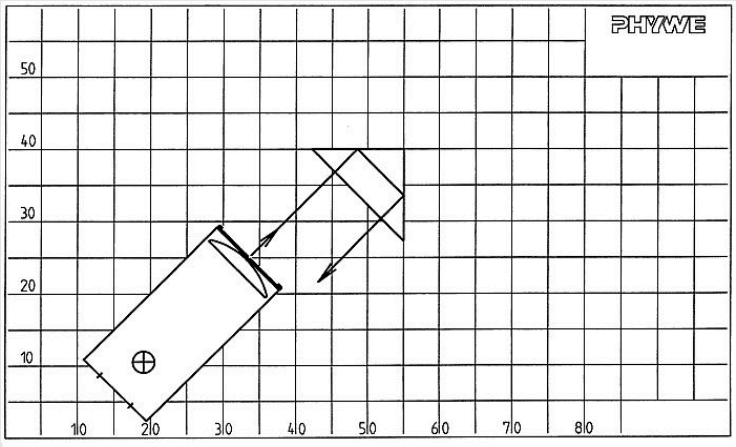

1-slit aperture directed perpendicular to hypotenuse

- Then place the luminaire so that the light beam hits the hypotenuse perpendicularly.
- Observe radiation patterns

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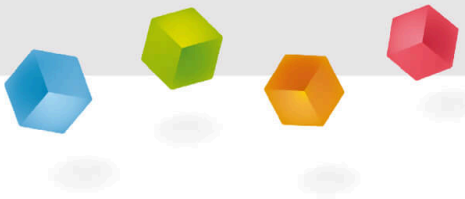

Report

Task 1

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Draw the correct words into the gaps!

When the _____ of light strikes the _____ of the right-angled isosceles _____ perpendicularly, it is totally reflected at the _____ and then runs _____ to the original direction;

It is deflected by _____.

prism
90°
beam
cathetus
perpendicularly
hypotenuse

Check

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Task 2

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If the light beam occurs perpendicular to the hypotenuse,...

- then it is reflected so that it exits in the opposite direction to the original direction.
- then it is shifted parallel so that it exits in the same direction.
- then it is broken so that it exits at a slight angle to the original direction.

Task 3

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If the beam is deflected by 180°, this is also called a deflecting prism.

○ True ○ False

Check

An inverted prism has different uses depending on its position.

○ True ○ False

Check

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Slide	Score / Total
Slide 12: Light reflection at the prism	0/6
Slide 13: Light beam perpendicular to the hypotenuse	0/2
Slide 14: Multiple tasks	0/2

Total 0 / 10

Solutions Repeat

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