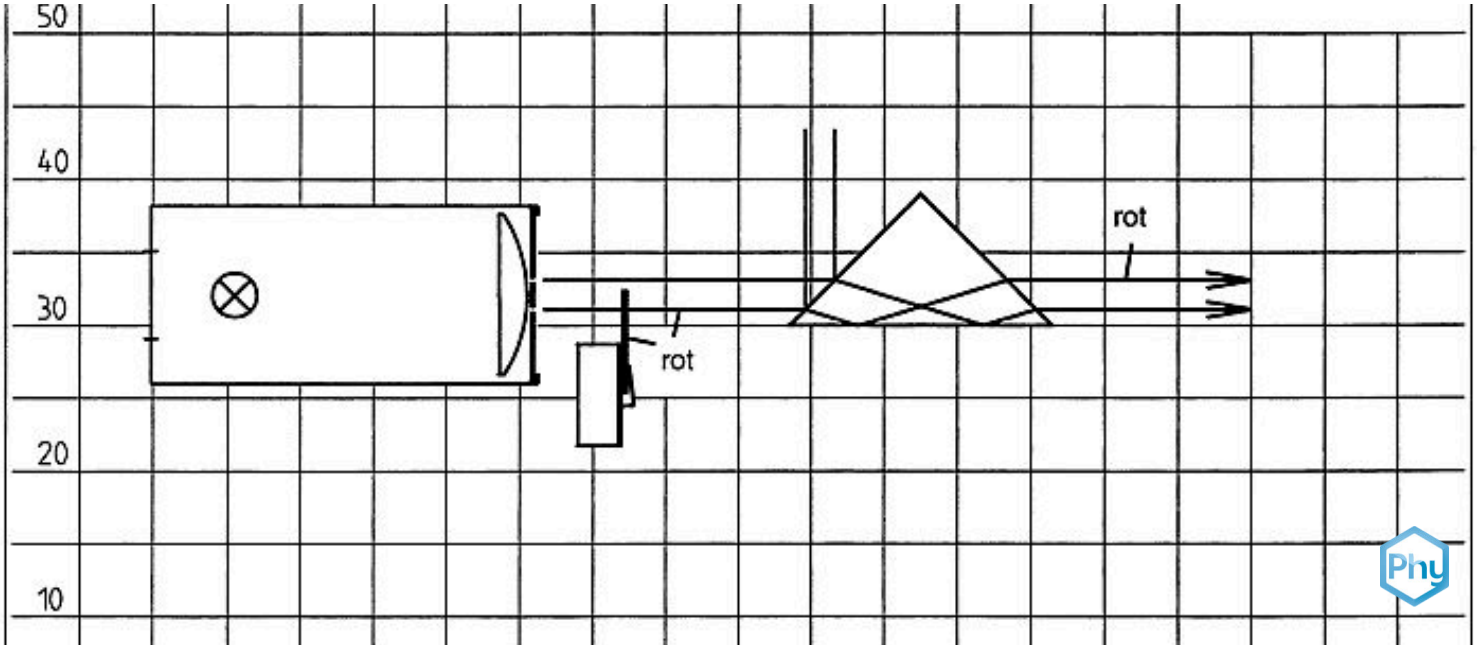
Light path through a reversing prism



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/64287c1d9020e100028153c9

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Teacher information

Application

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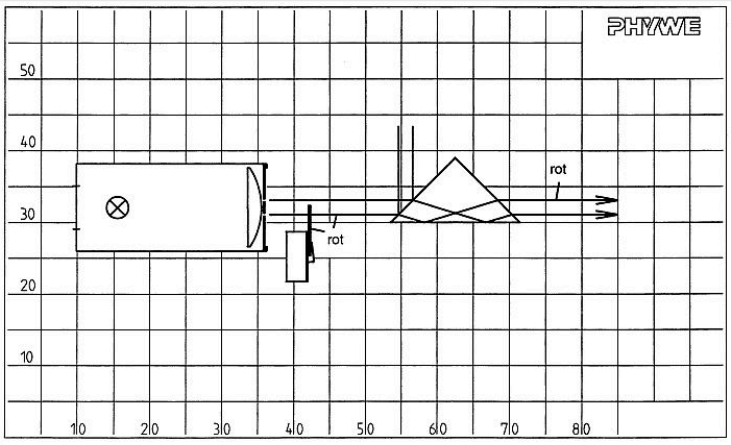

Experimental set-up:

Beam path through inverted prism

This experiment is intended to show that an inverted prism not only refracts the light and passes it on in parallel, by colouring a beam of light it is possible to see that the lower beam is later the upper beam.

This means that the rays travel different paths in the prism depending on where they enter.

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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 demonstrate how light rays travel when they impinge on a right-angled isosceles prism, parallel to its hypotenuse.

Other teacher information (2/2)

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Learning objective

The students should observe that the light, in a right-angled prism, the rays that run parallel to the hypotenuse also emerge parallel again from the prism, but they are rearranged.

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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SLR 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.

The underlying experiment should explain how this is possible.

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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	Diaphragm w. holder, magnet held	08270-10	2
5	Colour filter set, additive (red, blue, green)	09807-00	1
6	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
7	G-clamp	02014-00	2

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Set-up and Procedure

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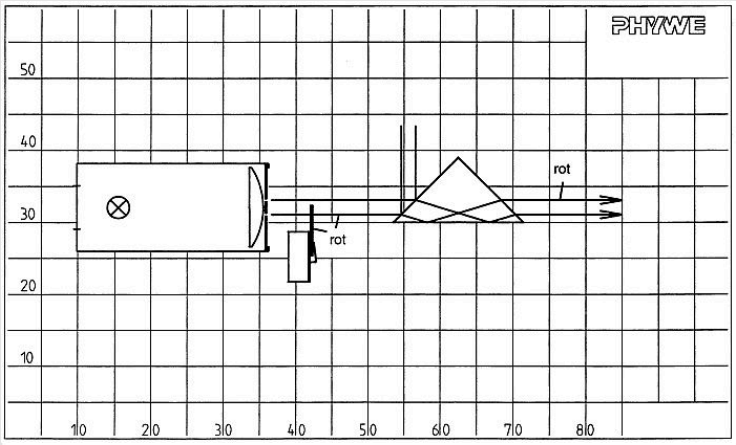

2-slit aperture directed towards reversing prism

- Place the model body on the adhesive board
- Position the luminaire with the 2-slit cover as shown in Fig. 1.
- Place the colour filter (e.g. red) in one of the beams using an aperture with a holder.
- If necessary, use the second diaphragm to dim the upward rays reflected from the prism.
- Observe radiation patterns

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Report

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Task 1

Fill the correct words into the gaps!

The two _____ hitting the prism _____ to the _____ are refracted at the first _____.

Then _____ reflected at the hypotenuse and again _____ at the _____ cathetus when exiting the prism.

hypotenuse
totally
second
cathetus
refracted
rays
parallel

Check

Task 2

After exiting the prism, the rays run...

- in the same direction as before impact.
- in the opposite direction as before impact.
- offset parallel to the impact.
- perpendicular to the incidence slot.

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Task 2

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After exiting the prism, the rays run...

- in the same direction as before impact.
- in the opposite direction as before impact.
- offset parallel to the impact.
- perpendicular to the incidence slot.

Task 3

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The prism used is also called a mirror prism.

○ True ○ False

Check

Inverting prisms are used in microscopes, cameras and telescopes.

○ True ○ False

Check

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