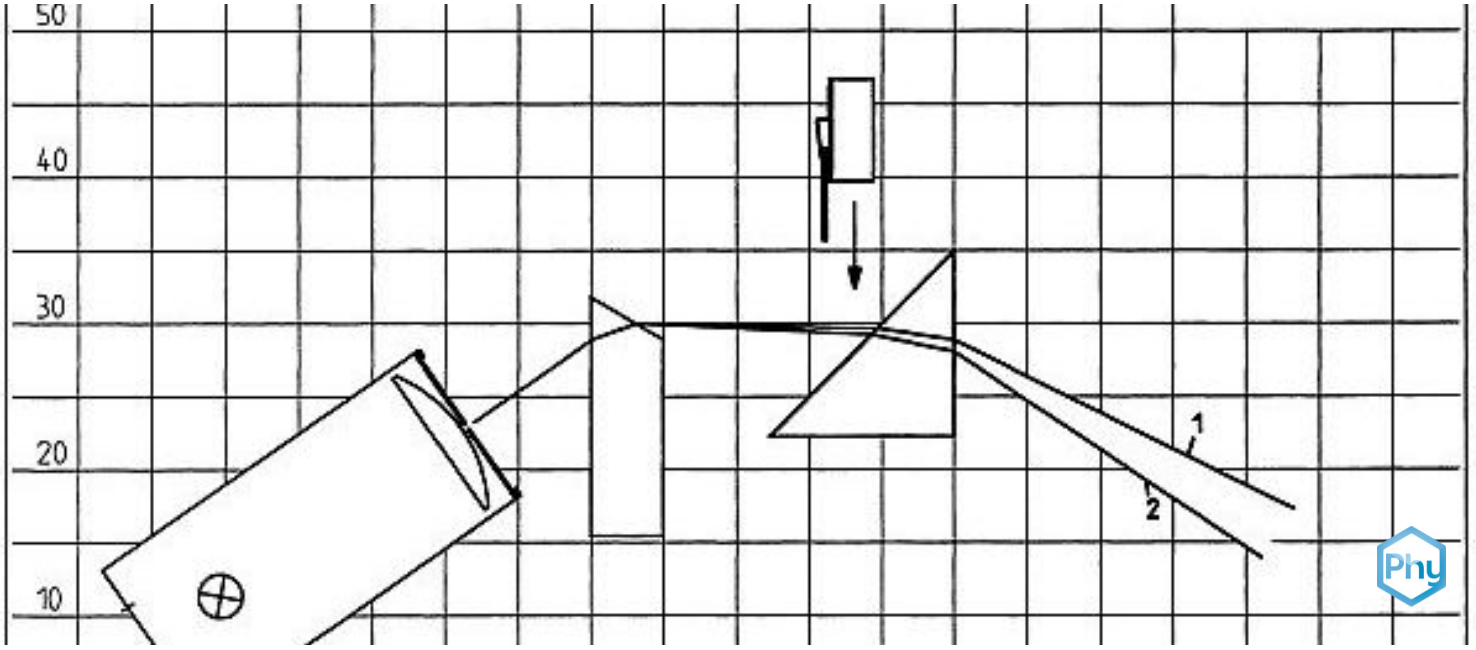
Indecomposability of the spectral colors



Indecomposability of the spectral colors

Physics | Light & Optics | Light & Colour

Difficulty level	Group size	Preparation time	Execution time
easy	1	10 minutes	10 minutes

This content can also be found online at:

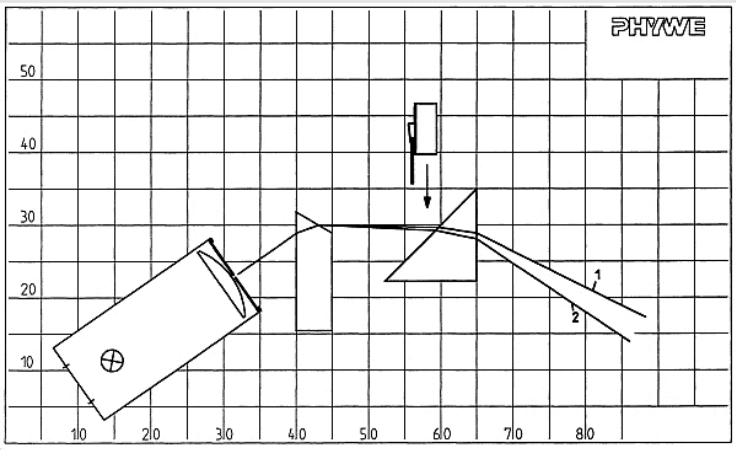
http://localhost:1337/c/616d55beaeb0ac0003430af7

PHYWE

Teacher information

Application

PHYWE



Experimental setup:

1-slit diaphragm with prisms

The experiment is to show that the spectral colours cannot be fanned out further. As soon as dispersion occurs, the beam is broken into an infinite number of colours between red and violet.

A further fanning of the colors is not possible, only the infinitely many intermediate colors can be recognized better.

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Other teacher information (1/2)

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Previous

Students need prior knowledge of light refraction and dispersion in spectral colors.

Principle

It is to be shown that spectral colors cannot be further decomposed.

Other teacher information (2/2)

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Learning

Students will develop a sound knowledge of image construction.

Tasks

The students should observe the experiment and learn which concepts and properties are of high importance for the construction of the image.

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Safety instructions

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

Student Information

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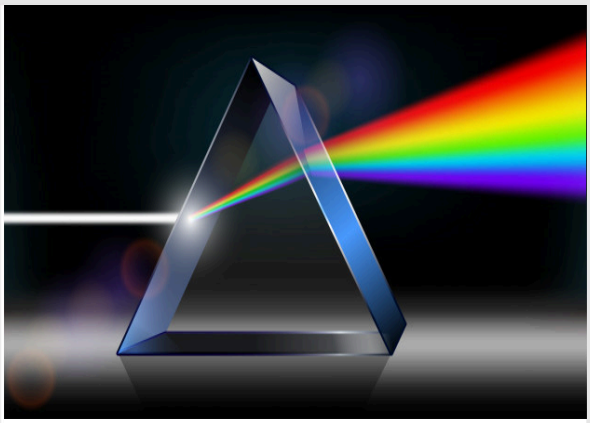
Motivation



Glass prism refracts light into spectrum

On the left side you can see how a glass prism apparently creates a rainbow.

In fact, rainbows are created in a very similar way; the light of the sun, which is almost white for us, is broken down into its spectral colours in raindrops and appears from red to violet in the familiar rainbow colours.

The underlying experiment is intended to show that fanned-out color spectra cannot be fanned out further.

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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	Opt. block,triangular,magnet held	08270-06	1
5	Diaphragm w. holder, magnet held	08270-10	2
6	Colour filter set, additive (red, blue, green)	09807-00	1
7	Colour filter set, subtractive (yellow, magenta, cyan)	09808-00	1
8	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

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Structure and implementation

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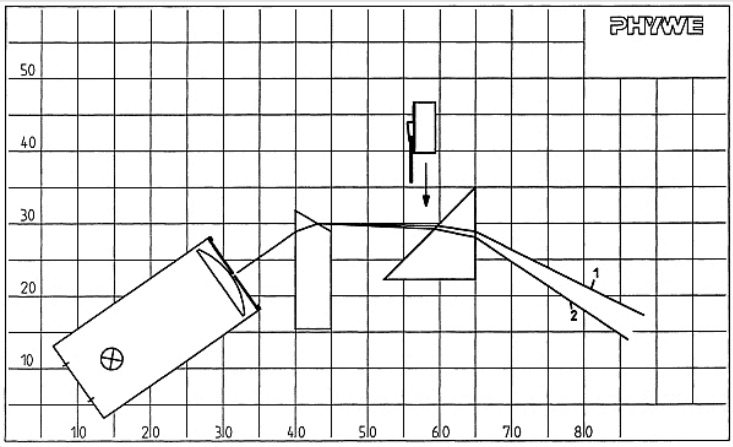

1 slit diaphragm with glass prisms

- Attach the holding lamp with 1-gap cover
- 60°- Prism of the model body Trapezoid set into the light beam, so that the beam path through the prism is approximately symmetrical.
- Rotate the prism slightly around the point of incidence of the light beam so that the resulting coloured light beam is wide enough.
- 45°- Place prism in the coloured light beam
- Viewing light in front of and behind the 45°

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Report

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Task 1

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Drag the correct words into the gaps!

The _____ light hitting the prism is _____ by the prism to a _____ light bundle, which is _____. For example, the colors red, yellow, green and blue - from _____ to _____ in succession - are recognizable.

colored
white
above
below
fanned out
divergent

Check

Task 2

PHYWE

When passing through the second prism, the colors are decomposed again.

○ True ○ False

Check

When passing through the second prism, the colors are fanned out more broadly.

○ True ○ False

Check

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Slide	Score / Total
Slide 11: Light on prism	0/6
Slide 12: Multiple tasks	0/2

Total 0 / 8

Solutions Repeat

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