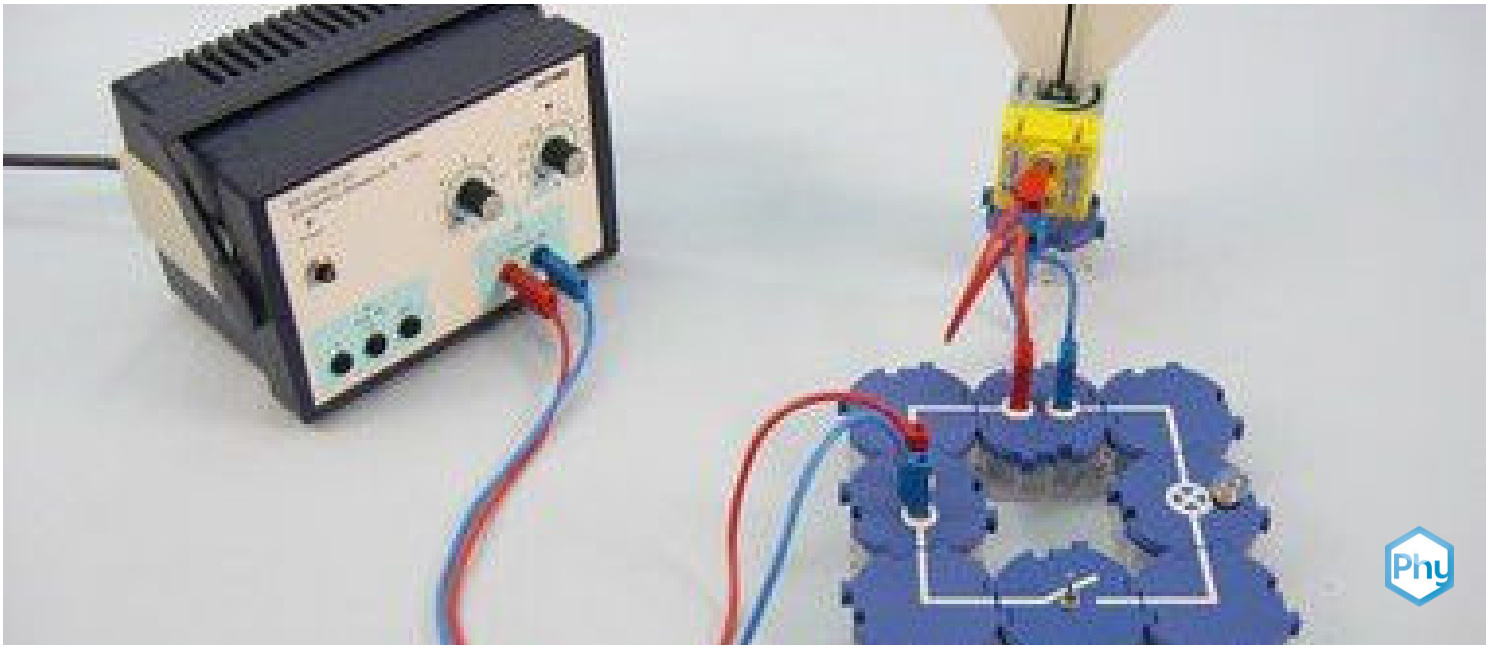
The galvanometer



With this experiment, the students should work out the basic construction and the functional principle of a galvanometer.

Physics > Electricity & Magnetism > Electromagnetism & Induction

Difficulty level	Group size	Preparation time	Execution time
medium	2	10 minutes	10 minutes

This content can also be found online at:

http://localhost:1337/c/63145c1a971a9300037ff61d

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Teacher information

Application

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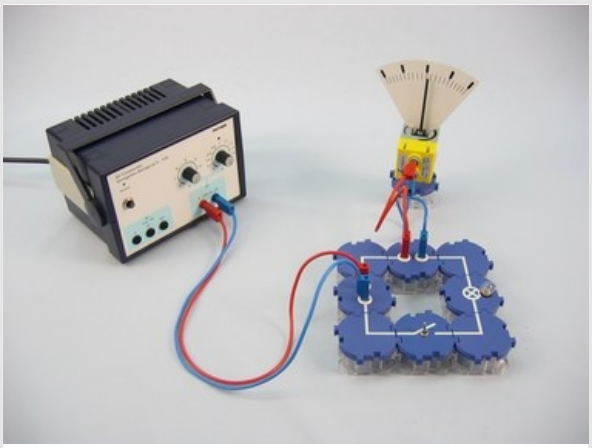

Experimental setup

Galvanometers are electromechanical current measuring instruments which generate a mechanical rotary movement proportional to the electric current.

The principle is used, among other things, in moving-coil movements in combination with a pointer and a scale as a display instrument. Other applications are in galvanometer drives, which are used for fast angle adjustment for light pointers, scanners or in CD players.

The galvanometer is named after the Italian doctor and researcher Luigi Galvani.

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Other teacher information (1/2)

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Prior knowledge

The students should have gained first experimental experience in using the power supply unit.

Principle

The galvanometer uses the principle of the moving-coil instrument, or more rarely the moving-magnet instrument, and is designed for high current sensitivity without sacrificing high accuracy.

Other teacher information (2/2)

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Learning objective

With this experiment, the students should work out the basic construction and the functional principle of a galvanometer.

Tasks

Build a model of a galvanometer (a device for measuring current) and investigate how the galvanometer works.

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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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Galvanometers are electromechanical current measuring instruments which generate a mechanical rotary movement proportional to the electric current.

The principle is used, among other things, in moving-coil movements in combination with a pointer and a scale as a display instrument. Other applications are in galvanometer drives, which are used for fast angle adjustment for light pointers, scanners or in CD players.

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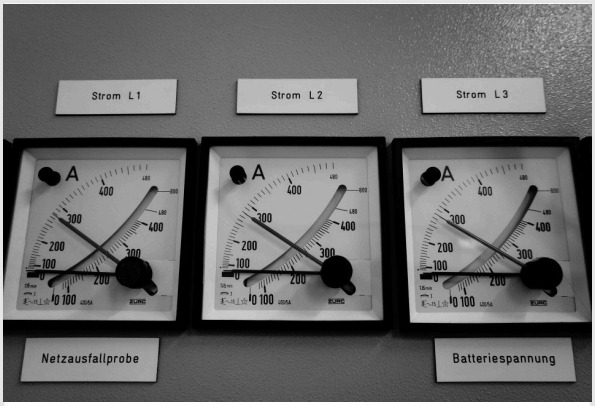

Galvanometers are electromechanical current measuring instruments.

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Equipment

Position	Material	Item No.	Quantity
1	Angled connector module, SB	05601-02	4
2	Interrupted connector module with sockets, SB	05601-04	2
3	Straight connector module with socket, SB	05601-11	1
4	On-off switch module, SB	05602-01	1
5	Socket module for incandescent lamp E10, SB	05604-00	1
6	Coil, 400 turns	07829-01	1
7	Galvanometer movement	07875-00	1
8	Galvanometer scale	07876-00	1
9	Notch bearing with plug	07877-00	1
10	Connecting cord, 32 A, 500 mm, red	07361-01	2
11	Connecting cord, 32 A, 500 mm, blue	07361-04	2
12	PHYWE Power supply, 230 V, DC: 0...12 V, 2 A / AC: 6 V, 12 V, 5 A	13506-93	1
13	Filament lamps 4V/0.04A, E10, 10	06154-03	1

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Set-up and Procedure (1/4)

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- Assemble the model of the galvanometer according to Fig. 1 and Fig. 2:

1. Assemble the coil and notch bearing.
2. Attach the scale.
3. Make sure that the pointer axis is exactly in the notch bearing and that the pointer is in the middle of the scale. If this is not the case, the pointer must be readjusted by turning the compensating body.

- Place the notch bearing of the galvanometer on a line module with socket and build the experiment according to Fig. 4 and Fig. 5.

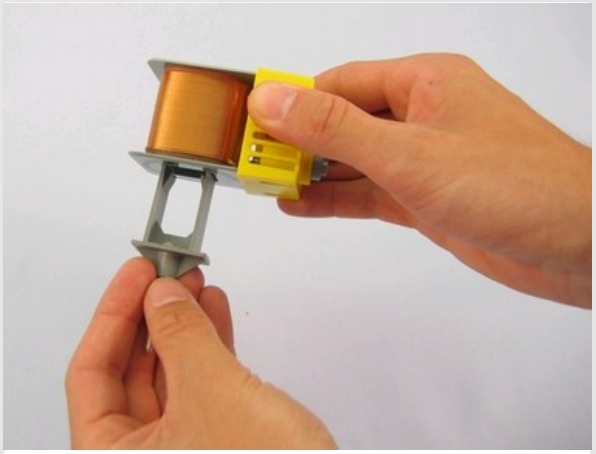

Fig. 1

Set-up and Procedure (2/4)

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- Set the power supply unit to 0 V and switch it on.
- Close the switch and slowly increase the voltage until the pointer is fully deflected. Then increase the voltage to max. 4 V, always watching the bulb.
- Reduce the voltage to 0 V, observe the pointer and the bulb and note your observations in the report.

Fig. 2

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Set-up and Procedure (3/4)

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- Open the switch and swap the connecting leads. Reverse the polarity of the meter model.
- Close the switch and increase the voltage as before and then reduce it to 0 V again. Observe the pointer deflection and the bulb.
- Note down your observations in the report and switch off the power supply unit.

Fig. 3

Set-up and Procedure (4/4)

PHYWE

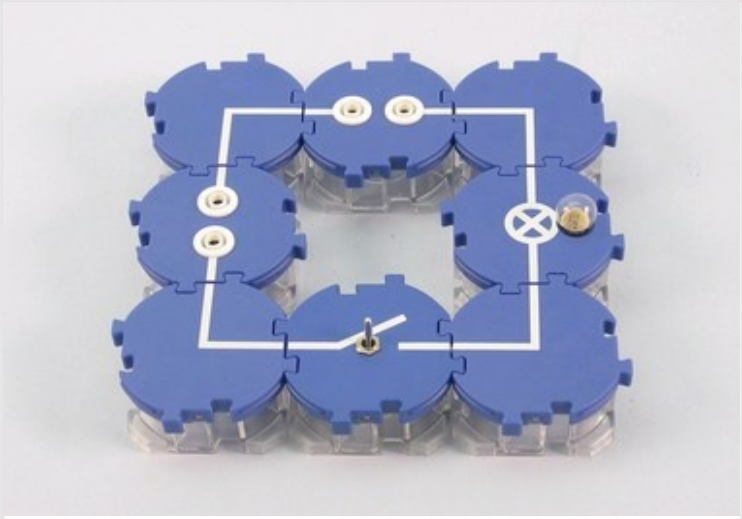

Fig. 4

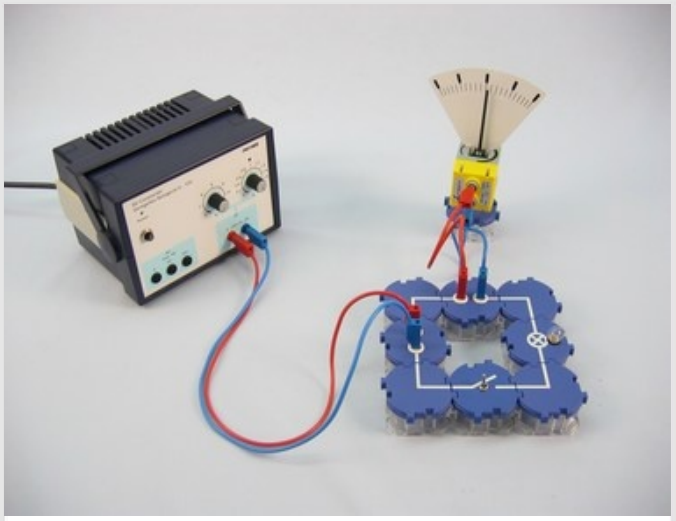

Fig. 5

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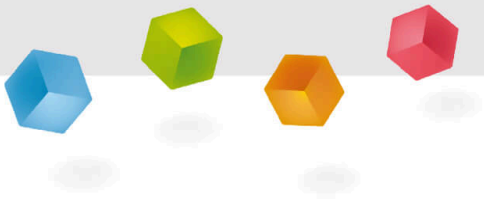

Report

Observation (1/2)

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Write down your observations about the first part of the experiment.

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Observation (2/2)

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Write down your observations on the second part of the experiment.

Task (1/3)

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What effect of the electric current is exploited in this type of galvanometer?

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Task (2/3)

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Why not just use a light bulb to measure the electric current?

- The brightness of a light bulb does not depend on the current intensity
- The brightness of a light bulb does not increase linearly with the current intensity
- The brightness of a light bulb is not easy to measure

How can you tell if an electric current is flowing in this experiment?

- The light bulb lights up
- The light bulb does not light up

Task (3/3)

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Try to describe the construction and function of the galvanometer used in the experiment.

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Slide	Score / Total
Slide 17: Multiple tasks	0/2

Total score 0 / 2

Show solutions | Repeat | Export text

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