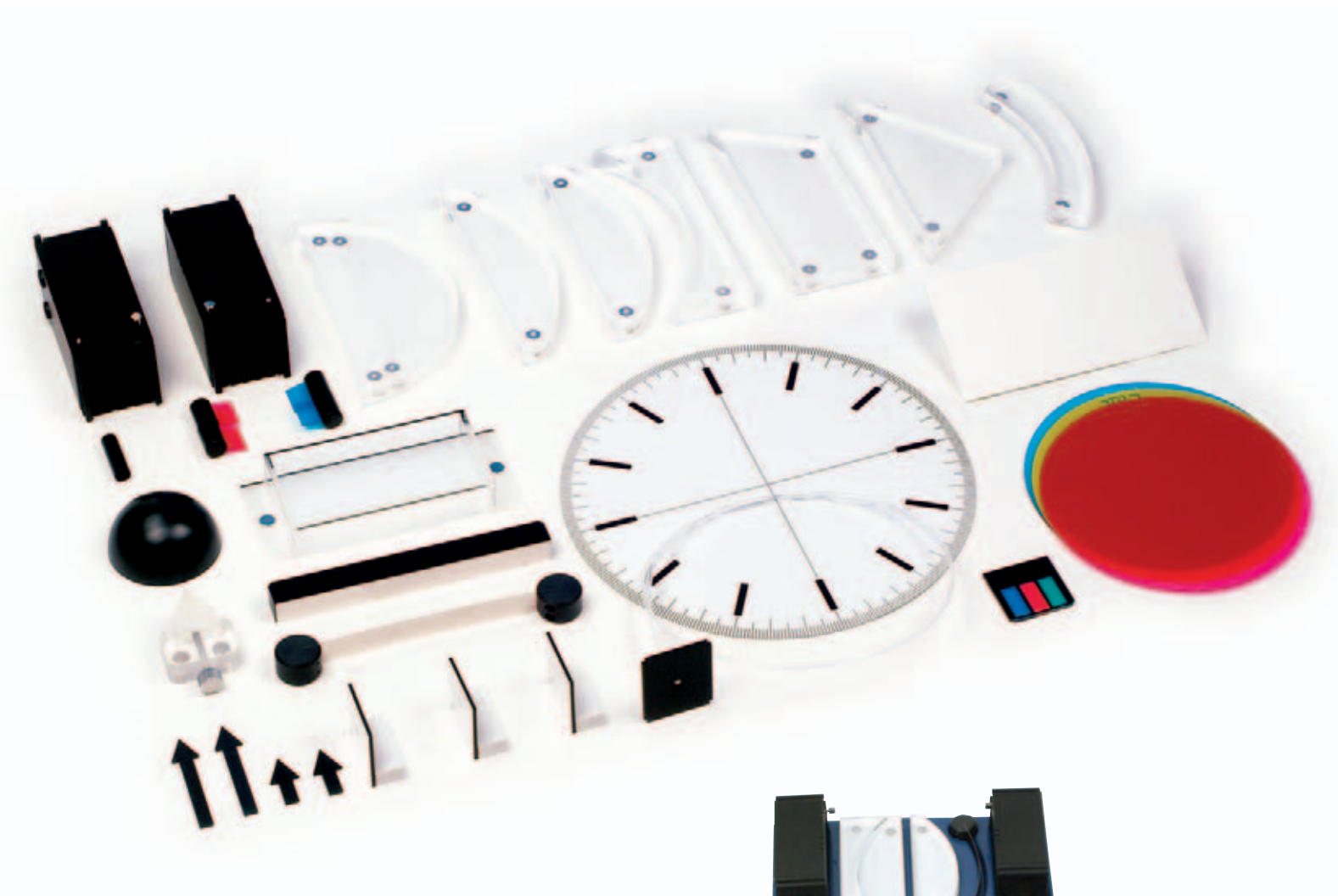




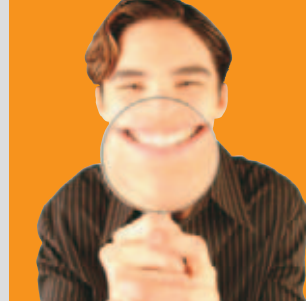
# magnetic panel optics

## MAGNETIC PANEL OPTICS

This equipment set features magnetic parts that allow experiments in geometric optics to be demonstrated on metal panels in a clearly visible and understandable manner. Set 1 contains magnetic lamps equipped with 6-volt xenon bulbs. Not only do these lamps supply especially white light, they also provide a much greater degree of illumination than conventional 12-volt halogen lamps. And, thanks to a small filament, light rays emitted from a 6-volt xenon lamp have a very sharp resolution.



# magnetic panel optics



## DL715-1A Magnetic panel optics, set 1

consisting of:

DL100-1XL	1x	MPO-Lamp, Xenon, 6V/20 W, sockets left
DL100-1XR	1x	MPO-Lamp, Xenon, 6V/20 W, sockets right
DL930-1A	1x	MPO Model body planoconcave
DL930-1B	2x	MPO Model body planoconvex
DL940-1A	1x	MPO Mirror, plane
DL940-1B	1x	MPO Mirror, flexible
DL960-1G	1x	MPO Hemisphere for shadowing
DL960-1K	1x	MPO Cylinder for shadowing, small
DL970-1A	2x	Arrow, l=80mm, magnetic
DL970-1B	2x	Arrow, l=40mm, magnetic
P5405-1A	2x	Shutter with 1 and 2 slits
P5405-1B	2x	Shutter with 3 and 5 slits
P7920-10	1x	Box-insert MPO - 1



## DL715-1B Magnetic panel optics, set 2

consisting of:

DL920-1A	1x	Optical disc, magnetic, D=300 mm
DL930-1C	1x	Semicircular object, magnetic, r=100 mm
DL930-1D	1x	Prism model, magnetic, L=200mm, H=100 mm
DL930-1E	1x	Trapezoid object, magnetic, L=200 mm, 60 °/ 30 °
DL930-1L	1x	Optical fibre, c-shaped, magnetic
DL935-1K	1x	Cell, magnetic, 200x100x25 mm
DL950-1A	1x	Prism, flint glass, magnetic, n=1.62
DL980-1G	2x	Colour filter, blue, magnetic
DL980-1R	2x	Colour filter, red, magnetic
P7806-20	1x	Storage box, large
P7920-20	1x	Box insert MPO set 2

## DL715-1C Magnetic panel optics, set 3

consisting of:

DL931-1L	1x	Model optical fibre, flexible
DL203-1S	1x	Colour filter discs, subtractive, set of 3, D=195 mm
DL930-1K	1x	Projection wedge, magnetic, 200x45 mm
DL941-1A	1x	Mirrors, demo, magnetic, set of 3, 50x50 mm
DL980-1D	1x	Three-colour filter, additive

## DS103-1A Assembly panel complete

consisting of:

DS101-1G	1x	Universal support base, L = 500 mm
DS103-1P	1x	Panel, white/green, 900x610 mm
DS600-6G	1x	Panel support stand, pair

### Recommended accessory:

DS500-1G	2x	Screw clamp, for tables
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### Ordering information for magnetic panel optics:

DL720-1G	1x	Universal support base, L = 500 mm
consisting of:		
DL715-1A	1x	Magnetic panel optics, set 1
DL715-1B	1x	Magnetic panel optics, set 2
DL715-1C	1x	Magnetic panel optics, set 3
DL720-1CE	1x	Manual MHO, CD-ROM

### Recommended accessory:

DS103-1A	1x	Assembly panel complete
P3120-1N	1x	Mains transformer „inno“
DG507-37	4x	Safety connecting lead, yellow 37 cm



# magnetic panel optics



## **DL100-1XL Lamp for magnetic panel, xenon, connectors at left**

Lamp for experiments, made of black powder-coated aluminium, magnetic, including a condenser lens for parallel light rays; in order to obtain divergent light rays, the condenser lens may be removed from the path of rays by pulling out a pin on the upper surface of the lamp; on each side of the lamp housing there is a holder for inserting various screens (50x50 mm); voltage source: 6 volts, connected by means of two 4-mm safety jacks on the left side of the lamp; by mounting beside it the xenon lamp for magnetic panels with the connectors at right (**DL100-1XR**), a "single" light source for experiments with a maximum of 10 parallel light rays is obtained; light bulb: xenon 6 V/20 W  
Dimensions: 150x60x60 mm

## **DL100-1XR Lamp for magnetic panel, xenon, connectors at right**

Design is the same as DL100-1XL, except that the connectors are on the right side of the lamp

## **DL980-1G Colour filter, blue, magnetic**

Blue, plastic filter permanently mounted in a cylindrical magnetic column 25 mm in height

## **DL980-1R Colour filter, red, magnetic**

Red, plastic filter permanently mounted in a cylindrical magnetic column 25 mm in height

## **Model objects, magnetic:**

Acrylic model objects featuring a contact surface that is painted matte white in order to make the light rays passing through the object more clearly visible; two or four strong neodymium magnets for holding the object; thickness: 20 mm; length or diameter: 200 mm

## **DL930-1C Semicircular object, "inno"**

## **DL930-1B Plano-convex object, "inno"**

## **DL930-1A Plano-concave object, "inno"**

## **DL930-1E Trapezoid object, "inno"**

## **DL930-1D Prism model, "inno"**

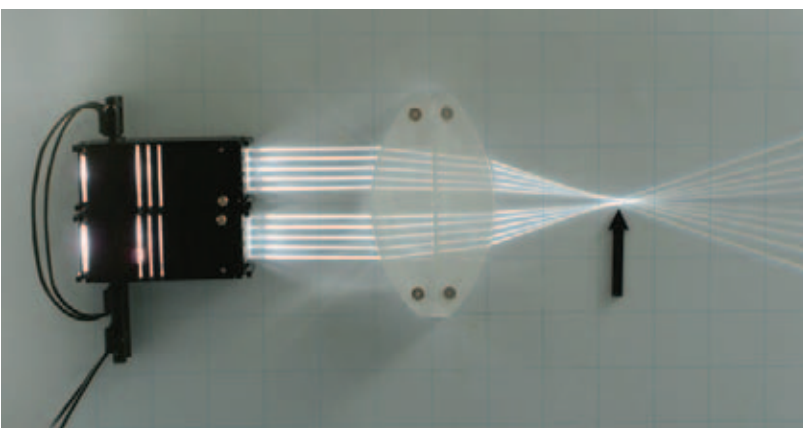
## **DL930-1L Optical fiber, c-shaped, "inno"**

## **DL970-1A Pointer, long**

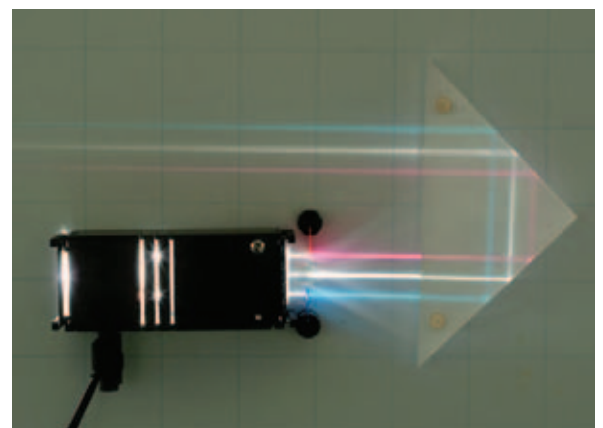
Plastic panel shaped like an arrow; with magnetic foil backing, black coating; L=80 mm

## **DL970-1B Pointer, short**

Plastic panel shaped like an arrow; with magnetic foil backing, black coating; L=40 mm

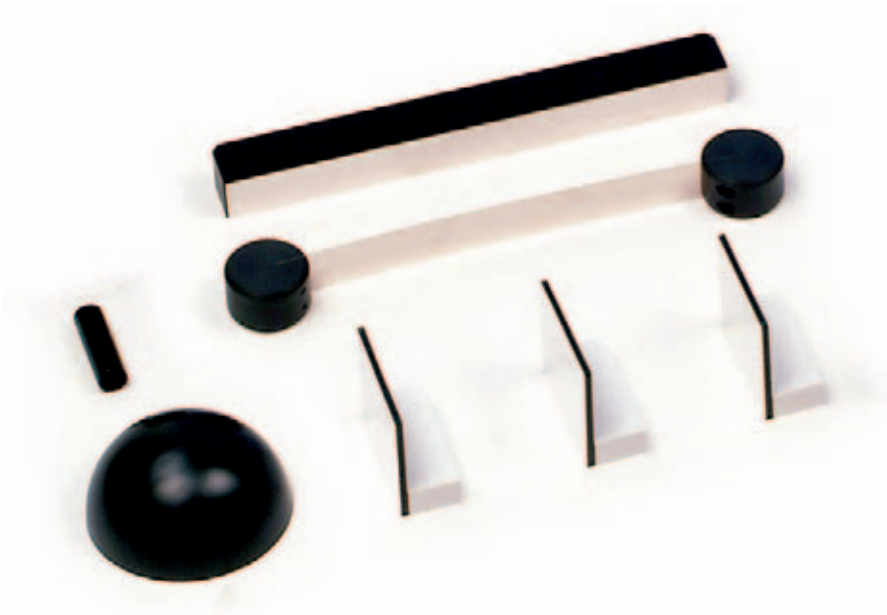
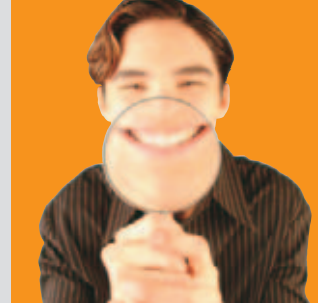


**Experiment:** Focal point position of a biconvex lens



**Experiment:** Right-angle prism reversing rays

# magnetic panel optics



## **DL960-1G Hemispherical model for casting shadows, magnetic**

Plastic hemisphere with neodymium magnet for holding it on a panel; D=80 mm, H=40 mm

## **DL960-1K Cylindrical model for casting shadows, magnetic**

Plastic cylinder, D=12 mm, H=40 mm

## **DL940-1A Planar mirror, magnetic**

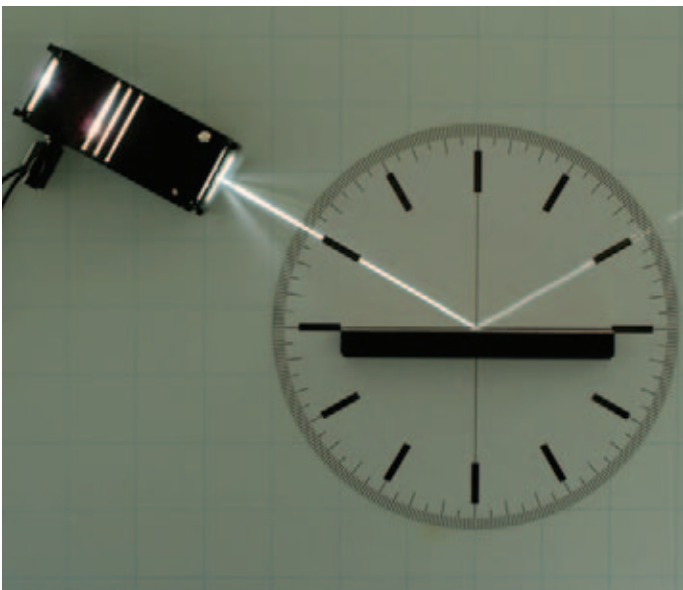
Mirror surface area: 200x20 mm

## **DL940-1B Flexible mirror, magnetic**

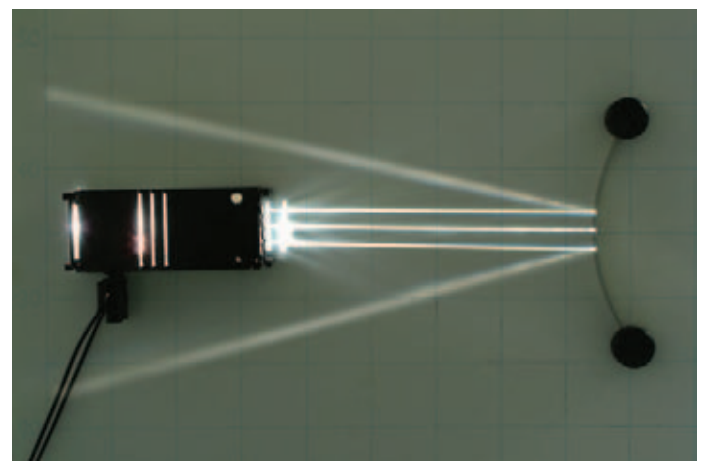
Convex or concave mirror of polished metal; mirror surface area: 160x20 mm

## **DL941-1A Mirrors, demo, magnetic, set of 3**

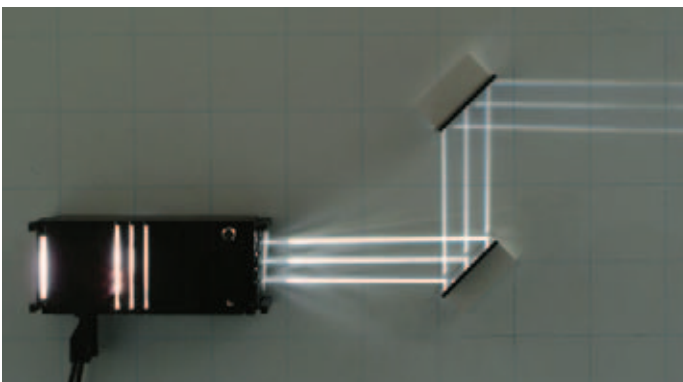
May be used for redirecting light rays; particularly suitable for magnetic panel experiments in the additive mixture of colours; Dimensions: 50x50 mm



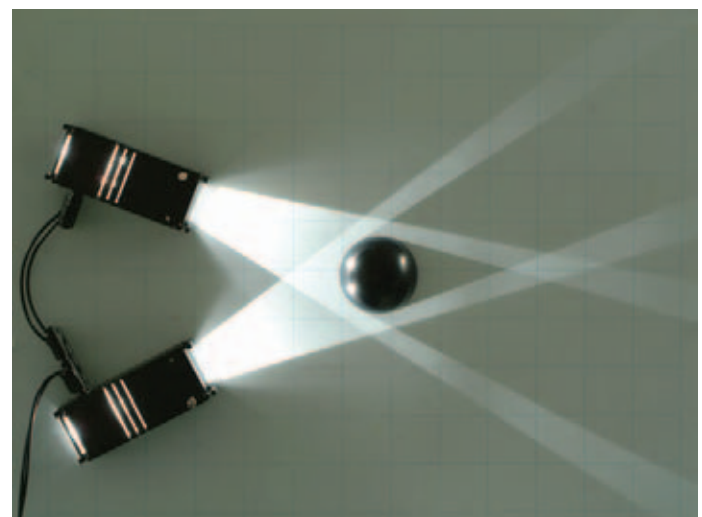
**Experiment:** Law of reflection



**Experiment:** Path of rays along a convex mirror



**Experiment:** Periscope



**Experiment:** Umbra and penumbra



# magnetic panel optics

**DL920-1A Optical disc, magnetic, D=300 mm**

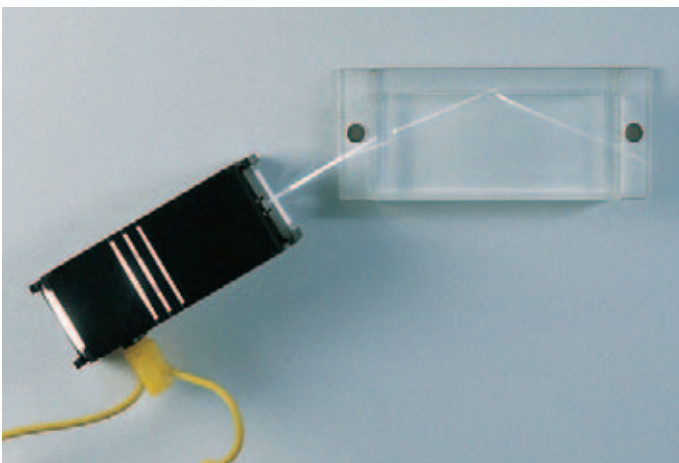
White, magnetized plastic foil labelled with a degree scale; D=300 mm

**DL931-1L Optical fibre, flexible**

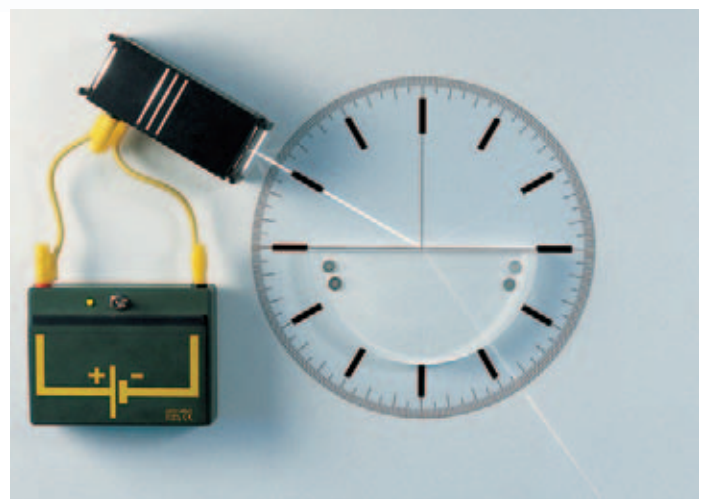
Round acrylic profile (D=3 mm, L=75 mm) with one end permanently attached to a black screen (50x50); may be inserted in the screen holder on magnetic panel lamp DL100-1XL or DL100-1XR

**DL935-1K Cell, magnetic**

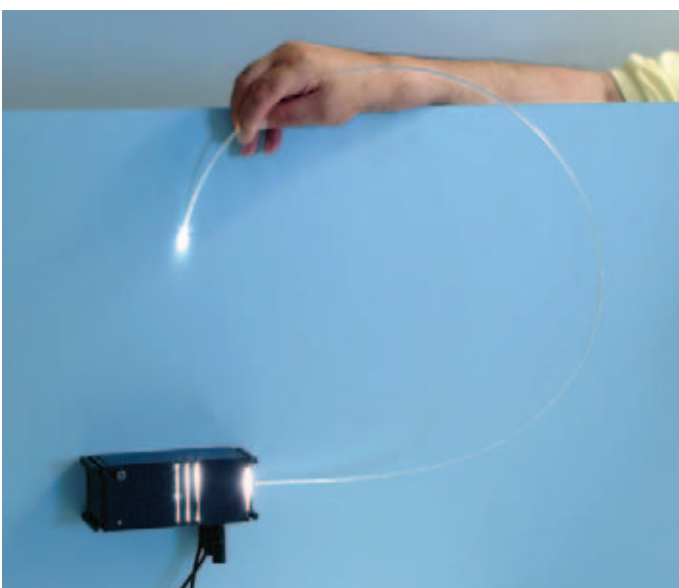
Acrylic cell with two neodymium magnets for holding it on a panel  
Cell dimensions: 150x80x25 mm



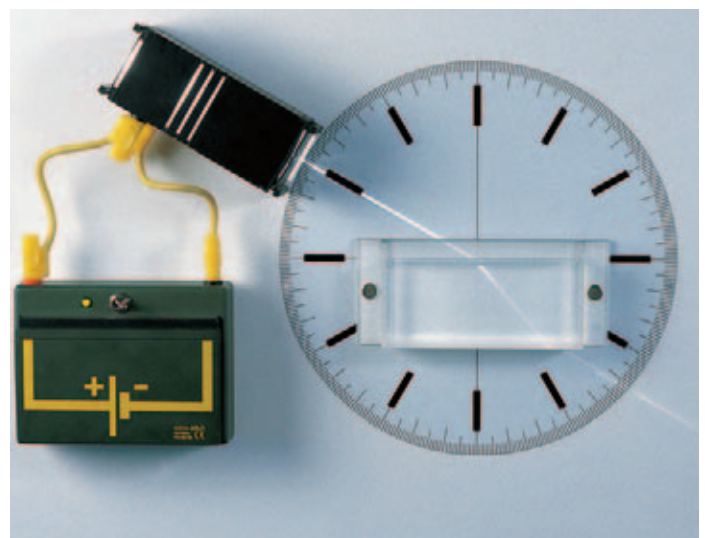
**Experiment:** Total reflection in water



**Experiment:** Determining the coefficient of refraction



**Experiment:** Optical fibre



**Experiment:** Angles of incidence and refraction in water

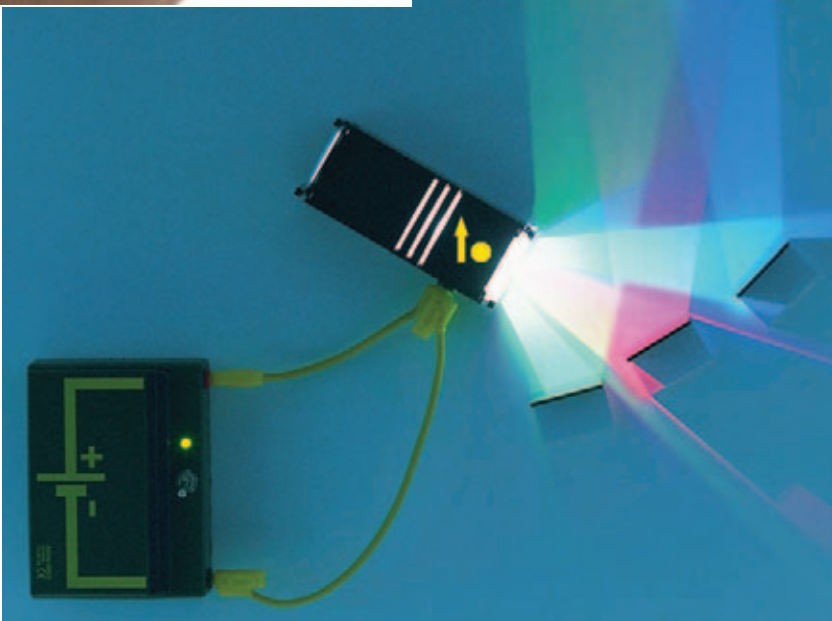
# magnetic panel optics



**Experiment:** Colour dispersion



**Experiment:**  
Subtractive mixture of  
colours



**Experiment:** Additive mixture of colours



**Equipment for experiments in colour dispersion and in the additive and subtractive mixture of colours:**

**DL203-1S Colour filter discs, subtractive, set of 3**

Plastic discs coated in yellow, magenta (purple) and cyan (green-blue); D=195 mm

**DL980-1D Three-colour filter, additive**

Slide with red, blue and green plastic filters; may be inserted in the holder of magnetic panel lamp DL100-1XL or DL100-1XR  
Dimensions: 50x50 mm

**DL930-1K Projection wedge, magnetic**

Inclined surface for projections on a magnetic board; matte white, magnetic; particularly suited for experiments in the additive mixture of colours; dimensions: 200x100 mm

**DL941-1A Mirrors, demo, magnetic, set of 3**

May be used for redirecting light rays; particularly suitable for magnetic panel experiments in the additive mixture of colours  
Dimensions: 50x50 mm

**DL950-1A Prism, magnetic**

Flint glass prism; index of refraction = 1.62; mounted in a magnetic acrylic clamp with a clamping screw; base length: 32 mm  
Height: 32 mm



# magnetic panel optics - experiment topics

With the magnetic panel optics, complete set DL720-1G are the below listed experiments possible:

**DL720-1SE Manual magnet panel optics, book (black and white)**

**DL720-1CE Manual magnet panel optics, CD-ROM**

## Diffusion of Light

- OPI 001 Light spreads in a straight line
- OPI 002 Punctual sources of light produce sharp shadows
- OPI 003 Diffuse sources light produce indistinct shadows
- OPI 004 Eclipse of the moon (model)
- OPI 005 Eclipse of the sun (model)



## Reflection

- OPI 006 The Law of Reflection
- OPI 007 A mirror is rotated
- OPI 008 Regular reflection
- OPI 009 Diffuse reflection of light - diffraction
- OPI 010 Position of an image point on a plane mirror
- OPI 011 Creating a virtual image on a smooth mirror
- OPI 012 Concave mirror as a light collector
- OPI 013 Model of a headlight
- OPI 014 Path of rays in a concave mirror
- OPI 015 Images in a concave mirror
- OPI 016 Movement of rays in a convex mirror



- OPI 017 Path of rays in a convex mirror
- OPI 018 Path of rays when forming an image in a convex mirror

## Refraction

- OPI 019 Refraction of light viewed qualitatively
- OPI 020 Angle of incidence and angle of refraction
- OPI 021 Refraction from the perpendicular – total reflection in water
- OPI 022 Refraction to the perpendicular
- OPI 023 Calculating the index of refraction
- OPI 024 Refraction from the perpendicular – total reflection in glass
- OPI 025 Total reflection in a semi-circular body
- OPI 026 Basic principle of a photoconductor
- OPI 027 Photoconductor, flexible
- OPI 028 The plane parallel plate
- OPI 029 Refraction of light in a prism
- OPI 030 Deviating prism
- OPI 031 Inverting prism
- OPI 032 Torricelli's prism

## Lenses

- OPI 033 Refractive effect of a convergent lens
- OPI 034 Refractive effect of a divergent lens
- OPI 035 Position of the focal point of a biconvex lens
- OPI 036 Position of the focal point of a thin planoconvex lens
- OPI 037 Position of the focal point of a thick planoconvex lens
- OPI 038 Refractive effect of convergent and divergent lenses on diverging light rays
- OPI 039 Lens systems
- OPI 040 Special rays on a convergent lens
- OPI 041 Special ray paths on a planoconvex lens
- OPI 042 Special ray paths on a concave lens
- OPI 043 Path of rays when forming an image on a convergent lens
- OPI 044 Path of rays when forming an image on a divergent lens

## The Eye

- OPI 045 Ocular accommodation
- OPI 046 Faulty vision and its correction – near-sightedness
- OPI 047 Faulty vision and its correction – far-sightedness

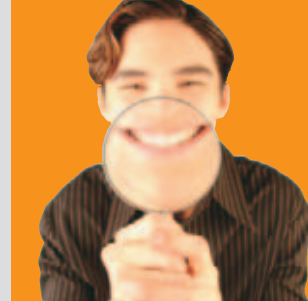
## Optical Instruments

- OPI 048 Path of rays in a single lens reflex camera
- OPI 049 Path of rays in a slide projector
- OPI 050 Model of a magnifying glass
- OPI 051 Model of a microscope
- OPI 052 Model of an astronomical telescope
- OPI 053 Model of a Galilean telescope

## Color

- OPI 054 Dispersion of color
- OPI 055 Spectral colors cannot be further dispersed
- OPI 056 Converging spectral colors to make white
- OPI 057 Mixed color of a partial spectrum
- OPI 058 Complementary colors – color theory
- OPI 059 Subtractive mixture of colors

# magnetic panel optics supplement



## Recommended supplement to magnetic panel optics:

### Hollow objects, magnetic:

Acrylic model objects with an opening for adding liquids and featuring a contact surface that is painted matte white in order to make the light rays passing through the object more clearly visible; thickness: 20 mm  
Length: 200 mm

### DL935-1A Plano-convex object, hollow

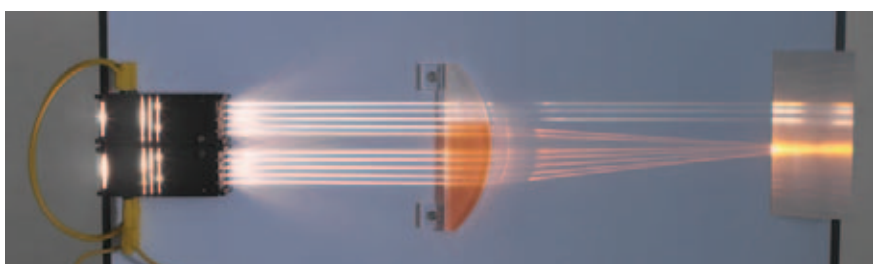
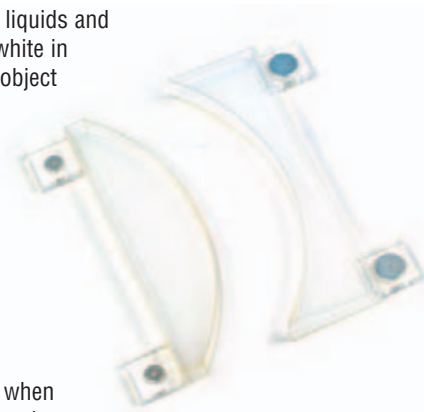
Radius: 140 mm

### DL935-1B Plano-concave object, hollow

Radius: 140 mm

### DL937-1K Circular cell

Hollow circular cell made of acrylic, used for demonstrating angles of incidence and refraction when light rays pass from air to water and from water to air; opening for pouring in liquids; labelled with a 360 ° scale  
Diameter: 200 mm



**Experiment:** Creating a plano-convex lens by adding water to the plano-convex cell

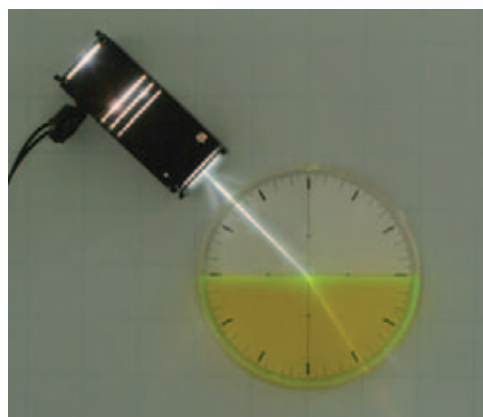
### DL513-2F

#### Fluorescein sodium

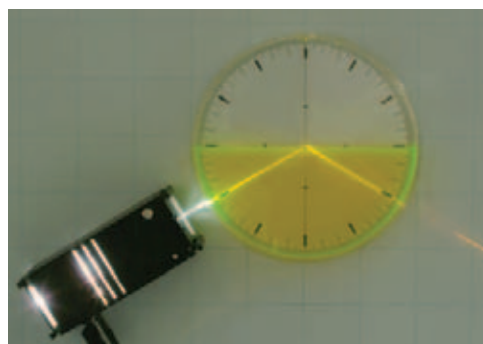
Used for staining a liquid in order to make the light rays passing through it more easily visible  
Bottle contents: 25 g



**Experiment:** Light ray refraction phenomena when passing from water to air at various angles



**Experiment:** Angles of incidence and refraction of a light ray passing from air into water



**Experiment:** Total reflection in water