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Modern educational equipment by KVANT

KVANT®

www.kvant-laser.de

Look and learn, practice and understand.

KVANT spol. s r.o.

Company KVANT spol. s r.o. was established in 1995. During its existence the company has achieved significant success in development and production of its own products as well as in distribution of technical devices to different areas of science, research, industry and education. The company has received several awards at exhibitions. The company exports 95% of its production all around the world.

Since 2007 the company obtained certificates for ISO 14001 (Environmental Management Systems) and OSHAS 18001 (Occupational Health and Safety Managment Systems) and since September 2016 the company expanded the certificates for information security by obtaining the certificate ISO 27001 (Information Security Managment Systems). One of the dominant departments is department of didactic equipment. This department is developing and manufacturing didactic aids for physics mainly for optics and technical fields at all levels of schools as well as for other educational institutes.

The high quality and teaching value of these products are appreciated not only by distributors but also by end-users. That is how many of these products became popular and delivered worldwide and through local distributors to the countries all over the world. Intention of this department is to prepare some successful novelties every year. We have been able to achieve this goal and the proof of this is the cataloque with its products.

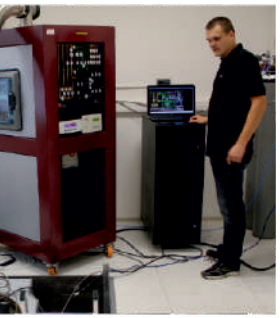
ISO 9001
ISO 14001
OHSAS 18001
BUREAU VERITAS
Certification

ISO 27001
BUREAU VERITAS
Certification

S 3100

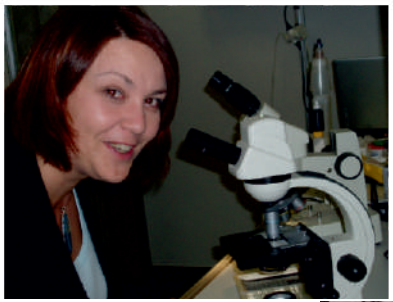



KVANT
SLOVAKIA

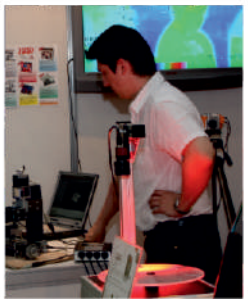







KVANT

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2013



Learn about us



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Laser Ray Box (LRB)

The Laser Ray Box consists of five independent red laser modules producing five parallel beams that are collimated by cylindrical lenses to be highly visible. The laser is very effective in the demonstration of light trace. It also effectively demonstrates the transmission of rays through a combination of optical elements. It is taped with magnetized foil, allowing intuitive attachment to a magnetic board or use in conjunction with sheets and models from Ray Optics Demonstration Set. LRB can be set into different modes (one or three light sources) via the **mechanical shade**. Set includes: Battery box (2x1,5V, AA size), mechanical shade.



5 YEAR WARRANTY

Specification:
Laser type: Diode
Wavelength: 635nm
Output Power/laser class: Pmax < 1mW / II.
Ray distance: 18 mm
Dimensions: 112 x 63 x 32 mm
Electrical Requirements: 3V DC / 500 mA

21-0301 Laser Ray Box w/o power supply
21-0302 Laser Ray Box with power supply
21-0300 Laser Ray Box 2.0

Laser Ray Box – Electronic (LRB–e)

The Laser Ray Box - Electronic consists of five independent red laser modules producing five parallel beams that are collimated by cylindrical lenses to be highly visible. It is packed with the same features as the Laser Ray Box, but adds **electronic shade control**. It is complementary product for the Ray Optics Demonstration Set. It is taped with magnetized foil, allowing intuitive attachment to a magnetic board or use in conjunction with sheets and models from Ray Optics Demonstration Set. The laser is very effective in the demonstration of light trace. It also effectively demonstrates the transmission of rays through a combination of optical elements. With the ON/mode/OFF switch, the following light source modes are in option: five rays (1,2,3,4,5), three rays (1,3,5), three rays (2,3,4), single ray (3). Set includes: Battery box (2x1,5V, AA size).
We also offer a version with an LED light source to enhance functionality for additional experiments requiring white light source.



5 YEAR WARRANTY

Specification:
Laser type: Diode
Wavelength: 635nm
Output Power/laser class: Pmax < 1mW / II.
Ray distance: 18 mm
Dimensions: 112 x 63 x 32 mm
Electrical Requirements: 3V DC / 500 mA

21-0311 Laser Ray Box - Electronic w/o power supply
21-0312 Laser Ray Box - Electronic with power supply
21-0312-LED Laser/LED Ray Box - Electronic with power supply
21-0310 Laser Ray Box – Electronic 2.0
21-0310-LED Laser/LED Ray Box – Electronic 2.0

Green Laser Ray Box – Electronic (GLRB-e)

The Green Laser Ray Box - Electronic consists of five independent green laser modules producing five parallel beams that are collimated by cylindrical lenses to be highly visible. It is taped with magnetized foil, allowing intuitive attachment to a magnetic board or use in conjunction with sheets and models from Ray Optics Demonstration Set. The laser is very effective in the demonstration of light trace. It also effectively demonstrates the transmission of rays through a combination of optical elements. It increases the comfort of teaching of geometric optics due to **electronic shade control**. The human eye is 3 times more sensitive to green light than red light. It offers higher comfort at the same optical power output. With the ON/mode/OFF switch, the following light source modes are in option: five rays (1,2,3,4,5), three rays (1,3,5), three rays (2,3,4), single ray (3).



5 YEAR WARRANTY

Specification:
Laser type: Diode
Wavelength: 520nm
Output Power/laser class: Pmax < 1mW / II.
Ray distance: 18 mm
Dimensions: 112 x 63 x 32 mm
Electrical Requirements: 3V DC / 500 mA

21-0321 Green Laser Ray Box – Electronic w/o power supply
21-0322 Green Laser Ray Box – Electronic with power supply
21-0320 Green Laser Ray Box – Electronic 2.0

Duo Laser Ray Box – Electronic (Duo LRB–e)

The Due Laser Ray Box - Electronic consists of five independent laser modules producing five parallel beams that are collimated by cylindrical lenses to be highly visible.It is complementary product for the Ray Optics Demonstration Set. It is taped with magnetized foil, allowing intuitive attachment to a magnetic board or use in conjunction with sheets and models from Ray Optics Demonstration Set.The laser is very effective in the demonstration of light trace. It also effectively demonstrates the transmission of rays through a combination of optical elements. Moreover, it increases the comfort of teaching of geometric optics due to electronic shade control and green optical axis which highlighted and, therefore, stands out clearly. With the ON/mode/OFF switch, the following light source modes are in option: five rays (1,2,3,4,5), three rays (1,3,5), three rays (2,3,4), single ray (3).
Set includes battery box (2x1,5V, AA size).
We also offer a version with an LED light source to enhance functionality for additional experiments requiring white light source.



Specification:
Laser type (Red / Green): Diode / Diode
Wavelength: 635nm / 520nm
Output Power/laser class: Pmax < 1mW / II.
Ray distance: 18 mm
Dimensions: 112 x 63 x 23 mm
Electrical Requirements: 3V DC / 500 mA

5 YEAR WARRANTY

21-0341 **Duo Laser Ray Box – Electronic w/o power supply**
21-0342 **Duo Laser Ray Box – Electronic with power supply**
21-0342-LED **Duo Laser/LED Ray Box – Electronic with power supply**
21-0340 **Duo Laser Ray Box – Electronic 2.0**
21-0340-LED **Duo Laser/LED Ray Box – Electronic 2.0**

3-Beam Laser Ray Box – Electronic (3beam LRB-e)

3-Beam Laser Ray Box – Electronic – economic version of Laser Ray Box with 3 beams. It is possible to switch the beams electronically. Ray distance is 24 mm.
We also offer a version with an LED light source to enhance functionality for additional experiments requiring white light source.



Specification:
Laser type: Diode
Wavelength: 635 nm
Output Power / laser class: Pmax < 1mW / II.
Ray Distance: 24 mm
Dimensions: 112 x 63 x 32 mm
Electrical requirements: 3V DC / 500 mA

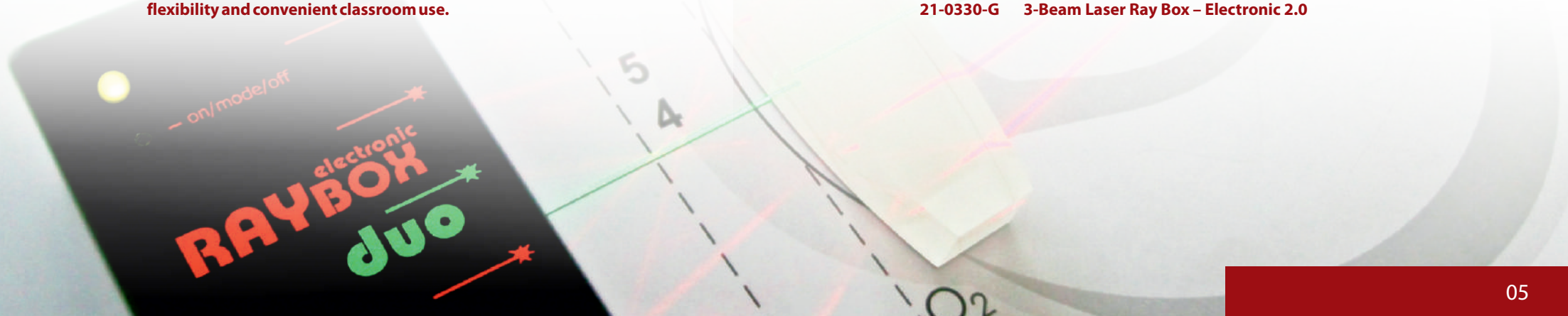
5 YEAR WARRANTY

21-0331 **3-Beam Laser Ray Box – Electronic**
21-0331-LED **3-beam Laser/LED Ray Box – Electronic**
21-0330 **3-Beam Laser Ray Box – Electronic 2.0**
21-0330-LED **3-Beam Laser/LED Ray Box – Electronic 2.0**
21-0330-G **3-Beam Laser Ray Box – Electronic 2.0**

NEW

NOW PRESENTING NEW RAYBOX 2.0

The new 2.0 version features an integrated 2100 mAh rechargeable battery with USB-C charging, enabling fully wireless operation. It can be powered by any standard 5 V USB-C charger, ensuring maximum flexibility and convenient classroom use.



Ray Optics Demonstration Set (RODS)

The set has turned out to be the best-selling product due to its simple design, user-friendliness and clear demonstration of basic principles of geometrical optics. Complemented with laser light source (**laser is sold separately**) the set improves the quality of teaching and offers the new possibilities in comparison with the classic incandescent lamp. With the use of complementary Laser Ray Box, it is possible to demonstrate most of the elementary optic principles quickly and intuitively. Moreover the demonstration of beams passing through the combination of several optical elements is possible, which enables effective demonstration and modelling of basic optical devices. RODS using Laser Ray Box can be used in standard classrooms without any additional room darkening. It allows very good demonstration and visualization of the following optical effects: transmission of the light through the convex (concave) lens, transmission effect of an optical prism, reflection on the planar convex and concave mirror, refraction of the light, index of refraction values and others. The set also demonstrates the function of healthy, short-sighted and far-sighted vision and the correction of these aberrations by glasses. Furthermore the set demonstrates the function of Galileo and Kepler telescopes, as well as photo camera, etc. The effect of the lens spherical aberration and its correction, the demonstrations of absolute reflection in the optical fiber are interesting and easy to demonstrate as well. All elements are taped with magnetized foil at the bottom, allowing intuitive attachment to a magnetic board.

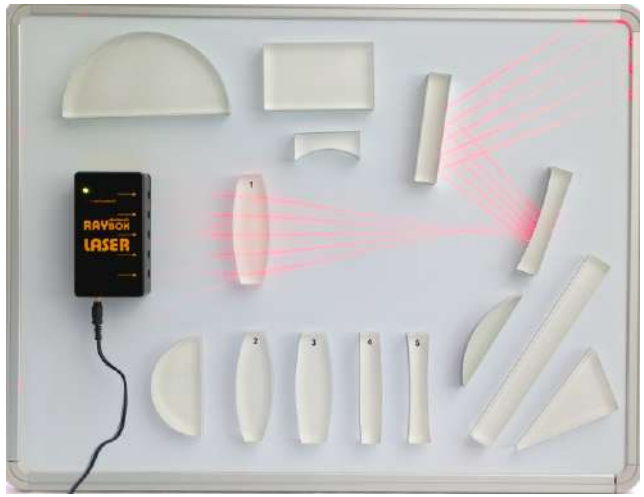
Ray Optics Demonstration Set contains:

- Printed instruction manual
- QR codes linked to experiment videos
- Optical models (14 pcs) – 8 different lenses, 3 types of mirrors, planparallel plate, right-angle prism, model of optical fibre.
- Magnet board with support stand (version with magnetic board).
- Example sheets (6 pcs) for very simple and quick preparation of demonstration.
  The demonstration is done quickly if the desired objects are located on assigned positions on the sheet.

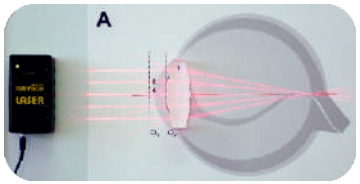
The sheets in the box:

A – model of the human eye
B – photo camera
C – Galileo telescope
D – Kepler telescope
E – spherical aberration of a lens, and its correction
F – refraction and reflection demonstration sheet

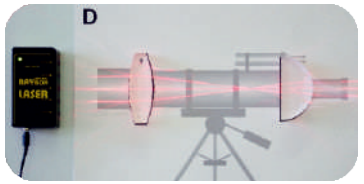
Watch demonstration video on our YouTube channel



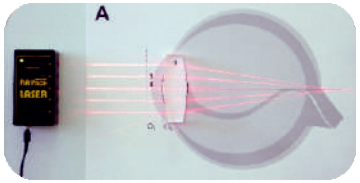
21-0401 Ray Optics Demo Set w/o Magnet Board
21-0402 Ray Optics Demo Set with Magnet Board
21-0116 Magnet Board 59×45 with Support Stand
Laser light source is sold separately.



Healthy eye



Kepler telescope



Long-sighted eye

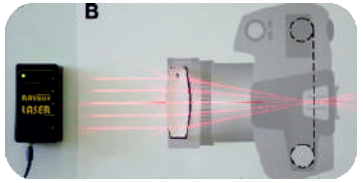
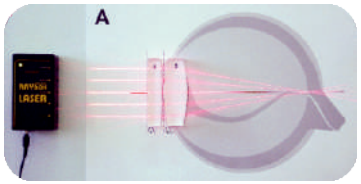
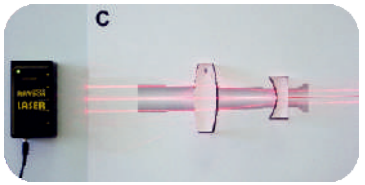


Photo camera



Correction of long-sighted eye

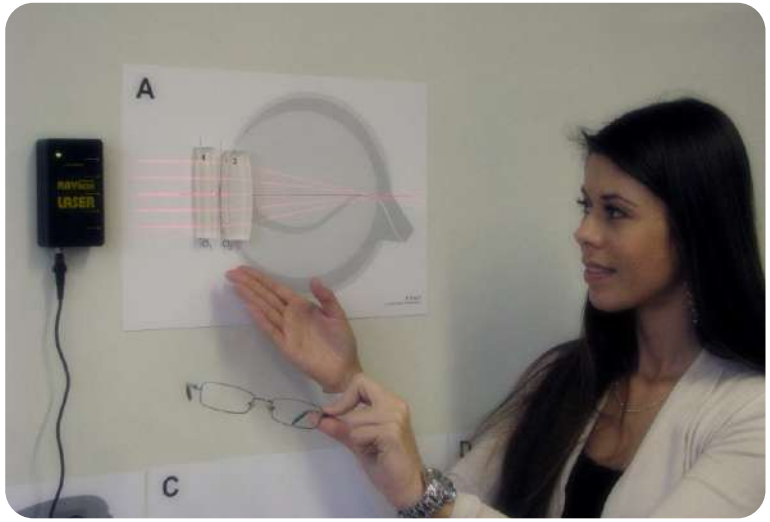


Galileo telescope

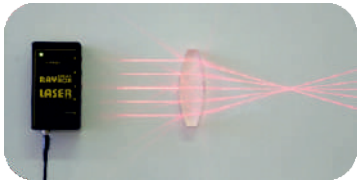
Ray Optics Demonstration Set PLUS (RODS PLUS)

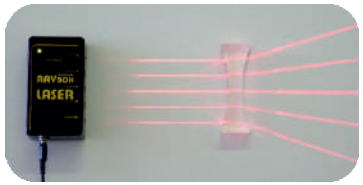
The new additional 15 different complementary optical elements extending the portfolio of experiments and demonstrations. In conjunction with Laser Ray Box and RODS the set is highly useful educational tool for a very good demonstration of advanced geometrical optics principles. The visual demonstration clearly shows the relationships between the refractive index and positive or negative optical elements. Many various examples show exploitation of optical elements in technical optics/concave lenses, plano-concave lenses, convex and plano-convex lenses, equilateral prism, right angle prisms, mirrors, condenser lenses, cube beamsplitter, periscope, ...

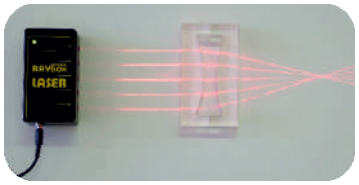
Very interesting experiments using air lenses illustrate why optical elements can be positive or negative depending on refraction index. As for Ray Optics Demonstration Set, this one has also advantage thanks to low demand for room light conditions and therefore can be used in standard classrooms without any additional room darkening. Users guide is included. Magnet board with support stand (version with magnetic board).

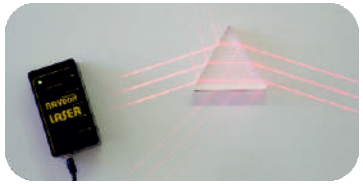


21-0411 Ray Optics Demo Set PLUS w/o Magnet Board
21-0412 Ray Optics Demo Set PLUS with Magnet Board
21-0116 Magnet Board 59×45 with Support Stand


Focusing light by convex lens

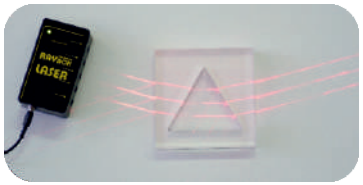

Diverging light by concave lens

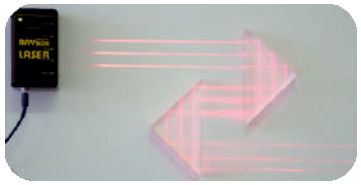

Ray tracing through air lens (concave)


Glass prism deviation of light ray

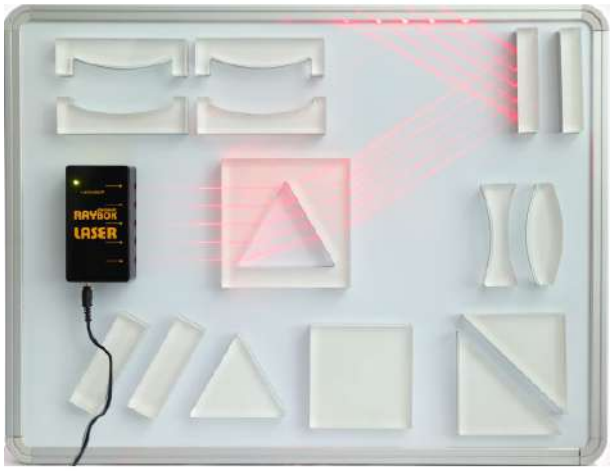

Periscope model


Ray tracing through air lens (convex)


Air prism deviation of light ray


Ray tracing through prisms

Laser light source is sold separately.



Ray Optics 1 – Students Set

Excellent essential set for practical exercises. The set enables students to understand basic ray optics principles – transmission, reflection, refraction. Students can construct simple optical devices using worksheets. Worksheet "human eye" helps to understand the importance of glasses. The set has been designed to be table-top used. All elements are **non-magnetic**. Manual with experiments is included. Set is packed in plastic case. This set is very effective for clear understanding of the following optical principles: transmission of the light through the convex (concave) lens, transmission effect of an optical prism, reflection on the planar (convex, concave) mirror, refraction of the light, index of refraction values and others. The set also demonstrates the function of healthy, short-sighted and far-sighted vision and the correction of these aberrations by glasses. Furthermore the set demonstrates the function of Galileo and Kepler telescopes, as well as photo camera, etc. The demonstration of absolute reflection in the optical fiber is interesting and easy to demonstrate as well.

The Ray Optics – Students Set consists of:

- Optical models (12 pcs) - 8 various lenses, 3 types of mirrors, model of optical fiber
- 3-beam Laser Ray Box Electronic
- Battery pack
- Working sheets (7pcs) for very simple and quick preparation of exercises
- Instruction manual with experiments
- set of RGB filters
- 3 pcs of optical boat

The sheets in the box:

A - model of the human eye
B - photo camera
C - Galileo telescope
D - Kepler telescope
E - refraction and reflection demonstration sheet
X - significant rays - konverging lens
Y - significant rays - diverging lens

Ray Optics 2 - Students Set

Extended version of Ray Optics 1-Student Set. We added parts to allow demostration of light dispersion:

· Prism
· Laser Ray Box with white light LED source
· new sheet - Light dispersion



21-0423 Ray Optics 2 - Students Set



21-0421 Ray Optics 1 - Students Set

Astro Laser Set (ALS)

This extensively enhanced version of our best-selling product, the Ray Optics Demonstration Set, offers an exciting introduction to the fascinating world of astronomy and astrophysical phenomena. This newest teaching equipment is intended and applicable for almost all age groups - from 8 year-old children to adults. Its goal is to acquire basic astronomical knowledge in an interactive way. The set improves the quality of teaching and offers the new possibilities in this constantly evolving field of science. The Astro Laser Set uses two different independent sources of light (white LED, red and green laser light), which represent the Sun or the stars and are visible even in normal daylight or under artificial lighting in the interior. The kit contains plastic elements that present cosmic bodies (Earth, Moon, exoplanet ...) and optical elements (lenses, mirrors, etc.). The working drawings have exactly marked positions where optical elements, light sources and other objects are supposed to be placed during each task. All topics and tasks can be conducted by a lecturer of the class in the field of astronomy, physics, optics, mathematics, geometry, etc. Some optical elements from the set (lens, scattering, semicircle, mirrors) can be used to explain and represent other optical phenomena (refraction of light, light reflection, etc.). Every element is taped with magnetized foil at the bottom, allowing intuitive attachment to a magnetic board.

Astro Laser Set contains:

- Instruction manual with task collection (downloadable)
- QR codes linked to experiment videos
- Light sources – white LED, Duo Laser Ray Box – Electronic
- Optical models (15 pcs) – 4 different lenses, 8 pieces of different mirrors, equilateral prism
- Astro objects – Earth, Moon, Albedo, Exoplanet, Earth's atmosphere, bottom pads for the Moon
- Example sheets (14 pcs) for very simple and quick preparation of demonstration.

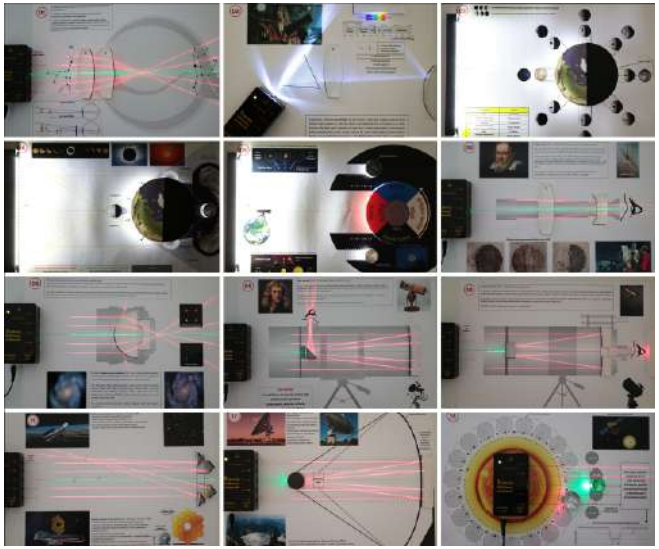
The sheets in the box:

1 – View Of The Sky
2 – Electromagnetic Radiation Spectrum
3 – Phases Of The Moon
4 – Eclipses
5 – Albedo
6 – Galilei Telescope
7 – Kepler Telescope
8 – Spherical Aberration And Its Correction
9 – Newton Telescope
10 – Cassegrain Telescope
11 – Hubble and James Webb Space Telescope
12 – Radio Telescope
13 – Searching For Exoplanets By Eclipsing Method
14 – Variable Stars

Watch demonstration video on our YouTube channel



21-0461 Astro Laser Set



Hartl Optical Disc + Laser Line Box

Popular and solid aid for explanation of reflection and refraction principles of light in an optical environment. The aid is built on circular base, which can be rotated around the axis. The angle of refraction or reflection can be detected by the light beam reflected on the angular scale. Half-circle optical transparent module allows to measure the material index of refraction taking into account the Snell`s law. The 1mW Laser Line Box with the wavelength of 635 nm (red) or 520nm (green) is used as the light source. Due to the collimated laser beam, the angles of refraction and reflection are excellently displayed, therefore the experiment is very clear and students can arrange the practical exercise very easily and quickly.

The high didactic value of the aid is reached with regard to its following features:
- high clarity of the experiment
- easy arrangement
- acceptable price

The set consists of:
- metal base with the rotating circle and angular scale
- semi-circle optical transparent module
- Laser Line Box



21-3005 Hartl Optical Disc (635nm)
21-3006 Hartl Optical Disc (520nm)

Laser Line Box

In principle, very similar device to Laser Ray Box, but emitting one laser ray since it contains one independent laser module. The beam is collimated by cylindrical lenses to be highly visible. Via attaching multiple Line Boxes, multi-beam source can be created. It is taped with magnetized foil, allowing intuitive attachment to Hartl Optical Disc. Set includes also battery box (2x1,5V, AA size) and connecting cable for multiple Line Boxes. Available in three versions: red, green and blue color.



Specification:
Laser type: Diode
Wavelength: 635 nm
Output Power / laser class: Pmax < 1 mW / II.
Dimensions: 80 x 25 x 20 mm
Electrical requirements: 3V DC / 500 mA

21-0501 Laser Line Box w/o power supply
21-0502 Laser Line Box with power supply



Specification:
Laser type: Diode
Wavelength: 520 nm
Output Power / laser class: Pmax < 1 mW / II.
Dimensions: 80 x 25 x 20 mm
Electrical requirements: 3V DC / 500 mA

21-0511 Green Laser Line Box w/o power supply
21-0512 Green Laser Line Box with power supply

The human eye is 3 times more sensitive to green light than red light. Line is visible even under extreme conditions; therefore the laser is very effective in the demonstration of light trace.



Specification:
Laser type: YVO4
Wavelength: 450 nm
Output Power / laser class: Pmax < 1 mW / II.
Dimensions: 80 x 25 x 20 mm
Electrical requirements: 3V DC / 500 mA

21-0521 Blue Laser Line Box w/o power supply
21-0522 Blue Laser Line Box with power supply

Laser Optical Set (LOS1) with magnetic board

A set of optical and mechanical elements has been designed to make possible the observation and easy understanding of physical principles of wave optics. By such means the usual way of theoretical teaching may be raised to a higher level. It helps in demonstration of wave optics principles such as interference, diffraction, linear polarization of light or the hologram reconstruction. All components contain magnetic mounting base. The set is packed in a plastic carrycase designated for the safe transport and convenient storage.

Following principles are easy to demonstrate:

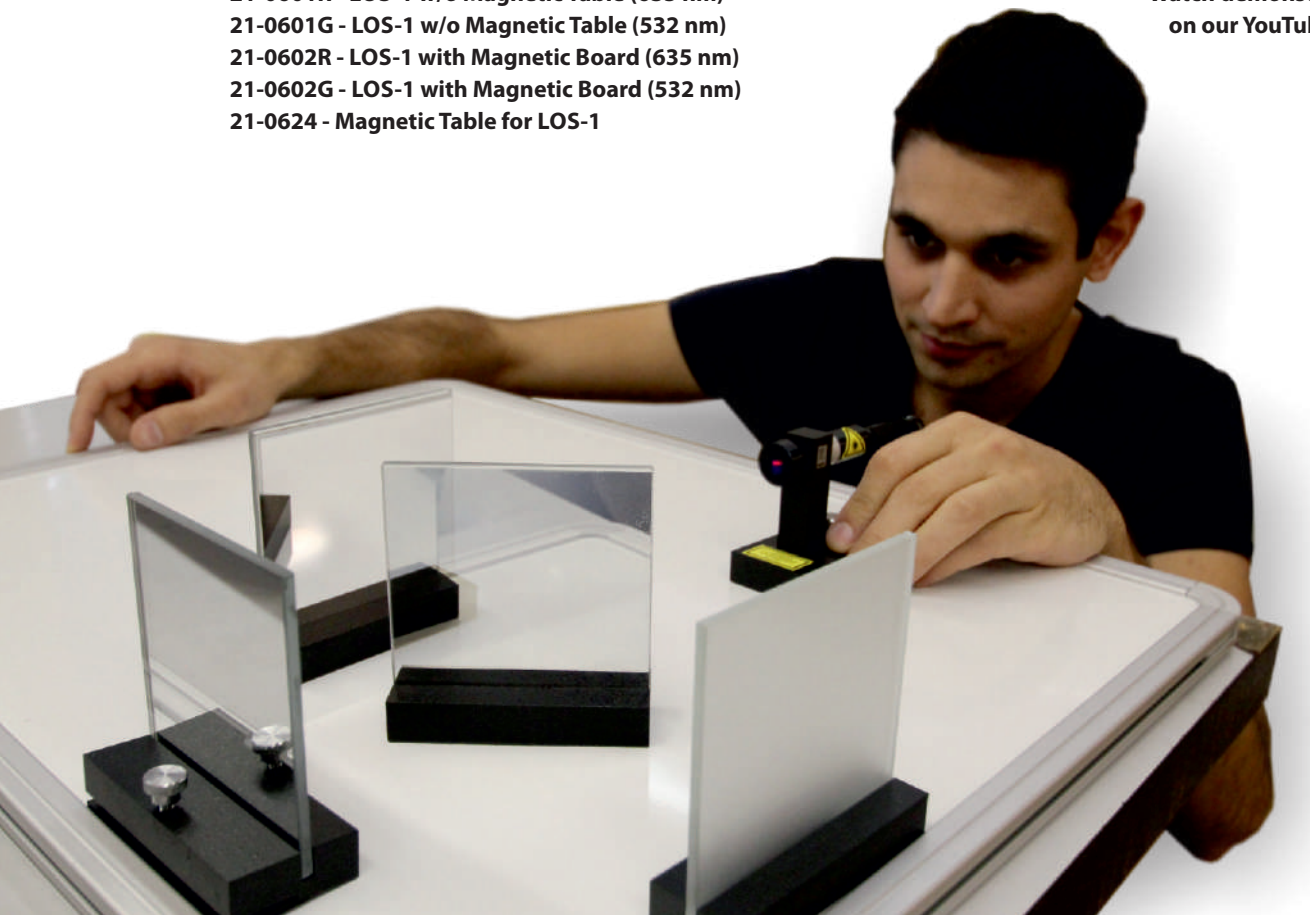
- basic optical principles of light DIFFRACTION using diffraction elements included
- the phenomena of coherent LIGHT INTERFERENCE, 2-beam, as well as multi-beam interferometers, interference of both plane and spherical wave fronts
- reconstruction of HOLOGRAPHIC IMAGES
- the behavior of linearly POLARIZED LIGHT

21-0601R - LOS-1 w/o Magnetic Table (635 nm)
21-0601G - LOS-1 w/o Magnetic Table (532 nm)
21-0602R - LOS-1 with Magnetic Board (635 nm)
21-0602G - LOS-1 with Magnetic Board (532 nm)
21-0624 - Magnetic Table for LOS-1

Watch demonstration video on our YouTube channel

The set consists of:

- laser 635 nm (or 532 nm) - Pmax = 1 mW/ laser class: II., mounted in adjustable holder
- 2 pcs mirrors mounted in adjustable holders
- semitransparent mirror mounted in holder
- polarizing filter
- lens
- image screen mounted in holder
- ground screen mounted in holder
- plan parallel plate
- set of diffraction and interference structures
- hologram mounted in holder
- plastic carrycase
- power supply 100-240V AC/ 3V DC
- battery box (2x 1.5V AA battery type)
- 2 pcs universal holder
- holder of polarizing filter or lens



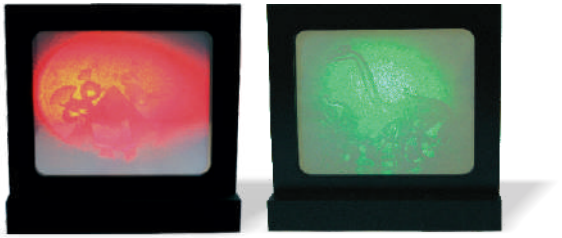


For better visibility of experiment, green laser is better choice!

Hologram

The reconstruction of hologram, three-dimensional record of an object, is possible by the means of a divergent beam. Highly effective device for demonstration of holography and wave aspects of light. Hologram is framed, delivered with stand. Dimensions – (85x70mm). In case of hologram reconstruction, we recommend to purchase Laser LOS (red or green) with lens.

21-0621 Hologram



Laser LOS (including lens)

Small but effective adjustable laser designed for LOS1 set. Adjustable holder enables you to point the ray demanded direction. Magnetic bottom of base helps to attach the laser to magnetic board. Delivered with power supply and collimating lens, which can be used by hologram reconstruction.



Laser LOS Red

Specification:
Laser type: Diode
Wavelength: 635 nm
Output Power: Pmax < 1 mW
Laser class: II.
Dimensions: 70 x 40 x 72 mm
Electrical requirements: 3V DC / 500 mA

21-0623R Laser LOS (including lens)



Laser LOS Green

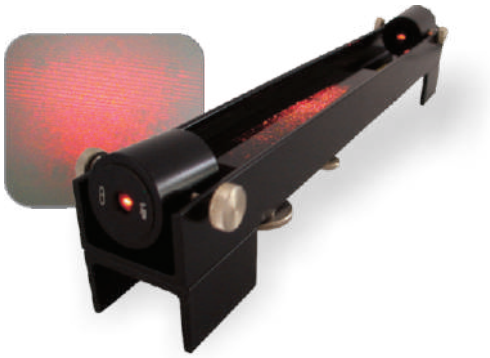
Specification:
Laser type: YVO4
Wavelength: 532 nm
Output Power: Pmax < 1 mW
Laser class: II.
Dimensions: 70 x 40 x 72 mm
Electrical requirements: 3V DC / 500 mA

21-0623G Laser LOS (including lens)

Fresnel Mirrors

The Fresnel Mirrors didactic tool is using advanced semiconductor laser technology for better explication of the interference effect. The tool is based on interference of two waves propagated from two planar mirrors. One of the mirrors is fixed and other is adjustable in transversal and longitudinal direction. This allows changing the angle between the two mirrors. The interference image form and parameters are dependent on this angle. The combination of monochromatic light and adjustable mirror angle allows an inclusion of exams, demonstrating the use of interference in praxis by small angles measurement and deformation observation. Using this didactic tool, the interference can be explained more transparently and with active participation of students. Set also includes: ground screen, laser light source 635 nm/1 mW, image screen and battery box (2 x 1,5V for battery size AA).

The set consists of:
Fresnel mirrors (main part):
A – Fundamental board
B – Optical radiation source (Laser 635 nm, 1mW), laser class: 2
C – Fixed mirror
D – Adjustable mirror
E – Adjusting screws
F – Optical projecting set



Laser type: Diode
Wavelength: 635 nm
Output Power : Pmax < 1mW
Laser class: II.
Dimensions: 400 x 50 x 70 mm

21-1201 Fresnel Mirrors w/o power supply
21-1202 Fresnel Mirrors with power supply

Optical Fibre Demonstration Kit 2

The kit was developed to demonstrate light propagation in optical fibers, transmission, receiving and transfer of optical data. This version allows audio and one way PC to PC transmission. Two newly added modules extended the possibilities of the set for video signal transmission experiments. The set contains basic transmitter and receiver boards with possibility to connect following modules: analogue transmitter, receiver, digital transmitter, receiver, transmitter set with microphone, receiver set with amplifier and speaker, a frequency generator, USB receiver and transmitter. The set also contains special holder for fiber optics, universal AOV meter device, equipment for Tyndall´s light guiding experiment, force plates, bending cylinders, special emeries for fiber preparation, jacketed and unjacketed fibers, power sources and user guide with a set of examples. The kit contains video user guide and tutorials about the experiments.

Current version includes an HDMI converter, enabling video signal visualization on modern HDMI display devices.

Basic experiments:

- Detection of optical signal by the analogue receiver
- Tyndall´s light guiding experiment
- Transmission and amplification of sound, whereby the electrical signal is changed into an optical signal, amplified, changed back to an electrical signal and finally received by the speaker
- Fiber to fiber connection damping measured by using mechanical adjustable holders
- Transmission of signal from the frequency generator
- Fiber bend damping measured by using special cylinders to create the bend
- Optical liquid level sensors
- Transmissions sensor allowing detecting changes of optical signals between two separate optical ends (could be used as a counter of passing objects)
- Optical fiber based dynamometer
- One way transmission of digital signal between two computers through USB port with the help of optical fibers



21-1101 Optical Fibre Demonstration Kit
21-1111 Optical Fibre Demonstration Kit 2

Optical fibres polishing set

The practical set consists of three unjacketed polymer optical fibers (2m, 3m, 5m long) with 1mm diameter, one 3m long jacketed optical fiber with 2mm outside-diameter (diameter of core is 1mm). The fibers have a step profile of refractive index of various lengths. Set contains 3 types of polishing films (2 pc of each) with various level of abrasiveness (0,3 micro, 1 micro and 9 micro). The set can be used as a spare kit for experiments done by Optical Fiber Demonstration Kit or for your own experiments regardless the OFDK.



21-1103 Optical fibres polishing set

Laser Communication Set (Lasercom 3)

Updated kit that allows analog (audio/video) and digital transmission (direct data transfer from PC to PC) using a laser beam. This system allows an understanding of the basic principles of optical communication. The kit allows the simultaneous transmission of video and audio. All components are neatly housed in a compact plastic case. The transmitter has adjustable power output ranging from 0.2 to 0.99 mW. Current value is shown on the display. For video transfer, any video source can be connected to the laser transmitter (eg. CCD camera, video camera, video recorder) and any screen has to be connected to the receiver (TV or monitor) - not included in the set. The kit consists of adjustable laser transmitter, laser receiver with speaker, microphone, color CCD camera, manual, adjustable holder and power supplies (2 pieces): 100-240V AC / 12V DC.

Current version includes an HDMI converter, enabling video signal visualization on modern HDMI display devices.

Specification:

Transmitter MLDD4.0
Dimensions (L x W x H): 150 x 100 x 60 mm
Laser (diode): Pmax<1mW, 635 nm, class II.
DC: 12VDC / 500mA
LF-audio / frequency: red CINCH / 100Hz-10kHz
HF-video / frequency: yellow CINCH / <20MHz (PAL,NTSC)
MIC: 3,5 Jack / / 100Hz-10kHz
USB: USB v 2.0 Hi-speed mode

Receiver
Dimensions (L x W x H): 72 x 69 x 113 mm
DC: 12VDC / 150mA
LF-audio / impedance: red CINCH / 8 ohm
HF-video / impedance: yellow CINCH / 75 Ohm, 1Vpp
USB: USB v 2.0 Hi-speed mode



21-1011 Lasercom3

CCD camera is included. The choice of NTSC or PAL format must be specified when placing the order.

Laser Diode MLDD 4.0 (with power supply)

Semi-conductor laser MLDD 4.0 - (Modulated laser-diode device). The laser works with adjustable power output ranging from 0.2 to 0.99 mW (produced also in 3mW version). The current output power is immediately displayed on the LCD. The laser unit is connected to control unit using cable to prevents any laser oscillation in the experiment setup. The laser can be also used for audio and video transmission. The power supply is included.

21-0802 Laser Diode MLDD 4.0 - 1mW

5 YEAR WARRANTY



Specification:

Laser type: Diode
Wavelength: 635 nm
Output Power: Pmax < 0,2 - 0,99 mW
Beam Dimensions: 4 x 2 mm
Class 2 Laser Product - Pmax < 1 mW
Dimensions: Box: 100 mmW x 60 mmH x 150 mmL
Module: 12 mmD x 40,5 mmL
Electrical requirements: 12V DC / 500 mA

We offer didactic lasers under a distinctive name Didactic, combining functionality in a sleek design. Each laser, based on the power output up to 1 mW classified as Class 2 according to EN 60825-1 dealing with the safety of lasers. The structural design of the laser allows placement directly on an optical bench or any other optical configuration thanks to anchor holes below, suitable for the screws M6.

Didactic Laser DL Series – Precision and Elegance

The Didactic Laser DL Series features long, tubular designs, offering a sleek and elegant construction that makes them ideal for a variety of educational and experimental applications. Available in red, green, and blue versions, these lasers serve as an effective alternative to traditional He-Ne lasers, providing similar performance with enhanced durability.
Each laser comes with a stable stand, ensuring easy and secure placement during use. With their reliable output and stylish design, the Didactic Laser DL Series is perfect for those seeking high-quality, cost-effective laser solutions.

Didactic Laser R - DL

Didactic Laser R - DL is ideal for teaching the basics of optics. Its shape and design allow very easy handling. This equipment contains stable holder, the laser is safely supplied (3V). You can use it as a replacement for the standard He-Ne laser.

21-0901 Didactic Laser R - DL w/o power supply
21-0902 Didactic Laser R - DL with power supply



Specification:
Laser type: Diode
Wavelength: 635 nm
Output Power / laser class: Pmax < 1mW / II.
Beam Dimensions: 4 x 2 mm
Dimensions: 250 mm (W) x diameter 35 mm
Electrical requirements: 3V DC / 500 mA

Didactic Laser G - DL

Didactic Laser G - DL is ideal for teaching the basics of optics. Its shape and design allow very easy handling. This equipment contains stable holder, the laser is safely supplied (3V). You can use it as a replacement for the standard He-Ne laser.

21-0961 Didactic Laser G - DL, green w/o power supply
21-0962 Didactic Laser G - DL, green with power supply



Specification:
Laser type: YVO4
Wavelength: 532 nm
Output Power / laser class: Pmax < 1mW / II.
Beam Dimensions: 4 x 2 mm
Dimensions: 250 mm (W) x diameter 35 mm
Electrical requirements: 3V DC / 500 mA

Didactic Laser B - DL

Didactic Laser B - DL is ideal for teaching the basics of optics. Its shape and design allow very easy handling. This equipment contains stable holder, the laser is safely supplied (3V). You can use it as a replacement for the standard He-Ne laser.

21-0971 Didactic Laser B - DL, blue w/o power supply
21-0972 Didactic Laser B - DL, blue with power supply



Specification:
Laser type: YVO4
Wavelength: 450 nm
Output Power / laser class: Pmax < 1mW / II.
Beam Dimensions: 4 x 2 mm
Dimensions: 250 mm (W) x diameter 35 mm
Electrical requirements: 3V DC / 500 mA

Small Diode Laser S-DL1 – Compact, Precise, and Versatile

The Small Diode Laser S-DL1 series consists of compact laser modules designed for high-precision applications. Featuring an M8 thread, these lasers are pre-mounted on a threaded rod base, allowing for easy and secure attachment to experimental setups.
Perfectly suited for use with optical rails, the S-DL1 lasers provide the accuracy required for advanced experiments and demonstrations. Available in red, green, and blue versions, these lasers offer versatility and reliability in the most demanding scientific environments.

Small Diode Laser S-DL1, red

S-DL1 is a simple semi-conductor laser emitting at wavelength of 635 nm and output power Pmax = 1mW; supplied with a M6 rod. Suitable for simple experiments on the optical bench.

21-2101 Small Diode Laser S-DL1, red w/o power supply
21-2102 Small Diode Laser S-DL1, red with power supply



Specification:
Laser type: Diode
Wavelength: 635 nm
Output Power / laser class: Pmax < 1mW / II.
Dimensions: 55 x 26 x 26 mm
Electrical requirements: 3V DC / 500 mA
Threaded hole: M6
Mounting rode: Yes

Small Diode Laser S-DL1, green

S-DL1 is a laser emitting at wavelength of 532 nm and output power Pmax = 1mW; supplied with a M8 rod. Suitable for simple experiments on the optical bench.

21-2111 Small Diode Laser S-DL1, green w/o power supply
21-2112 Small Diode Laser S-DL1, green with power supply



Specification:
Laser type: YVO4
Wavelength: 532 nm
Output Power / laser class: Pmax < 1mW / II.
Dimensions: 70 x 26 x 26 mm
Electrical requirements: 3V DC / 500 mA
Threaded hole: M8
Mounting rode: Yes

Small Diode Laser S-DL1, blue

S-DL1 is a laser emitting at wavelength of 450 nm and output power Pmax = 1mW; supplied with a M8 rod. Suitable for simple experiments on the optical bench.

21-2121 Small Diode Laser S-DL1, blue w/o power supply
21-2122 Small Diode Laser S-DL1, blue with power supply



Specification:
Laser type: YVO4
Wavelength: 450 nm
Output Power / laser class: Pmax < 1mW / II.
Dimensions: 70 x 26 x 26 mm
Electrical requirements: 3V DC / 500 mA
Threaded hole: M8
Mounting rode: Yes

Didactic Laser DL1 Series – Robust Design, Reliable Performance

The Didactic Laser DL1 series features a rectangular design, allowing for stable placement on flat surfaces during use. Constructed from high-quality aluminum, these lasers are both durable and reliable for educational and experimental applications. Operating at a safe 1 mW output, the DL1 lasers fall within Class 2 laser safety standards, ensuring compliance with safety regulations. The series is available in red, green, and blue, with a dual version that combines red and green lasers for versatile use. For enhanced safety, all versions are equipped with a switching key and LED indicator, ensuring the laser is only functional when the key is turned to the ON position. This added feature provides a secure and controlled operation, prioritizing safety at all times.

Didactic Laser R-DL1 - Red

Didactic Laser R-DL1 is ideal for learning the basics of optics. Its shape and design enables easy handling of the device. The laser emits light of wavelength 635 nm. The device has a switching key and LED indicator.

21-0931 Red Didactic Laser R-DL1 w/o power supply
21-0932 Red Didactic Laser R-DL1 with power supply



Specification:
Laser type: diode
Wavelength: 635 nm
Output Power / laser class: Pmax < 1 mW / II.
Beam Diameter: 2 mm
Dimensions: 158 x 30 x 60 mm
Electrical Requirements: 3V DC/ 500 mA
Threaded hole: M6

Didactic Laser G-DL1 - Green

Green laser Didactic G-DL1 is an advanced laser source with a wavelength of 532 nm, on which the human eye is significantly more sensitive. Thus, the beam is about 3 times more visible than in the case of red 635nm wavelength. The device has a switching key and LED indicator.

21-0911 Green Didactic Laser GDL1 w/o power supply
21-0912 Green Didactic Laser GDL1 with power supply



Specification:
Laser type: YVO4
Wavelength: 532 nm
Output Power / laser class: Pmax < 1 mW / II.
Beam Diameter: 2 mm
Dimensions: 158 x 30 x 60 mm
Electrical Requirements: 3V DC/ 500 mA
Threaded hole: M6

Didactic Laser B-DL1 - Blue

Another device from the Didactic series of lasers is modern blue light source. It produces interesting and engaging light with a wavelength of 450 nm. The device has a switching key and LED indicator.

21-0941 Didactic Laser B-DL1 - Blue w/o power supply
21-0942 Didactic Laser B-DL1 - Blue with power supply



Specification:
Laser type: YVO4
Wavelength: 450 nm
Output Power / laser class: Pmax < 1 mW / II.
Beam Diameter: 2 mm
Dimensions: 158 x 30 x 60 mm
Electrical Requirements: 3V DC/ 500 mA
Threaded hole: M6

Duo Didactic Laser GR-DL1

Didactic Duo Laser GR-DL1 has two laser sources emitting at two different wavelengths (red - green and 635 nm - 532 nm). The built-in switch allows to switch between the two sources, as well as to turn off the power completely. The device has a switching key and LED indicator. It is suitable for simple experiments on the optical bench.

21-0921 Duo Didactic Laser GR-DL1 w/o power supply
21-0922 Duo Didactic Laser GR-DL1 with power supply



Specification:
Laser type: Diode / YVO4
Wavelength: 635 / 532 nm
Output Power / laser class: Pmax < 1 mW / II.
Ray Distance: 25 mm
Dimensions: 158 x 30 x 60 mm
Electrical requirements: 3V DC / 500 mA
Threaded hole: M6

PowerPlus Didactic Laser Series – Precision Meets Safety

The PowerPlus Didactic Laser is designed for educational and experimental use, offering unparalleled versatility and safety. Available in red, blue, and green variants, these lasers cater to diverse teaching and demonstration needs.
What sets the PowerPlus apart is its innovative dual-power mode. In standard mode, the laser operates at a safe, low intensity of 0.2 mW, ensuring maximum safety during handling and setup. For applications requiring greater visibility, simply press and hold the power boost button to increase the output to 1 mW. This feature provides enhanced control, combining precision and peace of mind in one compact device.
The PowerPlus Didactic Laser is the perfect choice for educators and researchers seeking reliable, adaptable, and secure laser technology.

PowerPlus Didactic Laser - Red

The PowerPlus Didactic Laser - Red emits red light with a wavelength of 635 nm. Pressing and holding the button increases the laser beam's output power to a maximum of 1 mW. The device features a switching key, an LED indicator, and a threaded hole with an M8 rod for mounting on an optical rail.
21-0983 Red Didactic Laser R-DL1 w/o power supply
21-0984 Red Didactic Laser R-DL1 with power supply



Specification:
Laser type: diode
Wavelength: 635 nm
Output Power / laser class: Pmax 0,2 - 1 mW / II.
Dimensions: 125 x 55 x 34 mm
Electrical Requirements: 3V DC/ 500 mA
Threaded hole: M8
Mounting rode: Yes

PowerPlus Didactic Laser - Green

The PowerPlus Didactic Laser - Green emits green light with a wavelength of 532 nm. Pressing and holding the button increases the laser beam's output power to a maximum of 1 mW. The device features a switching key, an LED indicator, and a threaded hole with an M8 rod for mounting on an optical rail.
21-0985 Red Didactic Laser R-DL1 w/o power supply
21-0986 Red Didactic Laser R-DL1 with power supply



Specification:
Laser type: YVO4
Wavelength: 532 nm
Output Power / laser class: Pmax 0,2 - 1 mW / II.
Dimensions: 125 x 55 x 34 mm
Electrical Requirements: 3V DC/ 500 mA
Threaded hole: M8
Mounting rode: Yes

PowerPlus Didactic Laser - Blue

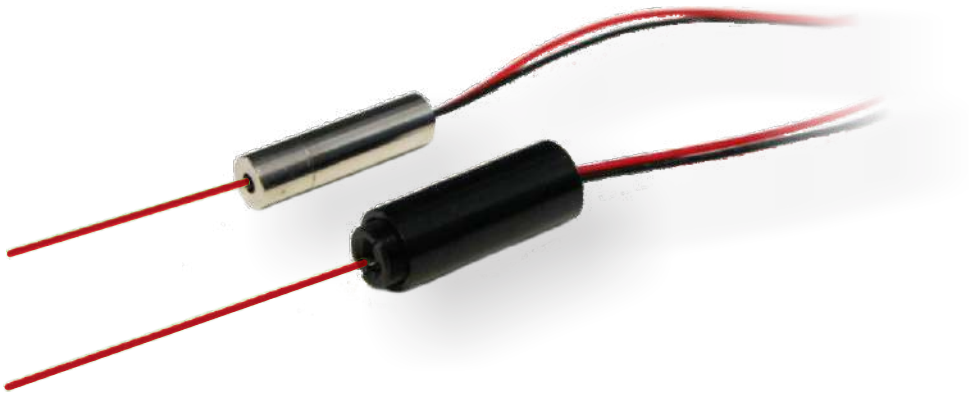
The PowerPlus Didactic Laser - Blue emits blue light with a wavelength of 450 nm. Pressing and holding the button increases the laser beam's output power to a maximum of 1 mW. The device features a switching key, an LED indicator, and a threaded hole with an M8 rod for mounting on an optical rail.
21-0981 Red Didactic Laser R-DL1 w/o power supply
21-0982 Red Didactic Laser R-DL1 with power supply



Specification:
Laser type: YVO4
Wavelength: 450 nm
Output Power / laser class: Pmax 0,2 - 1 mW / II.
Dimensions: 125 x 55 x 34 mm
Electrical Requirements: 3V DC/ 500 mA
Threaded hole: M8
Mounting rode: Yes

A special feature of the PowerPlus Didactic Laser series is the press-and-hold button, which increases the laser beam's output power. These feature ensures absolute safety for experimenting in your class!

Red laser-diode modul

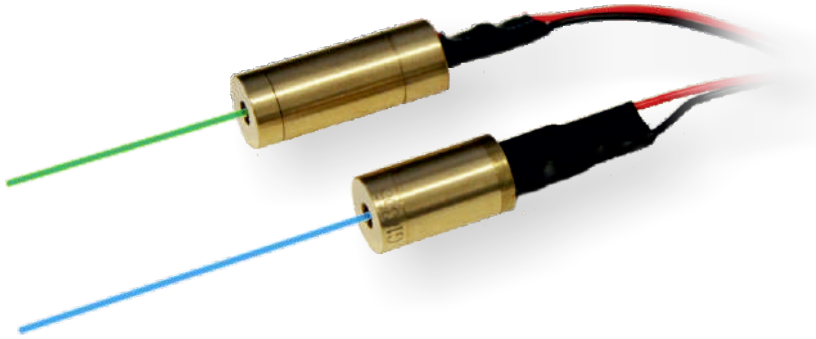


An ideal substitute for He-Ne lasers in many applications.
Includes:
• output power stabilization
• integral drive circuit

21-1301 LM 8 - 635 - 1 mW
21-1302 LM 12 - 635 - 3 mW

Dimensions: 30 x 8 mm / 40 x 12 mm
Wavelength: 635 nm
Max. output: Pmax < 1 mW / 3 mW
Laser Class: II. / III.R
Beam Dimensions: 4 x 2 mm
Voltage: 3V DC regulated
Current: 45 mA

Green and blue laser-diode modul



Green LM

21-1311 LM 12 - 532 - 1 mW
21-1312 LM 12 - 532 - 5 mW

Dimensions: 45 x 12 mm
Wavelength: 532 nm
Max. output: Pmax < 1 mW / 5 mW
Laser Class: II. / III.R
Beam Diameter: 2 mm
Voltage: 3V DC regulated
Current: 300 mA

Blue LM

21-1321 LM 12 - 450 - 1 mW
21-1322 LM 12 - 450 - 5 mW

Dimensions: 45 x 12 mm
Wavelength: 450 nm
Max. output: Pmax < 1 mW / 5mW
Laser Class: II. / III.R
Beam Dimensions: 3x2 mm
Voltage: 3V DC regulated
Current: 150mA / 250mA

Laser pointers

Maximum output: Pmax< 1 mW
Laser Class: II.
Beam Dimensions: 3 x 2 mm
Dimension: 133 mm (W), diameter 14 mm
LP-1 without ball pen wavelength: 650nm
GLP-1 green laser wavelength: 520 - 532nm

21-1401 LP-1 without ball pen
21-1404 GLP-1 green laser



LP-1 without ball pen



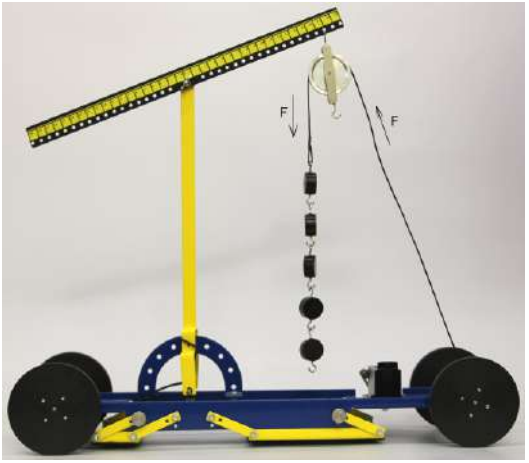
GLP-1 green laser



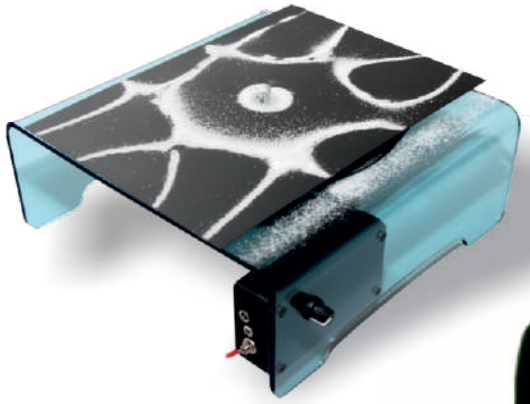
Mechanics Demonstration Vehicle

The construction is very robust and the model has ability to demonstrate several principles of mechanics, especially following:

- Measuring the length of the objects
- Frictional force
- Equal and unequal arm lever
- Single arm lever
- Straightforward, accelerated and deaccelerated motion
- Average speed
- Potential energy
- Momentum
- II. Newton's law (The Law of Power)
- Mechanical work
- Performance
- Conversion of potential energy to kinetic energy
- Hoist and double-drum hoist system



21-4001 Mechanics Demonstration Vehicle



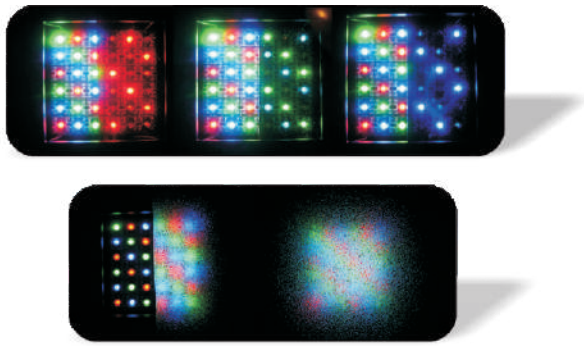
Chladni´s patterns

The pattern is formed on an iron plate as a result of vibrations generated by external vibration generator. In principle, the sand or salt used for visualization of patterns is forced off to areas of plate where amplitude of vibrations is equal to zero (areas with no deflection). Plate has numerous resonant frequencies and for each one there will a unique pattern emerge from sand. Higher frequencies generate more complex patterns. This set is simple tool for demonstration of different vibration modes, nodal lines and resonance.

21-2901 Chladni´s patterns

Spectral Plus

Spectral Plus demonstration set is designed for easy visualization of the basic light and colour principles. By using red, green and blue light emitting diodes (LEDs), filters of different colours and gratings, it is possible to demonstrate additive and subtractive colour mixing, light diffusion, absorption and diffraction. By using the spectroscope students can analyze the light emitted by the different light sources, understand the difference between continuous and bright line spectrum and understand the general white light source. Colour and colour vision is very interesting part of physics for students, since they get in touch with the principles everyday life.





Advantages of this set:
- ***light effects*** – experiments with light have strong motivational potential
- ***visibility*** – demonstration of creating different colours
- ***easy to manipulate*** – simple colour adjusting, simple turning on and off of light sources
- ***safety*** – tool does not use high voltage

Content of the Spectral Plus demonstration set:
- RGB display (square matrix of 36 LEDs containing 12 red, 12 green, 12 blue LEDs)
- Neon tube
- 1 white LED with phosphor wavelength converter
- 1 incandescent bulb
- 1 mercury fluorescent lamp
- set of colour and diffusion filters
- slit for the RGB display
- spectroscopes
- stand

21-2200 Spectral Plus

Spectroscope

Spectroscope is easy educational tool for visible light observation. Spectrum of visible light is part of electromagnetic spectrum, where also radio waves, microwaves, infrared, UV, X-rays and Gamma rays belong. Radio waves have the lowest frequency, Gamma rays have the shortest wavelength (higher the frequency, lower the wavelength). The spectroscope uses simple laws of optics to see spectrum of any light source easily, just by watching through the grid.



21-2302 Spectroscope

Spectra (High resolution spectrometer)

Spectrometers SPECTRA produced by Kvant are easy to use, educational spectrometer ideal for general measurement at schools, yet accessible at very good value. SPECTRA spectrometers are designed to effectively examine the visual part of the spectrum (from 360 nm to 940 nm), with sufficient sensitivity, covering a wide range of experiments. Construction of the device is solid enough to withstand the rough handling in the student's labs.



Design:
The spectrometer is equipped with all the components necessary to do precise measurement from the entrance slit through the grating to the detector. Optical signal enters the device through the open area or flexible optic fiber. Connection to any of your experiments cannot be easier. Data side is connected to the PC by USB 2.0 interface. It comes preconfigured and ready to use. Just plug it into computer and start your experiment! Specially selected transmitive grating with fine trimmed entrance slit is a guarantee of the high resolution and good reliability of the results.

Software:
Software for data collection has intuitive interface with clear real time graphics output. For easier interpretation of the spectrum, every wave band is marked with corresponding colour. The spectrum can be exported in graphic form for easy publication, or in text form (raw data) for more advanced scientist's calculations. Several toolbars allow setting of the spectrometer parameters, so they fit precisely to requirements of the experiment. The software is offered in multilanguage version (ENG, GER, FR, RU, SK) and is compatible with W7, W8, W8.1, Win 10, Win 11.

Dimensions: 80 x 40 x 120 mm
Weight: 600 g
Package includes: Spectrometer with USB cable, optical fiber



21-2301 Spectra (High resolution spectrometer)
Spectral range: 360 – 930 nm
Spectrometer resolution: < 1,8 nm FWHM
Pixel resolution: < 0,5 nm
Detector: 1/3" Colour CMOS Sensor, 1.3M, 1280x960
Dimensions: 80x40x120 mm

21-2305 Spectra UV-VIS
Spectral range: 360 – 620 nm
Spectrometer resolution: < 1,5 nm FWHM
Pixel resolution: < 0,3 nm
Detector: 1/3" Colour CMOS Sensor, 1.3M, 1280x960
Dimensions: 80x40x120 mm

21-2306 Spectra NIR
Spectral range: 630 – 930 nm
Spectrometer resolution: < 1,5 nm FWHM
Pixel resolution: < 0,3 nm
Detector: 1/3" Colour CMOS Sensor, 1.3M, 1280x960
Dimensions: 80x40x120 mm

21-2307 Spectra CNFG
Customers configuration, where spectral range and resolution is user selectable in the range of 360 – 930 nm.

Spectra light source

Spectra light sources are essential accessories for spectrometer Spectra 1.

SPM-UV-W-LS:
• built in two different light sources:
halogen white light source and UV LED with wavelength 407 nm
• selection of light source enabled by switch located on top enclosure
• serves for measurement of absorption and luminiscent spectras of various materials
• built in cuvette holder (also suitable for small solid materials)



21-2304 SPM-UV-W-LS

SPM-W-LS:
• halogen white light sources
• serves for measurement of absorption spectras of different materials
• built in cuvette holder (also suitable for small solid materials)



21-2303 SPM-W-LS

CALIBRATION SOURCE:

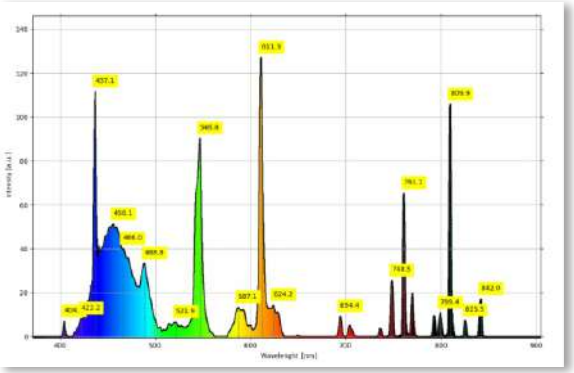
- equipped with two calibration light sources: mercury (Hg) and neon (Ne) discharge lamps
- switches for light source selection conveniently located on the device
- enhances accuracy and precision of the Spectra spectrometer by calibrating with well-characterized spectral lines
- includes power supply: input 100–240 V AC, output 9 V DC



21-2310 CALIBRATION SOURCE

The kit consists of:
• light source (SPM-W-LS or SPM-UV-W-LS)
• cuvette (20 pcs) for measuring spectra of liquid samples
• guiding rail (needed for adjusting position of source and spectrometer), your logo can be cut on rail
• software module for measurements of absorption spectra
• power supply 100-240 V AC / 5 V DC

Version	Light source	U (VDC)	Measurement	Dimensions	Cuvette
SPM-W-LS	Halogen 5W	5V	Absorption	80 x 40 x 60 mm	Plastic
SPM-UV-W-LS	Halogen 5W LED – 407 nm	5V	Absorption, luminosity (fluorescence, phosphorescence...)	80 x 40 x 60 mm	Plastic
CALIBRATION SOURCE	Hg - low pressure tube Ne - tube	9V		80 x 40 x 60 mm	



Discrete spectrum of a fluorescent lamp

Spectra Mic (Hi-Res educational spectrometer for microscopy)

Spectrometer SPECTRA Mic has been developed for measurement of microscopic samples in transmission and reflective mode. SPECTRA Mic allows spectral analysis in point and mapping of the speThe SPL sound level meterctra along line. It may simultaneously display the spectrum and the observed sample with a picture of the point being measured.

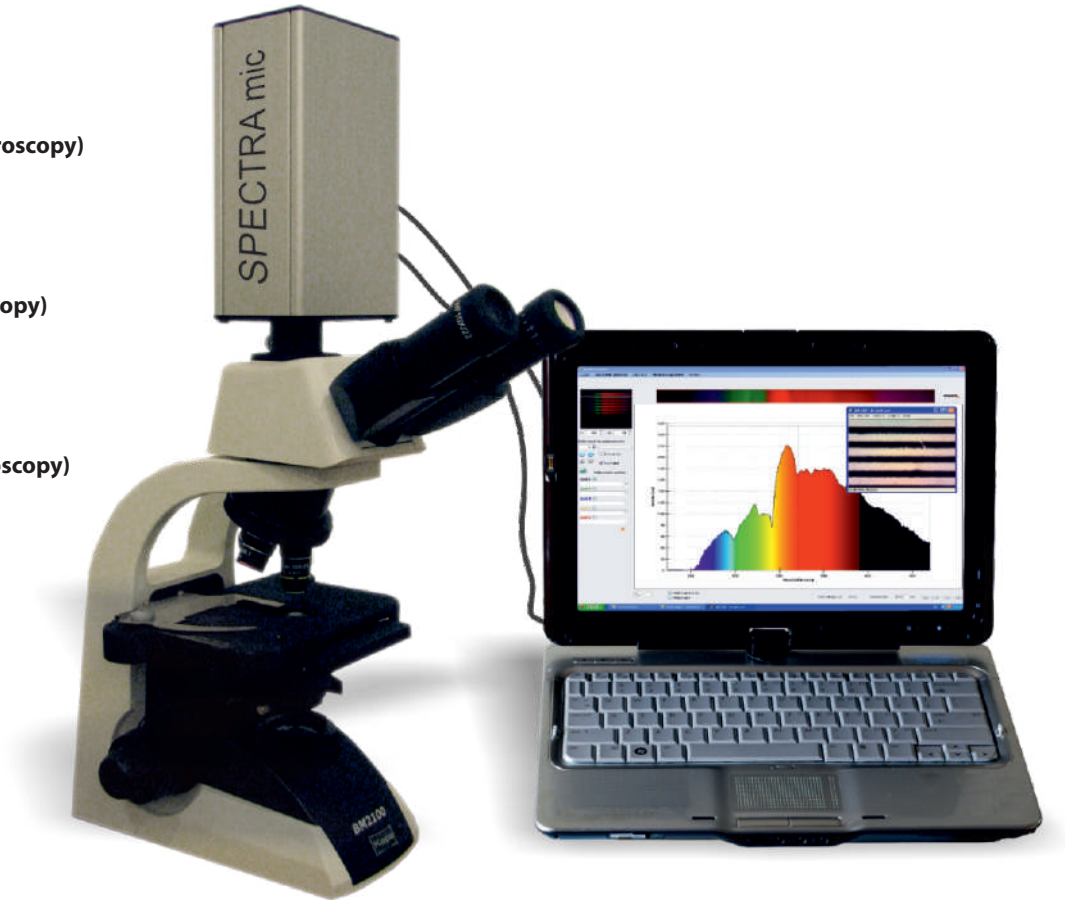
Dimensions: 200 x 40 x 80 mm
Weight: 1500 g
Software: W7, W8, W8.1, Win 10, Win 11
Package includes: Spectrometer with 2 USB cables, optical fiber, CD with software and Instruction manual

21-2351 Spectra Mic (Hi-Res educational spectrometer for microscopy)
Spectral range: 360 – 940 nm
Spectrometer resolution: < 1,5 nm FWHM
Pixel resolution: < 0,5 nm

21-2355 Spectra Mic UV-VIS (Hi-Res educational spectrometer for microscopy)
Spectral range: 360 – 650 nm
Spectrometer resolution: < 1,5 nm FWHM
Pixel resolution: < 0,5 nm

21-2356 Spectra Mic NIR (Hi-Res educational spectrometer for microscopy)
Spectral range: 650 – 940 nm
Spectrometer resolution: < 1,5 nm FWHM
Pixel resolution: < 0,5 nm

21-2357 Spectra Mic CNFG (Hi-Res educational spectrometer for microscopy)
Customers configuration, where spectral range and resolution
is user selectable in the range of 360 – 940 nm.



AMS – Automatic Measurement System

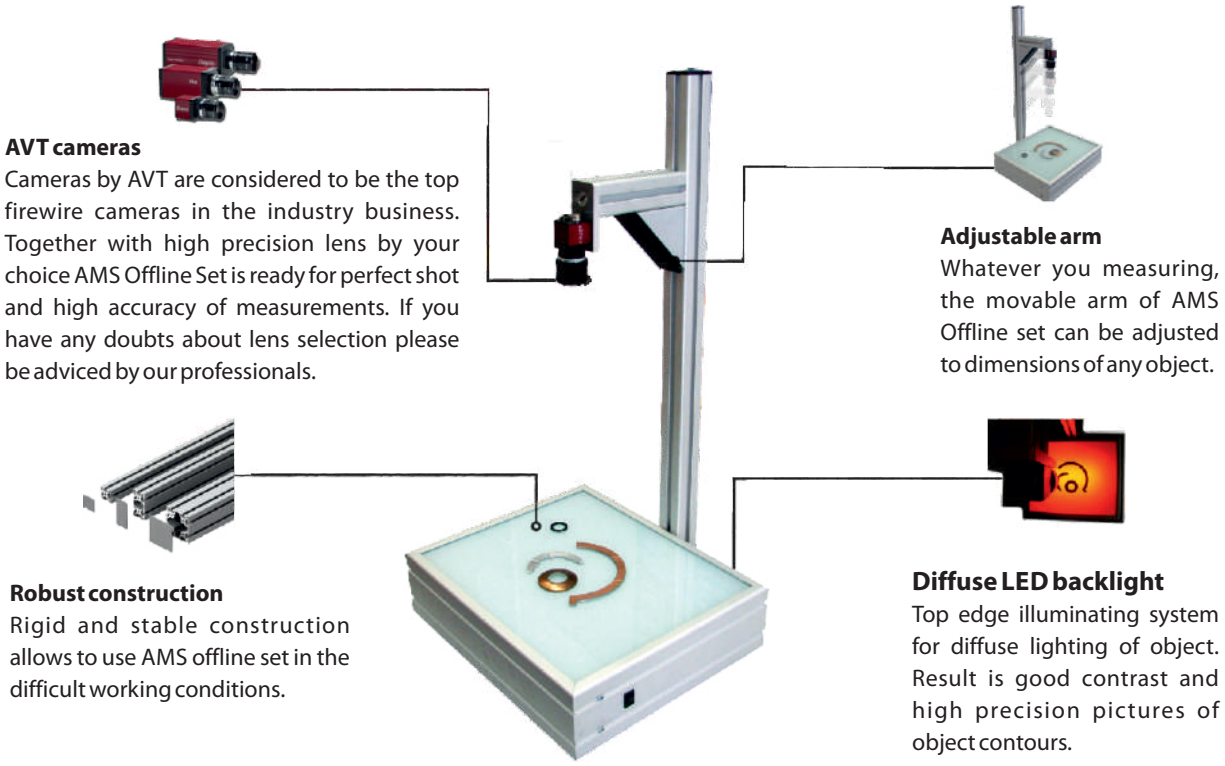
Optical measuring offers contactless, fast and accurate solutions for controlling products quality in industry. It enables simple putting and extension exactly according to customers needs. Universal access to image processing and easy results evaluation in combination with aspect control are becoming nowadays irreplaceable and fast returnable investment. Open AMS system architecture enables simple extension of it's functionality. For example using special measuring tools or connecting to external measuring devices. It is suitable for examining the principles of contactless measuring or for any laboratory measuring. Try the software simplicity and accuracy of measuring system.

Automatic Measuring System (AMS) software is open application structure, which implements methods of optical measuring in modern industry. It offers you contactless, fast and accurate solutions for controlling products quality.

Modularity of AMS allows to create various dynamic measuring schemes. Without any limitation user can measure angles, distances, diameters, patterns and so on.

System AMS present software solution independent of used hardware. It is implemented under Microsoft Windows XP, Windows Vista, or Windows7 systems and works on common personal and also on industrial computers. Optimal object imaging method is always designed for any special application. Customer thus gets very versatile solution, which can be modified for any object and realized with digital camera with 1394 FireWire interface.

Academic licence – full version of software with educational discount. When ordering please provide school's name and address.



AVT cameras
Cameras by AVT are considered to be the top firewire cameras in the industry business. Together with high precision lens by your choice AMS Offline Set is ready for perfect shot and high accuracy of measurements. If you have any doubts about lens selection please be adviced by our professionals.

Adjustable arm
Whatever you measuring, the movable arm of AMS Offline set can be adjusted to dimensions of any object.

Robust construction
Rigid and stable construction allows to use AMS offline set in the difficult working conditions.

Diffuse LED backlight
Top edge illuminating system for diffuse lighting of object. Result is good contrast and high precision pictures of object contours.

21-2601 AMS – Automatic Measurement System

Shooting Star Finder

The system *Shooting Star Finder* consists of fish-eye lens, image intensifier, projected lens and digital video camera. The whole system is protected by outer and inner housing and monitoring by detectors of temperature (inside, outside), rain and illumination of the sky. The system is design for meteor observation, but could be used for meteorological, geophysical, aviation or satellite observations.



Shooting Star FINDER

The network

The *Shooting Star Finder* cameras systematically monitor meteor activity in the Slovak Video Meteor Network (SVMN) at three locations at present, AGO Modra, Arboretum T. Mlyňany, Kysucké Nové Mesto Observatory, Važec stations. More stations are planned to be built in central and eastern part of Slovakia as well as in Canary Islands and in Chile. The operation of cameras is semi-automatic and needs electric power and internet connection.

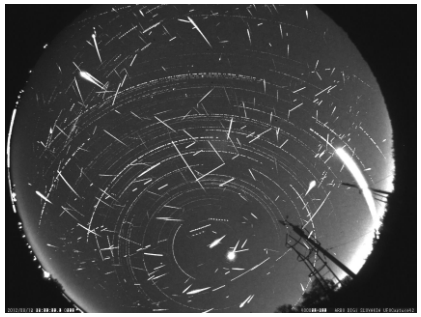


Mobility

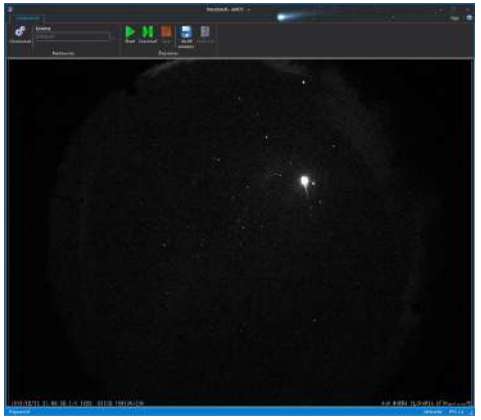
The internal part of system is portable (weight of 6.5 kg, size 50 x 25 cm) and suitable for expeditions from the ground or research planes.

Efficiency

The field of view of the *Shooting Star Finder* is 180°x140° and the output digital resolution 1280x960 pixels with video frame rate of 15 per second. Limiting sensitivity is comparable to human eye (+5,5 mag. stellar objects, +4 mag. for moving objects).

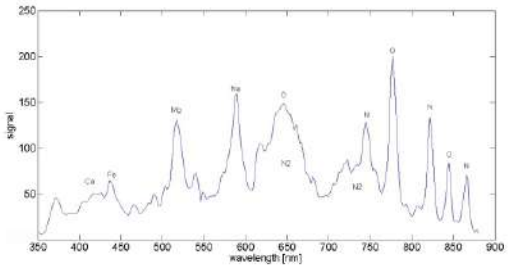


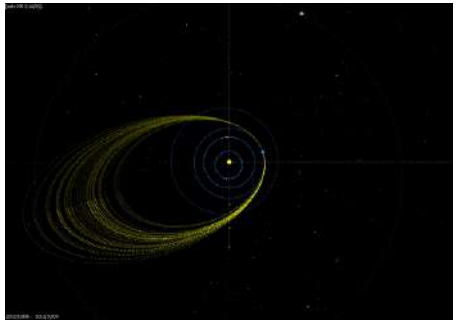




Meteor spectra

Observer can used diffraction grating for meteor spectra detection. We provide all necessary components to upgrade the system to *Shooting Star Finder*-Spec camera. The field of view is circular with diameter of 140°, which is the largest field of view meteor spectrograph. The spectral range is in 350 - 900 nm and the resolution is 2.4 nm/pixel. The obtained meteor spectra can be linked to its solar system orbit, if several *Shooting Star Finder* cameras are working in the network.







Results

The first prototype has been working at the AGO Modra Observatory since 2007. Each *Shooting Star Finder* camera records about 10 000 meteors per year as well as about 50 transient luminous events (sprites, elves).

Precision

The standard deviation of reference stars are within an interval of 0.03-0.05 degrees resulting into several tens of meters for meteor atmospheric trajectory determination from a distance hundreds of kilometers. The internal precision of the *Shooting Star Finder* cameras is even better, especially when the precise all-sky reduction methods are used.

21-4201 Shooting Star Finder

Science Museums

- Development, production, installation and service of exhibits for interactive science parks.
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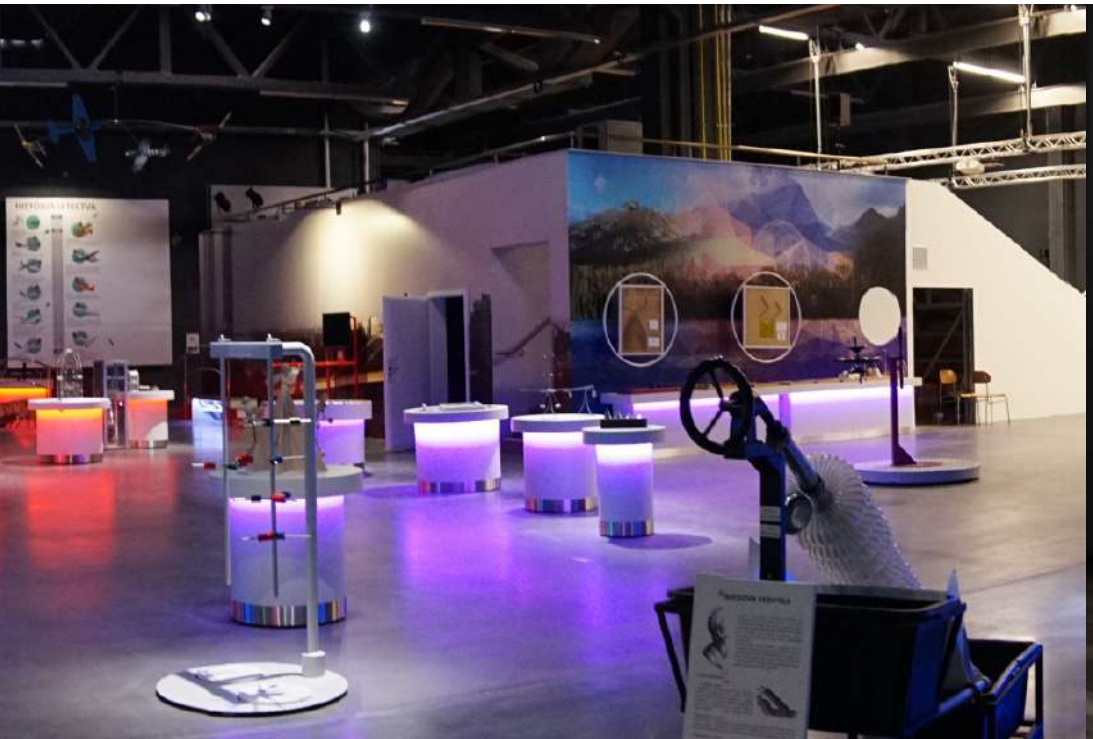



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