forschool

Modern educational equipment by KVANT 2019



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 Management Systems) and since September 2016 the company expanded the certificates for information security by obtaining the certificate ISO 27001 (Information Security Management 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 catalogue with its products.















VANT

















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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.



Specification: Laser type: Diode Wavelength: 635nm Output Power/laser class: Pmax < 1mW / 2 Ray distance: 18 mm Dimensions: 112 x 62 x 32 mm Electrical Requirements: 3V DC / 300 mA

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

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. Set includes: Battery box (2x1,5V, AA size). 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).



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 / 300 mA

21-0311 Laser Ray Box - Electronic w/o power supply 21-0312 Laser Ray Box - Electronic with power supply

Green Laser Ray Box - Elektronic (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 power output. Set includes: Battery box (2x1,5V, AA size). 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).



Specification:

Laser type: YVO4 Wavelength: 532nm Output Power/laser class: Pmax < 1mW / II. Ray distance: 18 mm Dimensions: 112 x 62 x 32 mm Electrical Requirements: 3V DC / 1A Warm-up time: < 3 min. Stability: <+-20%, 15°C-30°C

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

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. Set includes also battery box (2x1,5V, AA size). 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).

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.

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

BGYE



duo

Specification:

Laser type (Red / Green): Diode / YVO4 Wavelength: 635nm / 532nm Output Power/laser class: Pmax < 1mW / II. Ray distance: 18 mm Dimensions: 112 x 63 x 23 mm Electrical Requirements: 3V DC / 1A Warm-up time: < 10 min. Stability: <+-20%, 15°C-30°C

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

Specification:

Laser type: Diode Wavelength: 635 nm Output Power / laser class: Pmax < 1mW / 2 Ray Distance: 24 mm Dimensions: 112 x 62 x 32 mm Electrical requirements: 3V DC / 150 mA

21-0331 3-Beam Laser Ray Box – Electronic

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:

• Instruction manual – printed and video guide with tutorials of the experiments on CD.

- 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 Keplertelescope
- E spherical aberration of a lens, and its correction
- F refraction and reflection demonstration sheet



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.





Kepler telescope

B



Long-sighted eye







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





Diverging light by concave lens

Focusing light by convex lens



Ray tracing through air lens (concave)



Ray tracing through air lens (convex)



Glass prism deviation of light ray

Air prism deviation of light ray



Periscope model



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

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

The set has been enhanced and updated for the Significant Rays templates, yet for the same price.

There are three types of significant rays that are able to demonstrate with the set: a) The parallel rays to the optical axis. Those are reflected from a convex mirror in a way that the focus of a mirror is unreal (given by the extension of the rays).

b) The rays passing through the focus of a convex mirror. The are reflected as a parallel rays to the optical axis.

c) The rays passing through the center of curvature of the convex mirror hit the mirror perpendicularly and reflect straight back through the center of a curvature.

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 source
- new sheet Light dispersion



21-0423 Ray Optics 2 - Students Set



21-0421 Ray Optics 1 - Students 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 532nm (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 - laser class: 2



21-3005 Hartl Optical Disc (635nm) 21-3006 Hartl Optical Disc (532nm)

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 / 2 Dimensions: 80 x 25 x 20 mm Electrical requirements: 3V DC / 50 mA

21-0501 Laser Line Box w/o power supply 21-0502 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: 532 nm Output Power / laser class: Pmax < 1 mW / 2 Dimensions: 100 x 25 x 20 mm Electrical requirements: 3V DC / 200 mA

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





Specification: Laser type: Diode

Wavelength: 450 nm Output Power / laser class: Pmax < 1 mW / 2 Dimensions: 100 x 25 x 20 mm Electrical requirements: 3V DC / 300 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 21-0601G - LOS-1 w/o Magnetic Table 21-0602R - LOS-1 with Magnetic Board 21-0602G - LOS-1 with Magnetic Board 21-0624 - Magnetic Table for LOS-1

The set consists of:

laser 635 nm (or 532 nm) - Pmax = 1 mW/ laser class: 2, 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
- magnetic board



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.



Specification: Laser type: Diode Wavelength: 635 nm Output Power / laser class: Pmax < 1 mW/2 Laser class: 2 Dimensions: 70 x 40 x 72 mm Electrical requirements: 3V DC / 50 mA

Laser LOS Red

21-0623R Laser LOS (including lens)

Laser LOS Green



Specification: Laser type: YV 04 Wavelength: 532 nm Output Power: Pmax < 1 mW Laser class: 2 Dimensions: 70 x 40 x 72 mm Electrical requirements: 3V DC / 150 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).

Laser type: Diode Wavelength: 635 nm Output Power / laser class: Pmax < 1mW/2 Dimensions: 400 x 50 x 70 mm

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

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



Optical Fibre Demonstration Kit

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. 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.

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

Optical Fibre Demonstration Kit 2

With adding 2 new modules to Set we extend options of its using-transmission of videosignal is reality!

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, 3 micro and 12 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



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

Lasercom2 kit transmits audio and video signals 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. For video transfer, any video source can be connected to the laser transmitter (eq. CCD camera, video camera, video recorder) and any screen has to be connected to the receiver (TV or monitor) - not included in the set. We also offer supplementary CCD camera, or the version with the camera included in the box. The kit consists of a adjustable laser transmitter, laser receiver, microphone, speaker, adjustable holder, and power supplies (2 pcs): 100-240V AC / 12V DC.

Specification:

Transmitter MLDD3.0 Laser (diode): Pmax<1mW, 635 nm, class 2 Dimensions (LxWxH): 150x100x60 mm DC:12VDC/500mA **LF-audio/frequency:** 3,5 JACK/100Hz-10kHz **HF-video/frequency:** BNC/<20MHz(PAL,NTSC)

MIC: 3,5 Jack//100Hz-10kHz

Receiver

Dimensions (LxWxH): 72x69x113 mm DC: 12VDC / 500mA LF-audio/impedance: red CINCH/8 ohm HF-video/impedance: yellow CINCH/75 Ohm, 1Vpp

Transmission of Video and Audio simultaneously

21-1001 Lasercom2 w/o camera 21-1002 Lasercom2 with camera

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.

Specification:

Transmitter MLDD4.0 Dimensions (LxWxH): 150x100x60 mm Laser (diode): Pmax<1mW, 635 nm, class 2 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

21-1011 Lasercom3 CCD camera is included in the Lasercom 3.

Receiver

Dimensions (LxWxH): 72x69x113 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





Laser QUANT

The Laser Quant is regulated semiconductor laser with modulation for broad use. It has regulated output power ranging from 0,2 mW to 0,99 mW and consists of one laser module with wavelength of 635 nm. The laser starts to emit at the minimal output level being turned on. The optical power is adjustable by potentiometer and the current value is shown on a display. The laser will reach the set power output after pressing the external switch button connected by cable in order to avoid vibration caused by touching the device. The Laser Quant can be used also for a sound transmission. At the bottom part of the Laser Quant, there are holes for gripping (2 pcs with M5, 1pc with M8). There are three adjustable screws at the front side of the device used for positioning of the laser beam emitting from the aperture between them. A steel stand is an optional accessory.



Specification:

Laser type: Diode Wavelength: 635 nm Output Power / laser class: Pmax < 1mW / 2 Beam Dimensions: 4 x 2 mm Dimensions: 204 x 60 x 30 mm Electrical requirements: 12V DC / 300 mA

21-0701 Laser QUANT w/o power supply 21-0702 Laser QUANT with power supply

Laser Diode MLDD 3.0 (with power supply)

Semi-conductor laser MLDD 3.0 - (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 included.



Didactic Laser DL1 - Red

Didactic Laser DL1 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 DL1 w/o power supply 21-0902 Didactic Laser DL1 with power supply

Small Diode Laser S-DL1

S-DL1 is a simple semi-conductor laser emitting at wavelength of 635 nm and output power Pmax = 1mW; supplied with a stem of 10 mm diameter. Suitable for simple experiments on the optical bench.

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



Didactic Lase

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 Class 3R Laser Product - Pmax < 3 mW Dimensions: Box: 100 mmW x 60 mmH x 150 mmL Module: 12 mmD x 40,5 mmL Electrical requirements: 12V DC / 500 mA

Specification:

Laser type: Diode Wavelength: 635 nm Output Power / laser class: Pmax < 1mW / 2 Beam Dimensions: 4 x 2 mm Dimensions: 300 mm (W) x diameter 35 mm Electrical requirements: 3V DC / 50 mA



Specification:

Laser type: Diode Wavelength: 635 nm Output Power / laser class: Pmax < 1mW / 2 Beam Dimensions: 4 x 2 mm Dimensions: 55 x 26 x 26 mm Electrical requirements: 3V DC / 50 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 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. Device is supplied with a stable holder. 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**

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

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.

21-0943 Didactic Laser B-DL1 - Blue w/o power supply 21-0944 Didactic Laser B-DL1 - Blue with power supply

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 comes with a stem with the diameter of 10 mm. It is suitable for simple experiments on the optical bench. f 472 nm. The device has a switching key and LED indicator.

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 / 2 Ray Distance: 18 mm Dimensions: 158 x 30 x 60 mm Electrical requirements: 3V DC / 300 mA



Specification: Wavelength: 450 nm Output Power / laser class: Pmax < 1 mW / 2 Beam Diameter: 2 mm Dimensions: 158 x 30 x 60 mm

Electrical Requirements: 3V DC/ 150 mA



REEN DIDACTIC

Specification:

Specification:

Laser type: diode Wavelength: 635 nm Output Power / laser class: Pmax < 1 mW / 2 Beam Diameter: 2 mm Dimensions: 158 x 30 x 60 mm Electrical Requirements: 3V DC/ 50 mA





He-Ne laser

He-Ne laser is a great tool for demonstration of difraction, holography, and interference in a laboratory use.



Wavelength: 632,8 nm Laser type: Helium-Neon (He-Ne) Laser class: 2 Power output: Pmax < 1 mW Dimensions: 60×60×36,5 mm Electrical requirements: 12V DC

21-0951 He-Ne laser

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: 2 / 3 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: 2/3R 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: 2/3R Beam Dimensions: 3x2 mm Voltage: 3V DC regulated Current: 150mA/250mA

Laser pointers

Wave Length: 630 – 680 nm Maximum output: Pmax < 1 mW Laser Class: 2 Beam Dimensions: 3 x 2 mm Operation Time: 6 hours (min.) Dimension: 133 mm (W), diameter 14 mm

21-1401 LP-1 without ball pen 21-1402 LP-1 with ball pen 21-1404 GLP-1 green laser



LP-1 with ball pen

LP-1 without ball pen



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
- Straightforward, accelerated and deaccelerated motion
- 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

Vibra AS - Complet set



VibraAS - Control unit

Power and control unit serves as necessary interfaces for various VibraAS instruments used for experiments in the field of sound and vibrations. The unit contains analog-to-digital converter and it provides power supply for particular modules, as well. Modular concept of VibraAS set, where the control unit works as a central hub, let the users to modulate the set according to their preference and convenience. Users just pick the experiment they want to perform and plug appropriate module to PCU. PCU and all modules are sold separately, but there is also possibility to order full VibraAS package.

21-2811 VibraAS - Control unit

VibraAS - Laser vibrometer

The Laser vibrometer is used for non-contact vibration measurements of solid objects. The laser beam is projected onto the surface of the measured object (tuning fork, DC motor, etc.) at an approximate angle of 45°. The position of the laser spot is then recorded by sensitive optoelectronic sensor. Software processes and visualizes the measured data and offers the tools for advanced analysis, including spectral analysis. The software features allow students to determine deflections, character of vibrations or dominant frequencies of vibrations. Bundled software can analyze the measured data from vibration sensors and export either raw data or simplified image bitmap. The software also includes functions for calculating the spectrum of measured vibrations. NOTE: For proper functionality the control unit is necessary device. Software is included.

The Vibrometer is primarily inteneded for school demonstrations (rather slow, demonstrative movements). The parameters of the vibrometer are as following:

Measurement range - 30 mm Resolution - 20 um Sampling rate up to 6kHz usable (max 12kHz)

Laser vibrometer is a suitable tool for the detection of:

- determinate deflections
- character of vibrations
- dominant frequencies of vibrations

21-2831 VibraAS - Laser vibrometer



21-2801 VibraAS - Complet set for vibrational analysis

VibraAS - Kundt's tube

Kundt's tube is used to determine the parameters of vibrations of sound within the tube. Due to movable piston and microphone, along with a generator of sound waves, the tube offers the possibility to measure the parameters of standing waves. The software analyzes and processes the data to determine the vibration of sound inside the tube. The signals are recorded and processed digitally. Bundled software can analyze the measured data from vibration sensors and export either raw data or simplified image bitmap. The software also includes functions for calculating the spectrum of measured vibrations. NOTE: For proper functionality the control unit is necessary device. Software is included.

Kundt's tube is a suitable tool for: - determining sound speed in tube - propagation of sound waves - frequency of sound waves



21-2821 VibraAS - Kundt´s tube

VibraAS - Accelerometer

The Accelerometer extends the VibraAS possibilities to contact vibration measurements. With the accessory the VibraAS is able to measure vibrations on machines, oscillators, motors or any another source of vibrations in laboratory environment. Students can obtain valuable experience with measurement of vibrations and learn basic work principles with regard to accelerometers. Bundled software can analyze the measured data from vibration sensors and export either raw data or simplified image bitmap. The software also includes functions for calculating the spectrum of measured vibrations. NOTE: For proper functionality the control unit is necessary device. Software is included.

The accelerometer is a suitable tool for the detection of:

- determinate deflections
- character of vibrations
- dominant frequencies of mechanical oscillators - determining stiffness of spring



21-2841 VibraAS - Accelerometer



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

libraAs

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



SPECTRAL PLUS







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 Win XP, Vista, W7, W8, W8.1.

Dimensions: 60 x 60 x 120 mm Weight: 600 g Software: Win XP and Vista based, USB 2.0 Package includes: Spectrometer with USB cable, optical fiber, CD with software and Instruction manual

21-2301 Spectra (High resolution spectrometer) Spectral range: 360 – 940 nm Spectrometer resolution: < 1,5 nm FWHM Pixel resolution: < 0,5 nm

21-2305 Spectra UV-VIS Spectral range: 360 – 650 nm Spectrometer resolution: < 0,8 nm FWHM Pixel resolution: < 0,33 nm 21-2306 Spectra NIR Spectral range: 650 – 940 nm Spectrometer resolution: < 0,8 nm FWHM Pixel resolution: < 0,33 nm

21-2307 Spectra CNFG Customers` configuration, where spectral range and resolution is user selectable in the range of 360 – 940 nm.





Spectrum He-Ne

Every spectrometer comes ready-to-use, tested and calibrated.

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 365 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

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 / 9 V DC

Version	Light source	Measurement	Dimensions
SPM-W-LS	Halogen 5W	Absorption	60 x 60 x 73 mm
SPM-UV-W-LS	Halogen 5W LED – 365 nm	Absorption, luminosity (fluorescence, phosphorescence)	60 x 60 x 73 mm

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



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: 200x120x80 mm

 Weight: 1500 g

 Software: Win XP and Vista based, USB 2.0

 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: < 0,8 nm FWHM Pixel resolution: < 0,33 nm

21-2356 Spectra Mic NIR (Hi-Res educational spectrometer for microscopy) Spectral range: 650 – 940 nm Spectrometer resolution: < 0,8 nm FWHM Pixel resolution: < 0,33 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.



uLAB measuring system

uLAB measuring system is new developed hardware, software and curriculum content. uLAB is measuring system designed for education. Sensors and unique interface are dedicated for the natural science subjects in basic and secondary schools.

Features:

- sensors are connected to interface via USB connectors, up to 4 sensors at the same time
- sensors are automatically detected and set up for data collection (hot swap and plug-and-play)
- the interface wireless streams the data to user/client (tablet, smartphone, notebook or PC with WiFi)
- the interface creates it's own Access Point and IP address via DHCP is assigned to the connected devices
- webserver is running in the interface and user can communicate with the interface by means of webbrowser all data (sensors values and corresponding graph) and settings (system parameters and interface status) are available in real time
- interface can measure off-line, there is no need to connect the client, measurement will be stopped after default time. Later when the client is connected to interface, he can download the measured data as .csv files which are identified by the date of creation.

The set consists of

- Master unit
- 3 sensors: ultrasonic sensor for distance measurement temperature sensor luxmeter – light sensor

21-6001 uLAB measuring system





SPL sound level meter

The SPL sound level meter is accurate, practical and easy to use device for volume measurement. It can be used for measuring of noise level in schools, nursery schools, at home or work. Device measures noise by integrated microphone. Entering signal is first amplified and filtered and then its intensity is measured. Intensity appears on display in dB. Device can also display time and date added through web interface.

Display: 24" monitor

Measuring range: from 40dB to 130dB, Sensitivity: 0,01dB Power consumption: 1500mA (normal operating mode), <1mA (stand-by) Power input: 100 - 240V, 50/60Hz Dimensions: 16.61" x 22.32" x 8.15" Weight: 4,5kg

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Sound level meter has two standard types of placement: 1. attached on wall (hanging) 2. placed on solid base (table, bench...)

The set consists of:

sound level, stand, monitor, power cable 230V, connecting cable 230V, connecting HDMI cable, remote control.

volume measurement

- displaying of time and date
- stopwatch

21-4301 SPL sound level meter

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🔶 notifications (added through web interface)



LPM – Laser Profilometry Device

Compact profilometry device LPM is used for optical contactless measurement of objects 3D profile along defined cut. For this purpose is used well known, so-called triangulation principle. There is projected thin laser line on measured object. Laser line image is scanned at degrees by digital camera. From every scanned image is possible to evaluate actual 3D profile. This device works in collaboration with classical PC, where is making evaluation. For indication transmission is used standard IEEE-1394 interface (FireWire). On one PC can be connected more LPM devices, but we must face the consequences, that evaluation every LPM device saddle up to considerable size processor.

Software specifications:

- user friendly and easy to operate
 profile visualization
- live view mode
- export results to MS Excel
- •export image
- •roughness and waviness measuring
- anytime device calibration
- 3D profile of measured object
- measuring alarm mode
- comprehensive SDK
- multilanguage support
- •Windows7 compatible
- Optional XY linear stage motor upgrade for higher precision



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





Technical specification:

Parameter	LPM 80-50-131	LPM-XXX
Measure range (width x depth)	80 x 50 mm	
Resolution in Z axis	typically 0,1 mm	
Resolution in X axis (profile sum)	580	
Laser diode	660 nm / 40 mW	Customer defined parameters
Diverging laser angle	45°	
PC interface	IEEE-1394 (FireWire)	
Minimum requirements	Pentium 4; Windows 2000/XP	

High Speed camera

Inspector – all in one high-speed camera solution. This system represents complete low cost solution for high-speed image capturing. Inspector is based on industrial Allied Vision USB3 digital camera. It reaches 550 frames per second at 640 x 480 pixel resolution or even up to 4971 frames in smaller resolution. It's very popular for its portability, reliability and very affordable price. Bundled software is very easy to use, no training is necessary. With external battery pack you can have whole set ready on site within few minutes.



Options:

- Various IR cut/pass filters, protection glass, various lens mounts
- White medical housing

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

21-2501 Inspector Mako 4GB RAM version 21-2502 Inspector Mako 8GB RAM version

The kit consists of:

- high speed digital USB camera Mako U-029B
- industrial lens
- software
- transportation case
- tripod

Software specifications:

- record and playback
- loop recording mode
- export to AVI
- image export (current, range, all)
- live view mode
- slow down playback
- backward playback
- any Allied Vision camera support
- 6 predefined skins
- demo mode
- multilanguage support
- Windows compatible



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.



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

21-2601 AMS – Automatic Measurement System

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Adjustable arm

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



Diffuse LED backlight

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

DLW system

Method of direct laser writing DLW is based on the principle of direct exposure of a particular place using a **laser beam**. The laser beam deflection is realized using high-speed galvanometric mirror scanner, which deflects the laser beam in two perpendicular axes. This DLW lithographic method improvement reflects especially in high speed writing process.



Illustration of experimental stage for DLW system.



DLW system enables preparation of **arbitrary shapes** in the photoresist layer, from simple, such as. line, to more complicated, created in a vector graphics program. Depending on the objective type, system achieves a **resolution <0.5 µm and range up to 800 µm**.

Objective magnification	Range	Resolution
4x	800 µm	12 µm
10x	500 µm	4 µm
40x	100 µm	2 µm
100x	40 µm	<0.5 μm

In combination with soft-lithographic techniques, different **waveguide structures of defined shapes in polymer** materials can be prepared.



Demonstration of specific types of structures prepared using DLW system in photoresist, resp. PDMS layer analyzed using a confocal microscope: Y-splitter, ring resonator, Mach-Zehnder interferometer.

DLW system – parameters

Accessories:

laser with wavelength of 405 nm

- CCD camera for real-time monitoring of writing process
- high-power LED diode for sample surface illumination
- halogen lamp for transparent illumination of sample
- PC program for process monitoring and laser synchronization with galvo scanner

Technical information:

Laser		
Туре	semiconductor	
Wavelength	405 nm	
Maximal power	50 mW	
Modulation	TTL	
Galvo scanner		
Scanner type	CT 6215H	
Scanning speed	40 kpps @ 8° deflection	
Resolution	8 µrad	
Response	130 µs	
Specifications		
Writing speed	typ. 1 mm/s	
Max. resolution	<0,5 µm*	
Max. range	800 µm*	



Scanning mirror system is controlled by computer and developed program, which controls of scanning angle of galvo mirrors and synchronizes the scanning system with laser modulation. CCD camera is used for writing process monitoring and for precise adjustment of the sample position. DLW system enables exchange of different objectives (4x, 10x, 20x, 40x, alternatively 100x).



Microscope image of Fresnel zone plate prepared in thin Al layer deposited on glass using DLW lithography system.

21-4101 DLW system



Developed in cooperation with the Department of Physics, University of Zilina.

* depending on used DLW system configuration



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.





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.







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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.
- Complete solutions for designated area or supply of individual exhibits based on customers choice.
- Offer of exhibits in fields of mathematics, practical physics, mechanics, electrotechnics, microcopy, nature, chemistry, energy and many others.
- Inspired by Technologies from world's most famous scientists, inventors and explorers.
- Funny, educational, esthetic, safe and durable.
- Materials, design or size can be adjusted to customer requirements.
- Integrated hardware solution for interactive presentations.
- Attractive prices and delivery times.
- Offer of exhibits in fields of mathematics, practical physics, mechanics, electrotechnics, microcopy, nature, chemistry, energy, laser technology, optical illusions, waves, optics, hydraulics and many others.

For more information or references, do not hesitate to contact us!



Electromagnetism and communication technologies



Chemistry and materials







Mechanics, thermodynamics and engineering

Waves, light, optics

Human and environment



Mathematics and basic physical phenomena





KVANT is offering full service with the deep involvement in each phase including logistics, assembling, testing, workshops and service.

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