

## The Heureka Workshops - Nachod 2014

Number	Name	Surname	Title	Abstract
1	Leoš	Dvořák	<b>Don't be afraid of operational amplifiers (or let's build again something interesting)</b>	Operational amplifier (OA) is an integrated circuit, a little "bug" :-), which can be used for various purposes. The aim of our workshop will be to remove unnecessary respect and fear we may feel to this component and to make us at least partly familiar with it. We will try one or two basic circuits with OA making it to amplify as we want and need. Finally we will build simple and cheap amplifier where LED will indicate small voltage – for example such that is indicated in a coil with just few turns when a magnet moves in it. If it's possible please bring your own small multimeter and two flat batteries.
2	Jiří	Krásný	<b>History in Science and Science in History</b>	History in Physics and Physics in History seriously and not seriously. The workshop will include questions and answers about Physics and History. The best participant will be rewarded; the worst participant will not be evaluated..... If you have a feeling that you lost some information in History of physics or in Physics of history, you can find the answer in this workshop.
3	Václav	Piskač	<b>The centre of gravity</b>	Set of experiments - "Everything you wanted to know about the centre of gravity but you was afraid to ask" or "From demonstrations to mechanical toys".
4	Zdeňka	Koupilová	<b>Experiments with particle camera MX-10</b>	Particle camera MX-10 is an unique educational device capable of detection and displaying of ionizing radiation, it can visualize the radiation similarly to a cloud chamber. At this workshop you will have the opportunity to try out the device and do several experiments that illustrate selected properties of ionizing radiation. Methodological materials of Vladimír Vicha will be used in this workshop.
5	Zdeňka	Koupilová	<b>What can we find out from the nucleus masses?</b>	Properties of atomic nuclei are usually presented only; they are verified by experimental data rarely. During the workshop we will use data obtained from professional databases, namely the weight of nuclei, and we try out to get some interesting information about the atomic nucleus. Workshop may take the form of demonstrations and discussion, or data manipulation done on participants own laptops (especially Excel). It depends on the wishes of workshop participants.

6	Radim	Kusák	1. Tablets squared - Usage of the Tablet's Camera	Workshop will start with few experiments with tablets. Then the experiments will be recorded and also will be shown how to share it. In the end of the workshop video-feedback will be recorded. In the workshop will be couple tablets to lend.
			2. Videoanalysis	In the workshop will be shown one or two tasks of the Young Physicists' Tournament. Together will try to explore the reliable parameters of the tasks and then will be measured one of the parameters dependence. Part of the workshop will be also a discussion how to prepare students for the tournament and where is possible to find more resources, information and support.
			3. Young Physicists' Tournament - Tasks	Workshop will start with small overview of the software and apps for videoanalysis. Then will be shown basic rules to make a movie for a videoanalysis and also we will try it in free software Tracker. In the workshop will be couple laptops with Tracker to lend, but it's better to bring your own laptop with preinstall Tracker or it will be possible to install it in the workshop.
7	Jerneja	Pavlin	Experiments with aqua pearls	Hydrogel balls (aqua pearls) are very attractive since they can absorb large quantities of water. They also have very interesting optical properties which can be easily shown. The experiments concerning properties of hydrogel balls will be presented in the workshop. If it's possible pls bring your own red and green laser.
8	Václav	Pazdera	1. Building of an ionization chamber (according to design of Zdenek Polak)	Every participant will build an ionization chamber according to the design of Zdenek Polak presented at the conference Physics Teachers' Inventions Fair 18. Simple experiments with this chamber will be presented. (10 participants at most, material will cost 50 CZK, the source of alpha radiation: 150 CZK).
			2. Building of a spectroscope from grating foil	Every participant will build a simple grating spectroscope. Simple proposals what to measure will be presented, as well as photos produced by means of this spectroscope. (10 participants at most; material costs: 20 CZK)
			3. Building of teaching aids for the topic Semiconductors (thermistor, photoresistor and their applications)	Every participant will build thermistor and photoresistor. Simple labs with these components will be presented as well as other applications. (10 participants at most, material costs: 50 CZK).

9	Jaroslav	Reichl	<b>Magic physics and math</b>	Would you like to do physics and mathematics more interesting for your students? Do you enjoy (non-)traditional solving of (non-)traditional tasks? If yes, this workshop is for you! You can try to solve these tasks and maybe you can make some aids for teaching physics or math.
10	Zdeněk	Polák	<b>PC as a generator of electric oscillations</b>	How to use PC as a generator for measuring in AC circuits. What are limits of common digital multimeters for measuring of quantities concerning alternating currents of various frequencies?
11	Mojca	Čepič	<b>Liquid crystals in school</b>	Liquid crystals are modern materials, present everywhere and are also a topic in current research. Therefore they are good candidates for being interesting and motivating. In the workshop we will explain what liquid crystals are, introduce an additional phase and show special optical properties on which liquid crystal display (LCD) technology is built.
12	Lucie	Kolářová	<b>Hidden Dimension - Nanomaterial Properties</b>	This workshop introduces one of the main idea of nanotechnology - the size-dependent properties as surface-dominated properties of material. We make virtual tour in laboratory offering measurement for the specific surface area determination. In the end we focus on nanoapplications.
13	Jaroslav	Salák	<b>Physics tasks</b>	Physical tasks from the different point of view then you can find them in the textbooks of Physics. Cross-curricular links in the physical tasks.
14	Petr Zdeňka	Lobaz Kielbusová	<b>Holograms</b>	The participants of this workshop will try to produce custom hologram using some kitchen equipment and will learn how to use holograms to explain different optical phenomena. Nothing can move in the room during the hologram producing, ideally no movement in the close rooms. Max. 5 people in one workshop for producing hologram and max. 5 people can observe.
15	Pavel	Jirman	<b>Physics, SETI, binary coding, ASCII...</b>	In the workshop we shall try counting on fingers, encoding a simple message by means of magnets and reading the message: 01010000 01001000 01011001 01010011 01001001 01000011 01010011. Then we shall turn our minds to the active SETI - how to read the messages that we have sent to extraterrestrials. You need 57 small magnets.
16	Jiří	Vinter	<b>Softness</b>	Softness was till yet everything possible but physical quantity (on the contrary off hardness). Why is it so we will let be (to soft scientists). We will be concerned with its definition, determine unit and measure softness different materials.

<b>17</b>	<b>Jana</b>	<b>Šestáková</b>	<b>Peer Instruction</b>	During the workshop conceptual questions which help students reveal and revise their misconceptions will be discussed. You will find the best way for posing these questions and some hint how to motivate student to think about them. You will try to learn using Peer Instruction method. You will try how interesting and funny can be the final exams if you can cooperate with your peer during answering.
<b>18</b>	<b>Peter</b>	<b>Žilavý</b>	<b>Electric generators</b>	Three-phase voltage system represents a secret for many students (and also teachers), even if it is a regular part of many technical devices around us. Why three phases? What about the phase and line voltage? Why sometimes three and sometimes four wires are needed to connect the three-phase power to the appliance? We will search answers to these and many other questions experimentally in this workshop newly using an alternator from a truck - a rotating electric machine, which "produces" electricity for car electric equipment. Usually it's a three-phase generator with built-in rectifier for direct connection to a DC car network. In the workshop we will also introduce a simple modification of such alternator for school experiments. There are many different types of school Van de Graaff generators for the experiments of electrostatics. They sometimes stop working, when we least need it. In the rest of time the workshop participants will exchange their experiences how to put such a "bad" device into operation.
<b>19</b>	<b>Věra</b>	<b>Koudelková</b>	<b>Unique device...or nonsense?</b>	One can buy various devices, which principle seems very unique. It is possible to buy for example "tick repeller", "electron filter", "water vitalizer" etc. During the workshop we will discuss what the producer say about the principle and if it is real. Are they really unique devices or more likely nonsense?
<b>20</b>	<b>Jakub</b>	<b>Jermář</b>	<b>Experiments with Vernier</b>	We will focus on the new Vernier products - wireless thermometer, projectile launcher, motion encoder system, ... But there will be also some classical experiments for those who need to try some basics.
<b>21</b>	<b>Hubert</b>	<b>Biezeveld</b>	<b>Appetizers</b>	I will show a varied collection of experiments on mechanics, optics and electricity. Many of them are with "string and sticky tape", but I use the computer also.
	<b>Jiří</b>	<b>Vinter</b>	<b>Argentine tango</b>	Who wants to learn a little bit, we dance on Friday and Saturday evening at gym.