

# JEMNÁ MECHANIKA A OPTIKA

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## OBSAH

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# CONTENTS

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## Education and research in optical fields at Institute of Physics, VSB-Technical University of Ostrava

(J. Pištora, J. Vlček, M. Lesňák) ..... 291  
The contribution is devoted to short view on programmes related to the optics and educated by members of Institute of Physics, VSB-Technical University of Ostrava. The second part describes the selected activities of optics and nanostructures research team.

## Effect of the reflectance model on determination of the thin-film thickness

(M. Luňáčková, J. Luňáček, D. Ciprian, P. Hlubina) ..... 293  
This paper presents the effect of various reflectance models of the thin-film structure system on determination of the thin-film thickness. A special program was created in software package Matlab, which is able to calculate theoretical spectral reflectance in selected wavelength interval for the certain thin-film thickness. Afterwards, this reflectance, which simulates experimental reflectance during the following study, is processed by other program in Matlab. In this way the simulated reflectance is fitted to theoretical one with thin-film thickness as fitted parameter. Different combinations of optical parameters - dispersive and non-dispersive - for the thin-film structure system can be used as the input for the program files in the fitted reflection spectrum. Finally, the effect of reflectance models on the value of the thin-film thickness is discussed.

Key words: Fresnel's formulas, spectral reflectance, thin-film structure, dispersion

## Diagnostic measurement of vibrations in assessment of focusing tube wear during hydro-abrasive splitting of aluminium

(S. Hloch, J. Valíček) ..... 295  
Abrasive waterjet cutting monitoring of materials in recent years has become an important area of research. The article deals with potential applications vibration analysis at technological process of cutting of material. In order to provide the vibration analysis at abrasive waterjet cutting, have been carried out experiments to measure vibration and ultrasonic emissions in order to ascertain the context of the parameters measured vibrations with the technology division of aluminium. The main challenge is finding the existence of the link between the focusing tube wear and vibration.

Keywords: abrasive waterjet cutting, vibration analysis, focusing tube wear

## Computer simulation of the system for non-contact vibration scanning of rotating and sliding machine and device parts

(R. Krehel) ..... 298

## Laser comparator for calibration of length sensors (O. Číp, M. Čížek, Z. Buchta, B. Mikel, J. Lazar, J. Kūr, R. Wíttek, P. Konečný, D. Smutný, P. Balling P. Křen) ..... 301

The article covers the topic of a laser comparator for calibration of length sensors that has been developed in cooperation with MESING, Institute of Scientific Instruments of the ASCR and Czech Metrology Institute. The laser comparator is destined for manufacturers of sensors and length meters as well as for factory metrology centres that deal with precision engineering. The comparator allows to calibrate the sensors with a measuring range up to 100 mm at the position reproducibility of 1 nm.

## Transmission Phase Gratings on Silver-Halide Materials

(Š. Němcová, P. Václavík) ..... 303  
This paper deals with an effect of a chemical processing and an exposure time to the diffraction efficiency and the signal/noise ratio of diffraction gratings made on silver-halide emulsions Agfa Gevaert. The results of measurements on gratings treated by 14 different chemical processes are presented.

## Cooling Mechanism of Drinks - an Understandable Physical Description (J. Sedláček, J. Dolejší) ..... 307

The paper describes the physical mechanism of the drinks cooling.

## RNDr. Dagmar Senderáková, CSc.'s anniversary

(V. Mesároš, A. Štrba) ..... 310

## Interferometric methods for phase evaluation of wave field in optics (J. Novák, P. Novák) ..... 311

The article presents a survey of selected methods for phase evaluation of optical wave fields based on interference principle. There are mentioned both the classical and modern interferometric methods for phase evaluation usable in many applications, especially in scientific and industrial optical metrology. Their advantage is a high precision, non-contact way of measurement and results obtained practically in real time.

## Sixth International Conference Photonics Prague 2008

(P. Tománek) ..... 318  
Czech and Slovak Society for Photonics organised its 6<sup>th</sup> conference Photonics Prague dealing with Photonics, Devices and Systems. The Conference was held on August 27-27, 2008 in Artemis Olympik hotel in Prague.

150 participants from 34 countries answered to the invitation of Organizing and Program Committees. The excellent and exciting 4 plenary talks were followed by successful thirteen sessions (with 29 invited, 78 oral and 51 posters presentations) on various aspects of Photonics.

SPIE Best student presentation Awards have been distributed among three young ladies, and CSSF Award received ex-aequo two young Czech scientists.

## Selected trends in the field of interferometric methods for optical control (J. Novák, P. Novák, A. Mikš) ..... 320

The article presents a survey of selected modern interferometric methods suitable for quality control in optical production. There are mentioned physical principles of these measuring and evaluating methods together with their advantages and disadvantages. Also the selected progress trends of interferometric methods are suggested including problems needed to be solved in practical tasks of optical industrial control.

## RNDr. Vladimír Malíšek, CSc. deceased (J. Pospíšil) ..... 325

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## Optics and Optometry - field of study at the Faculty of Biomedical Engineering, Czech Technical University in Prague

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# ANOTACE

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## Laserový komparátor pro kalibraci délkových snímačů

(O. Číp, M. Čížek, Z. Buchta, B. Mikel, J. Lazar, J. Kūr, R. Wíttek, P. Konečný, D. Smutný, P. Balling P. Křen) ..... 301  
Článek pojednává o laserovém komparátoru pro kalibraci délkových snímačů, vyvinutém ve spolupráci MESING, ÚPT AV ČR a ČMI. Je určen jak pro výrobce snímačů a délkoměrů, tak i pro podniková metrologická střediska firem přesného strojírenství. Komparátor umožňuje kalibraci snímačů s rozsahem měření až 100 mm při reprodukovatelnosti polohy 1 nm.