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Optics and Measurement – the first year of international conference (J. Kovačičinová)..... 299

Application of piezoelectric composite actuators to the suppression of noise transmitted through thin-walled structures

(K. Nováková, P. Mokry, J. Václavík) 300
People in cities are exposed to harmful influences on their health. One of them is ever-present noise. Thin-walled structures, such as glass windows or facades, often represent a virtual noise source for a building interior. Reduction of the noise transmission through such structures using passive noise control methods, e.g. laminated glass plates, is rather difficult and inefficient in the low frequency range (up to 1 kHz). Active noise control methods require robust control algorithms and powerful electronics, which results in expensive and energy consuming systems. In this article, a modern mechatronic system for the noise transmission control is presented. It is based on the principle which uses properties of piezoelectric materials and the possibility to control their elastic parameters by a shunt electronic circuit. The system for the noise transmission control through the planar structures is numerically simulated using the Finite Element Method. Calculations are verified using acoustic pressure measurements.

From technical library (J. Novák)..... 307, 324

Catadioptric system of G. M. Popov (Z. Rail, D. Jareš)..... 308

Since the fifties of the past century the computing machinery has allowed to compute many new complicated optical systems. The computer outputs – spotdiagrams, MTF curves, energy distribution profiles etc. made possible to estimate the optimized results more objectively. Using the computer programs many new optical systems were designed and used in scientific and technical branches. In the former USSR these optical systems were studied by Argunov, Popov and Klevcov. They devised two mirror telescopes with all spherical surfaces and with the various kinds of subaperture lens correctors placed in a front of the secondary mirror. Several optical sets of these systems were manufactured in VOD AV ČR Turnov, now IPP AS CR v.v.i., Topotec in Turnov. We present the optical designs of several G. M. Popov's systems which were developed in our workshop during last two decades.

Digital holographic set-up for measurement of asymmetric temperature field and tomographic reconstruction

(R. Doleček, P. Psota, V. Lédl, V. Kopecký).....311
This article presents a method of multidirectional digital holographic interferometry for measurement of periodic development of asymmetric temperature fields. The method employs the double response of modified Twyman-Green interferometer. In this arrangement, using precise synchronization of the CCD camera with examined phenomenon, it is possible to record from more directions the required number of projections and applied them in 3D tomographic reconstruction.

Fotonometres for coating and sputtering machines

(P. Oupický, D. Jareš, J. Václavík)..... 314
The concept of photonometers (alternative name of optical monitor of a vacuum deposition process) for coating and sputtering machines is based on photonometers produced by companies like SATIS or HV Dresden. Photo meters were developed in the TOPTEC centre and its predecessor VOD (Optical Development Workshop of Institute of Plasma Physics AS CR) for more than 10 years. The article describes current status of the technology and ideas which will be incorporated in next development steps. Hardware and software used on coating machines B63D, VNA600 and sputtering machine UPM810 is presented.

Relationship between photometric parameters of stars and the orbital parameters of exoplanets (P. Pintr)..... 317

In this work we have demonstrated a relationship between photometric parameters of stars and the orbital parameters of their exoplanets and we have applied the statistical analysis based on the regression model. Each stellar spectral class has another distribution. Stellar luminosity L and stellar irradiance J has no effect on the distribution of exoplanet distances. We have found the new formulas for calculation of effective temperature of exoplanets for the F, G and K spectral classes. We can use these new formulas for future calculation of habitable planets.

Keywords: exoplanets, regression analyse, stellar luminosity, stellar irradiance, effective temperature, orbital parameters

Workshop Applied Optics and Microscopy

(J. Novák)..... 320

Using FEM technology for optical surfaces

(F. Procháska, J. Polák, D. Tomka, E. Šubert)..... 321
The aim of this article is optical surfaces polishing on the six-axis computer-controlled (CCM) machine Optotech MCP 250 CNC using FEM technology, which is suitable for aspheric elements polishing. The main attention is dedicated to the choice and to the precise adjustment of major process parameters. The possibility of usage the multi-wave interferometer Lumphoscan as a data source for the 2D surface correction is solved too.

Keywords: asphere polishing, CCM polishing, asphere measurement

GaP – a material for optical elements of visible and infrared optics

(J. Václavík, D. Vápenka)..... 325
Gallium phosphide is neglected material that could be used for optical elements and systems working in both visible and MWIR or LWIR spectral ranges. TOPTEC research center developed methods for production optical elements from GaP and applications exploiting specific characteristics of the GaP. The article describes its most important characteristics and outlines some applications where GaP should prove to be useful.

Keywords: infrared optics, materials, production, optical systems

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Rayleigh's wave and its application in composites

(J. Dvořák) 333
The article deals with the analysis of the physical conditions leading to the occurrence of Rayleigh surface wave. The electromagnetic wave is generated by a special magnetizing coil. The paper includes the experimental results of registered mechanical response of this wave with use of a laser interferometer and describes the possibilities of application of Rayleigh wave in materials science and engineering. The maximum amplitude of displacement was 7 nm at a frequency of 250 kHz, whereas the amplitude of excitation current was 110 mA.
Keywords: Rayleigh's wave, Lorentz force, magnetic field

Delegates of optical communities from Czech Republic, Poland and Slovakia met together at the international conference in Ostravice (H. Šebestová) 335

ANOTACE

Zobrazovací vlastnosti čoček s paraboloidními plochami

(A. Mikš, J. Novák, P. Novák, P. Pokorný)..... 330
V článku je uvedena teorie zobrazení a metodika výpočtu optických soustav s čočkami majícími paraboloidní plochy. Je ukázáno, že tyto čočky mohou mít korigovanu sférickou aberaci, což u jednoduché čočky se sférickými plochami není možné. Jsou uvedeny příklady některých typů optických soustav s čočkami majícími paraboloidní plochy.