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Influence of surface goniometry at the contactless measurement of temperature (J. Bartl, V. Jacko, R. Fíra)211

While performing some technological operations, coupled with the contactless temperature measurement, e.g. drawing of wires, reinforcing steel bars, drawing of optical fibres, production of seamless drawn tubes etc., the emissivity of object surface depends on the angle between the normal of the surface and the direction of radiance detection.

In preponderant majority of practical considerations related to the radiation of bodies, we assume that radiant body emits in all directions equally. This simplifying assumption is fulfilled just for ideally diffusive surfaces, for which its radiance is independent on the angle between normal and direction in which the radiation propagates. Although the Lambert's cosine law is a good approximation for majority of bodies with diffusive surfaces, there are many objects for which this law cannot be applied, for instance burning gases, bodies with glossy and partly glossy surfaces. We would like to devote this paper to the angle dependence of the emissivity.

Keywords: emissivity, index of refraction, directional and normal spectral emissivity

Utilization of spiral phase modulation in optical imaging systems (M. Baránek, Z. Bouchal)214

The spiral phase singularities, often referred as optical vortices, have been investigated in connection with a number of unusual optical phenomena. In recent years, attention has also been paid to the practical applications of the principles of singular optics. In the paper, the selected imaging applications of optical vortices are discussed. The particular attention is focused on imaging systems, in which the spiral phase modulation is utilised for adaptive compensation of optical aberrations, imaging of thin phase samples or three-dimensional localisation of point-like objects. The presented experiments are based on spatial light modulator used for generation of optical vortex fields.

Optical diffusion methods for non-invasive medical diagnostic (P. Kaspar, P. Tománek)217

This paper creates a review of a few selected methods of non-invasive medical diagnostics, that make use of diffuse light beams, diffusion and absorption of light in tissues. Basic pitfalls of these methods, their adjustments for better use and application fields are also included.

Keywords: non-invasive optical methods, diffuse optical imaging, diffuse reflectance, goniometric measurement

Interference fringe center detection techniques in low-coherence interferometry (T. Pikálek, T. Fořt, Z. Buchta)220

This paper deals with interference fringe center detection techniques used in low-coherence interferometry for contactless surface analysis. It presents a complex analysis of the experimental data processed by using of four different techniques. The analysis compares those techniques in terms of computational complexity, measurement accuracy and resistance to optical dispersion caused by wedge-shaped optical components.

Keywords: low-coherence interferometry, interference fringe center detection techniques, surface analysis

Model of surface exomoons temperatures (P. Pintr)224

The calculation of surface temperatures for exomoons has been determined in the dependence on the total infrared optical thickness and on the basic physical parameters for exomoons. This model has been tested for Jovian and Saturnian moons in the solar system. We show that this model is in good agreement with current measurements provided by space probes.

Influence of the gravity induced deflection of a reference flat of the Fizeau interferometer on the measurement accuracy of testing flat surfaces in optics (A. Mikš, P. Novák)228

The paper presents analysis of the deflection of a reference surface of a Fizeau type interferometer due to the gravity on the measurement accuracy. Detailed expressions for calculation of a deflection of the reference flat of the interferometer and calculation of a deflection of a plane parallel plate tested by such interferometer assuming different supports are presented. Furthermore the relations for calculation of the minimum thickness of a reference flat of the interferometer ensuring the required accuracy of measurement are also given.

Keywords: gravity induced deformation; plate deflection; interferometric testing; measurement accuracy

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ANOTACE

Rontgenova difrakcia, snímacia elektrónová mikroskopia a koercivita permalloya pripraveného lisovaním prášku

(D. Oleškáčková)233

Cieľom tejto práce bolo preskúmať štruktúru (XRD, SEM) a magnetické vlastnosti (koercivita) kryštalickej zliatiny NiFe (81 % hmot. Ni) vo forme prášku a lisovaného kompaktu. Zistili sme, že mechanické mletie nemá vplyv na štruktúru takto pripravených práškových vzoriek a systém zostáva počas celej doby mletia jednofázový. Mechanické mletie spôsobuje redukciu rozmerov častíc, premagnetovanie je vo väčšej miere spôsobené otáčaním vektora magnetizácie, čo vedie aj ku zvyšovaniu koercivity. Po lisovaní prášku jednoosovým tlakom za tepla sa zosilní „magnetický kontakt“ medzi časticami prášku a proces premagnetovania je vo väčšej miere spôsobený posunom doménových stien. Hodnota koercivity pre vzorky pripravené lisovaním prášku, ktorý bol pripravený mechanickým mletím, je 11 A/m, čo je porovnateľná hodnota pre permalloy rovnakého chemického zloženia pripraveného konvenčným spôsobom.

Kľúčové slová: permalloy, mechanické mletie, koercivita

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