1. Record Nr. UNINA9910728395903321

Autore	Nazarchuk Z. T (Zinovii Teodorovich)
Titolo	Optical Metrology and Optoacoustics in Nondestructive Evaluation of Materials / / by Zinoviy Nazarchuk, Leonid Muravsky, Dozyslav Kuryliak
Pubbl/distr/stampa	Singapore : , : Springer Nature Singapore : , : Imprint : Springer, , 2023
ISBN	981-9912-26-1
Edizione	[1st ed. 2023.]
Descrizione fisica	1 online resource (415 pages)
Collana	Springer Series in Optical Sciences, , 1556-1534 ; ; 242
Disciplina	620.1127
Soggetti	Optics Optical measurements Metrology Materials—Analysis Applied Optics Optical Metrology Materials Characterization Technique
Lingua di pubblicazione	Inglese
Formato	Materiale a stampa
Livello bibliografico	Monografia
Nota di bibliografia	Includes bibliographical references and index.
Nota di contenuto	Optical Metrology and Optoacoustics Techniques for Nondestructive Evaluation of Materials -- Phase Shifting Interferometry Techniques for Surface Parameters Measurement -- Application of Phase Shifting Interferometry Methods for Diagnostics of Materials Surface -- Digital Speckle Pattern Interferometry for Studying Surface Deformation and Fracture of Materials -- New Methods of Speckle Metrology in Analysis of Rough Surfaces -- Methods for Processing and Analyzing the Speckle Patterns of Materials Surface -- Mathematical Modeling of Elastic Waves Interaction with Interface Crack-type Defects.
Sommario/riassunto	This book includes the description, modeling and realization of new optical metrology techniques for technical diagnostics of materials. Special attention is paid to multi-step phase shifting interferometry with arbitrary phase shifts between interferograms, phase shifting and correlation digital speckle pattern interferometry, optical-digital speckle correlation, and digital image correlation, as well as dynamic speckle patterns analysis. Optoacoustic techniques can be treated as a separate branch of optical metrology and can solve many problems of

technical diagnostics, including detection and localization of subsurface defects in laminated composite materials. The utility of such techniques can be increased by illumination of the object via acoustic waves at certain frequencies. Hence, an effective theoretical approach to the modeling of an elastic wave field interaction with an interphase defect, and to defect visualization using dynamic speckle patterns, is also included in this book. The experimental proof of the proposed approaches was achieved using a specially created hybrid optical-digital system for detection of different subsurface defects. This book is intended for engineers, researchers and students engaged in the field of nondestructive evaluation of materials and technical diagnostics of structural elements, hybrid optical systems, speckle metrology and optoacoustic imaging techniques.