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Front Matter: Volume 9203

, "Front Matter: Volume 9203," Proc. SPIE 9203, Interferometry XVII:
Techniques and Analysis, 920301 (18 August 2014); doi: 10.1117/12.2076088

SPIE.

Event: SPIE Optical Engineering + Applications, 2014, San Diego, California,
United States

PROCEEDINGS OF SPIE

Interferometry XVII: Techniques and Analysis

**Katherine Creath
Jan Burke
Joanna Schmit**
Editors

**17–19 August 2014
San Diego, California, United States**

Sponsored and Published by
SPIE

Volume 9203

Proceedings of SPIE 0277-786-786X, V.9203

SPIE is an international society advancing an interdisciplinary approach to the science and application of light.

Interferometry XVII: Techniques and Analysis, edited by Katherine Creath, Jan Burke, Joanna Schmit,
Proc. of SPIE Vol. 9203, 920301 · © 2014 SPIE · CCC code: 0277-786X/14/\$18
doi: 10.1117/12.2076088

Proc. of SPIE Vol. 9203 920301-1

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Please use the following format to cite material from this book:

Author(s), "Title of Paper," in *Interferometry XVII: Techniques and Analysis*, edited by Katherine Creath, Jan Burke, Joanna Schmit, Proceedings of SPIE Vol. 9203 (SPIE, Bellingham, WA, 2014) Article CID Number.

ISSN: 0277-786X

ISBN: 9781628412307

Published by

SPIE

P.O. Box 10, Bellingham, Washington 98227-0010 USA

Telephone +1 360 676 3290 (Pacific Time) · Fax +1 360 647 1445

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Printed in the United States of America.

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Contents

ix	Conference Committee
xi	Introduction

SESSION 1 DIGITAL HOLOGRAPHY AND SPECKLE

- 9203 02 **Complete shape measurement of micro parts by digital holography** [9203-1]
S. Huferath-von Luepke, R. Klattenhoff, C. Dankwart, C. Falldorf, Bremer Institut für angewandte Strahltechnik GmbH (Germany); R. B. Bergmann, Bremer Institut für angewandte Strahltechnik GmbH (Germany) and Univ. Bremen (Germany)
- 9203 03 **Development of in-plane and out-of-plane deformation simultaneous measurement method for the analysis of buckling** [9203-2]
Y. Arai, Kansai Univ. (Japan)
- 9203 04 **Real-time processing of off-axis interferograms: from the camera to the user** [9203-3]
P. Girshovitz, T. Gabay, N. T. Shaked, Tel Aviv Univ. (Israel)
- 9203 05 **Dual-wavelength digital holography: single shot calibration** [9203-4]
D. Khodadad, P. Bergström, Luleå Univ. of Technology (Sweden); E. Hällstig, Optronic (Sweden); M. Sjö Dahl, Luleå Univ. of Technology (Sweden)
- 9203 06 **Transparent stepped phase measurement using two illuminating beams** [9203-5]
B. Tayebi, F. Sharif, M. R. Jafar Fard, D. Y. Kim, Yonsei Univ. (Korea, Republic of)
- 9203 07 **ITIA: tripling the field-of-view in off-axis interferometric phase microscopy** [9203-6]
I. Frenklach, P. Girshovitz, N. T. Shaked, Tel Aviv Univ. (Israel)

SESSION 2 FABRY-PEROT AND FIBER SENSORS

- 9203 08 **Practical Fabry-Perot displacement interferometry in ambient air conditions with subnanometer accuracy (Invited Paper)** [9203-7]
D. Voigt, A. S. van de Nes, S. A. van den Berg, VSL Dutch Metrology Institute (Netherlands)
- 9203 09 **Simultaneous determination of thickness and refractive indices of birefringent wafer by simple transmission measurement** [9203-8]
H. J. Choi, J. Y. Ryu, M. Cha, Pusan National Univ. (Korea, Republic of)
- 9203 0A **Interferometric system for detecting radiation wavelength shift** [9203-9]
P. P. Brazhnikov, V. P. Andrianov, O. N. Koltovoy, A. A. Tikhov, All-Russia Research Institute of Automatics (Russian Federation)

- 9203 0B **Mode-mode interference sensor with increasing number of modes along the multimode optical fiber** [9203-10]
O. Kotov, I. Chapalo, A. Medvedev, St. Petersburg State Polytechnical Univ. (Russian Federation)

SESSION 3 DEFLECTOMETRY AND SHEAROGRAPHY

- 9203 0C **A comparative study between deflectometry and shearography for detection of subsurface defects (Invited Paper)** [9203-11]
P. Huke, J. Burke, Bremer Institut für angewandte Strahltechnik GmbH (Germany); R. B. Bergmann, Bremer Institut für angewandte Strahltechnik GmbH (Germany) and Univ. Bremen (Germany)
- 9203 0D **A trial for a reliable shape measurement using interferometry and deflectometry** [9203-41]
R. Hanayama, The Graduate School for the Creation of New Photonics Industries (Japan)
- 9203 0E **Stability of absolute depth reconstruction from deflectometric measurement data** [9203-12]
A. Pak, Fraunhofer-Institut für Optronik, Systemtechnik und Bildauswertung (Germany)
- 9203 0F **Measuring deformations with deflectometry** [9203-14]
W. Li, VEW Vereinigte Elektronik Werkstätten GmbH (Germany); P. Huke, J. Burke, Bremer Institut für angewandte Strahltechnik GmbH (Germany); C. von Kopylow, VEW Vereinigte Elektronik-Werkstätten GmbH (Germany); R. B. Bergmann, Bremer Institut für angewandte Strahltechnik GmbH (Germany)
- 9203 0G **Spurious mid-spatial frequency structure on optical surfaces reconstructed from surface slope measurements** [9203-15]
Y. Dong, Z. Hosseinimakarem, A. Davies, C. J. Evans, The Univ. of North Carolina at Charlotte (United States)

SESSION 4 SELF-CALIBRATION

- 9203 0I **Characterization of field dependent aberrations in Fizeau interferometer using double Zernike polynomials** [9203-17]
H.-S. Chang, C.-W. Liang, P.-C. Lin, M.-S. Tsao,, National Central Univ. (Taiwan)
- 9203 0J **A large field-of-view scene measurement based on control points with a single camera** [9203-18]
Y. Zhao, D. Zhang, Y. Li, H. Liu, L. Xu, Univ. of Science and Technology of China (China); L. Zhu, National Astronomical Observatories (China); W. Li, Univ. of Science and Technology of China (China)

SESSION 5 FRINGE ANALYSIS I

- 9203 0K **Hilbert-Huang processing and analysis of complex fringe patterns (Invited Paper)** [9203-19]
M. Trusiak, K. Patorski, M. Wielgus, Warsaw Univ. of Technology (Poland)

- 9203 OL **Improvement of defect detection in shearography by using principal component analysis** [9203-20]
J.-F. Vandenrijt, N. Lièvre, M. P. Georges, Univ. de Liège (Belgium)
- 9203 OM **Links between fringe pattern analysis and digital image correlation: windowed, optimal, and tracking (WOT)** [9203-21]
K. Qian, Nanyang Technological Univ. (Singapore)
- 9203 ON **Wavelet transform: capabilities expanded** [9203-22]
K. Pokorski, K. Patorski, Warsaw Univ. of Technology (Poland)

SESSION 6 FRINGE ANALYSIS II

- 9203 OO **Performance evaluation of a phase retrieval algorithm from sequences of interferograms with unknown phase shifts using generalized N-dimensional Lissajous figures** [9203-24]
A. Albertazzi Jr., A. Fantin, M. Benedet, D. Willemann, A. Maia, Univ. Federal de Santa Catarina (Brazil)
- 9203 OP **Estimation of the temperature of a flame with asymmetric profile** [9203-23]
E. González-Ramírez, Univ. Autónoma de Zacatecas (Mexico); L. R. Berriel Valdós, Instituto Nacional de Astrofísica, Óptica y Electrónica (Mexico); J. G. Arceo Olague, E. de la Rosa Miranda, C. A. Olvera-Olvera, T. Saucedo Anaya, J. I. de la Rosa Vargas, J. J. Villa Hernández, Univ. Autónoma de Zacatecas (Mexico)
- 9203 OQ **Design of new window function of phase extraction algorithm in wavelength tuning Fizeau interferometer** [9203-25]
Y. Kim, The Univ. of Tokyo (Japan); K. Hibino, National Institute of Advanced Industrial Science and Technology (Japan); N. Sugita, M. Mitsuishi, The Univ. of Tokyo (Japan)
- 9203 OR **Application of a swarm-based approach for phase unwrapping** [9203-27]
L. da S. Maciel, A. Albertazzi G. Jr., Univ. Federal de Santa Catarina (Brazil)

SESSION 7 MICROSCOPY

- 9203 OS **Interferometric microscope with true color imaging** [9203-29]
J. L. Beverage, X. Colonna De Lega, M. F. Fay, Zygo Corporation (United States)
- 9203 OT **Dual-wavelength diffraction phase microscopy for real-time dispersion measurement** [9203-30]
M. R. Jafarfard, B. Tayebi, D. Y. Kim, Yonsei Univ. (Korea, Republic of)
- 9203 OU **Reduction of the stagnation effect by combined iterative and deterministic single beam phase retrieval techniques** [9203-31]
K. Falaggis, Warsaw Univ. of Technology (Poland)
- 9203 OV **Comparison of full-field interferometric measurement techniques applied to small vibration amplitudes determination** [9203-32]
A. Styk, Warsaw Univ. of Technology (Poland)

- 9203 OW **Three-dimensional photothermal microscopy of KDP crystals** [9203-33]
J. Chen, J. Dong, Q. Zhang, Z. Wu, ZC Optoelectronic Technologies, Ltd. (China)

SESSION 8 HIGH-PRECISION TECHNIQUES

- 9203 OX **Overview of the optic component manufacturing and measurements for the Advanced Virgo optics (Invited Paper)** [9203-34]
A. Nelson, A. Estrin, Zygo Corporation (United States)
- 9203 OY **A novel linear Sagnac interferometer in position determination of perturbations** [9203-35]
S. Pi, B. Wang, J. Zhao, G. Hong, D. Zhao, B. Jia, Fudan Univ. (China)

SESSION 9 FRINGE PROJECTION

- 9203 10 **High-speed 3D shape measurement with fiber interference (Invited Paper)** [9203-37]
B. Li, Iowa State Univ. (United States); P. Ou, BeiHang Univ. (China); S. Zhang, Iowa State Univ. (United States)
- 9203 11 **Microscopic type of real-time uniaxial 3D profilometry by polarization camera** [9203-38]
S. Shibata, F. Kobayashi, D. Barada, Y. Otani, Utsunomiya Univ. (Japan)
- 9203 12 **Analysis of optimization method for interferometric evaluation of small shape deviations** [9203-46]
J. Novák, P. Novák, A. Mikš, Czech Technical Univ. in Prague (Czech Republic)

POSTER SESSION

- 9203 13 **Phase unwrapping using a surface mesh with constraints** [9203-26]
J. G. Arceo-Olague, Univ. Autónoma de Zacatecas (Mexico); L. R. Berriel-Valdos, Instituto Nacional de Astrofísica, Óptica y Electrónica (Mexico); E. de la Rosa Miranda, E. Gonzalez-Ramirez, C. A. Olvera-Olvera, T. Saucedo Anaya, Univ. Autónoma de Zacatecas (Mexico); J. J. Villa-Hernández, I. de la Rosa Vargas, Instituto Nacional de Astrofísica, Óptica y Electrónica (Mexico)
- 9203 14 **Fiber optic laser Doppler velocimeter with non-mechanical scanning of spatially encoded points for cross-sectional velocity distribution measurement** [9203-40]
K. Maru, K. Watanabe, Kagawa Univ. (Japan)
- 9203 15 **Experiment analysis of freeform testing based on absolute testing method** [9203-44]
X. Jia, F. Xu, T. Xing, Institute of Optics and Electronics (China)
- 9203 16 **Digital holographic moiré pattern for optical numerical code generation** [9203-48]
G. N. de Oliveira, M. E. de Oliveira, R. B. da Rocha Freire Jr., P. A. M. dos Santos, Univ. Federal Fluminense (Brazil)

- 9203 17 **Measure of a zinc oxide (ZnO) film thickness using a point diffraction interferometer** [9203-50]
E. Rueda-Soriano, H. Gómez-Pozos, J. L. González-Vidal, Univ. Autónoma del Estado de Hidalgo (Mexico); A. Muñoz Potosí, L. G. Valdivieso-González, Instituto Nacional de Astrofísica, Óptica y Electrónica (Mexico)
- 9203 18 **An interferometric humidity sensor based on a thin gelatin film** [9203-51]
S. Calixto, A. Montes-Perez, Ctr. de Investigaciones en Óptica, A.C. (Mexico)
- 9203 19 **IDIA: doubling the recorded imaging area or the frame rate in off-axis interferometric microscopy** [9203-52]
P. Girshovitz, N. T. Shaked, Tel Aviv Univ. (Israel)
- 9203 1A **Periodic error characterization in commercial heterodyne interferometer using an external cavity diode laser based Fabry-Perot interferometer** [9203-53]
M. Zhu, H. Wei, Y. Li, Tsinghua Univ. (China)
- 9203 1B **Shaping intensity behind amplitude masks for proximity correction lithography: design, measurement, and realization** [9203-54]
K. Puthankovilakam, T. Scharf, Q. Tan, H. P. Herzig, D. Nguyen, Ecole Polytechnique Fédérale de Lausanne (Switzerland); U. Vogler, A. Bramati, R. Voelkel, SUSS MicroOptics SA (Switzerland)

Author Index

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- 3 Deflectometry and Shearography
Song Zhang, Iowa State University (United States)
A. R. Ganesan, Indian Institute of Technology Madras (India)
- 4 Self-Calibration
Klaus Mantel, Max-Planck-Institut für die Physik des Lichts (Germany)
- 5 Fringe Analysis I
Michael B. North Morris, 4D Technology Corporation (United States)
- 6 Fringe Analysis II
Armando Albertazzi Gonçalves Jr., Universidade Federal de Santa
Catarina (Brazil)
- 7 Microscopy
Joanna Schmit, Bruker Nano Surfaces Division (United States)
- 8 High-Precision Techniques
Astrid Aksnes, Norwegian University of Science and Technology
(Norway)
- 9 Fringe Projection
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Introduction

Let us begin with a heartfelt thank-you to SPIE, the program committee, the authors, and everyone attending this seventeenth Interferometry conference. Metrology never goes out of style—quite the opposite: The demands for less uncertainty and faster measurements reach back to the early roots of interferometric techniques. Today, it is becoming increasingly apparent that metrology is required on many levels to help maintain automated production within tight tolerances and to reduce the rate of wasted production time and materials. Also, there are many new innovative uses beyond the realm of testing optics and process control. We are happy that SPIE continues to provide this forum for us to exchange ideas and share our latest research in interferometry and related fields.

In light of the recent discussions about what is original research, what papers should go to a conference and what should be prepared for a journal—and most importantly, whether you can still publish in a reviewed journal what you have already presented at a conference, we would like to state our view here, which also coincides with a new SPIE publication policy—It is perfectly acceptable, even expected, to bring first results, preliminary findings, and work-in-progress to this conference. Usually, the work will be extended and polished later for submission to a journal so long as progress is recognizable. Even with the preliminary nature of the contributions in this Proceedings volume, each contribution has been reviewed and revised where necessary to ensure a high scientific standard.

The flipside of the sometimes preliminary nature of results presented here is, of course, the real excitement and inspiration of live science—from brilliant feats of optical engineering, enabling new and better implementations of known techniques, to combinations of ideas generating new techniques, to breakthroughs where things widely accepted to be impossible suddenly no longer are, we see here the forefront of optical metrology what it looks like in 2014. Even in this age of teleconferences and instant messaging, it is beneficial to come together in person, to present, discuss, and socialize. Many collaborations are germinated when those involved in this conference have the opportunity to eat at (or at least put their coffee on) the same table for a few days in a row.

Optics is being recognized more and more as being not only one of the major research disciplines of the future, but also an enabling technology for a large number of manufacturing and testing techniques, and this conference series covers this wide range by a dual approach. Interferometry XVII is a part of the “Advanced Metrology” program and consists of two complementary conferences, one dedicated to Techniques and Analysis and the other to Applications. The proceedings of these two conferences are published in two separate volumes as Interferometry XVII: Techniques and Analysis (SPIE

Proceedings 9203) and Interferometry XVII: Advanced Applications (SPIE Proceedings 9204). The present volume contains the new research presented at the first conference: recent developments mostly in fringe analysis, interferometric or otherwise, for measurements of various natural and man-made objects and materials and their parameters. The second volume presents the application of such techniques to a wide range of tasks and systems.

Besides the traditional core topics of interferometry and analysis of fringe patterns, irrespective of their origin, this "Techniques and Analysis" part highlights developments in digital holographic and speckle metrology, Fabry-Perot and fiber sensors and other high-precision techniques, gradient methods such as deflectometry and shearography, calibration and self-calibration methods, microscopy, and fringe projection. From general topics of optical physics to custom solutions for very specific problems, once again the multitude of contributions reflects the versatility of the photon.

The authors, from 17 countries, have brought inspiring papers to this forum, which we are very pleased to present in this book. It contains 44 papers presented at the SPIE's 59th Annual Meeting in San Diego, 17–21 August, 2014. Thirty-five of these papers were presented orally.

During our last conference in 2012, we had a very lively and fun Fringe Art competition with several rounds of voting, choosing our favorite fringe patterns from those brought along by attendees. The image ultimately selected as the favorite was a display of fringes reflected by the surface of a progressive power eyeglass submitted by Christian Faber from the University of Erlangen, Germany.

The origin of phenomena submitted to the Fringe Art Competition spanned the range from reflection and refraction to diffraction and scattering, coherence and dispersion, as well as numerical simulation and architectural art.

Once you put your mind to fringe patterns, suddenly you discover the world is full of them. Beautiful, interesting, and sometimes puzzling images appeal to our inquisitiveness and our sense of wonder. During the Interferometry XVII conference, we have continued this tradition of celebrating beauty in science, and the favorite fringe pattern will be presented in the Interferometry XVIII proceedings.

Until then, may the Fringe be with you.

**Katherine Creath
Jan Burke
Joanna Schmit
Catherine E. Towers**