

PROCEEDINGS OF SPIE

Modeling Aspects in Optical Metrology

**Harald Bosse
Bernd Bodermann
Richard M. Silver**
Editors

**18–19 June 2007
Munich, Germany**

Sponsored by
SPIE Europe

Cooperating Organizations
EOS—European Optical Society
WLT—Wissenschaftliche Gesellschaft Lasertechnik e.V. (Germany)

Published by
SPIE

Volume 6617

Proceedings of SPIE, 0277-786X, v. 6617

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

The papers included in this volume were part of the technical conference cited on the cover and title page. Papers were selected and subject to review by the editors and conference program committee. Some conference presentations may not be available for publication. The papers published in these proceedings reflect the work and thoughts of the authors and are published herein as submitted. The publisher is not responsible for the validity of the information or for any outcomes resulting from reliance thereon.

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

Author(s), "Title of Paper," in *Modeling Aspects in Optical Metrology*, edited by Harald Bosse, Bernd Bodermann, Richard M. Silver, Proceedings of SPIE Vol. 6617 (SPIE, Bellingham, WA, 2007) Article CID Number.

ISSN 0277-786X
ISBN 9780819467591

Published by
SPIE—The International Society for Optical Engineering
P.O. Box 10, Bellingham, Washington 98227-0010 USA
Telephone 1 360/676-3290 (Pacific Time) · Fax 1 360/647-1445
<http://www.spie.org>

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Introduction

The proposal to arrange a new conference within the framework of the SPIE Optical Metrology Symposium dedicated especially to “Modeling Aspects in Optical Metrology” was initially suggested by Prof. Wolfgang Osten, chairman of the conference on “Optical Measurement Systems for Industrial Inspection.” The idea behind it was to establish a forum to present and discuss in particular basic methods, techniques, and algorithms which are necessary for a proper modeling and simulation of applied optical metrology techniques.

The use of optical metrology in production control is increasing and thus it is of ever greater importance to be able to fully understand the optical measurement process, which requires the ability of quantitatively predicting the dependence of the output of an optical sensor or measurement system on certain variations of the measurement object, the sensor itself, or the measurement environment. Only if these influences on the measurement result are well understood and appropriately taken into account in a suitable model of the measurement process, the measurement result and its associated measurement uncertainty can be used for example for reliable control of production processes. Moreover, the ability to understand and model a measurement process is also a prerequisite for comparison of the results with other independent measurement methods in so-called cross-calibration analyses.

A group of optical measurement techniques which is strongly dependent on appropriate modeling techniques and which has recently been further developed are scatterometry methods used for advanced process control in microelectronics production. Here forward calculations of the resulting diffraction patterns from different periodic grating structures have been refined with respect to computational accuracy as well as speed and approaches have been reported to address the inverse scattering problem, too. Scatterometry topics thus are one focal point of the new conference.

The two-day conference covers the following sessions: optical systems, optical wave propagation, interferometry and phase retrieval, Maxwell solvers, modeling in semiconductor metrology, scatterometry, and EUV scatterometry. I would like to thank all contributors as well as the cochairs and the members of the program committee for their support of this new conference, and I am looking forward to seeing you in Munich!

Harald Bosse



