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## User Guide

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The 21st century will be the  
century of the photon – much as  
the 20th century was the century  
of the electron.

European Technology Platform21,  
2nd edition



Astronomy



Biomedical  
Optics



Communications



Defense  
& Security



Energy



Imaging



Nanophotonics



Sensors

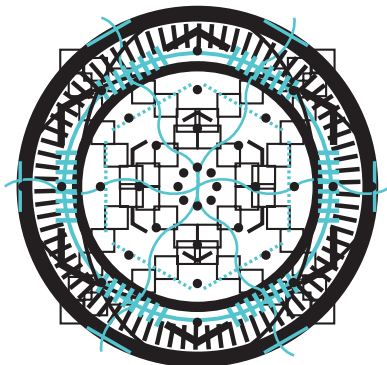
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# User Guide

The world's largest collection of  
**optics & photonics** applied research

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With more than **400,000** papers spanning biomedicine, communications, sensors, defense and security, manufacturing, electronics, energy, and imaging, the SPIE Digital Library is the most extensive database available on optics and photonics research.

## What's Available:

### Proceedings

SPIE is the largest organizer of conferences, workshops, and symposia in the field of optics and photonics with over 300 conferences occurring annually. SPIE Proceedings are the rich outcome of these events, providing you with a snapshot of what's happening—right now.

Over 380,000 articles from 1962 to the present.

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- Defense & Security
- Electronic Imaging & Signal Processing
- Energy
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- Light Sources & Illumination
- Lithography & Microelectronics
- Metrology
- Nanotechnology
- Optics
- Remote Sensing
- Sensors

### Journals

Over 20,000 peer-reviewed journal articles.

Coverage back to Volume 1:

- *Optical Engineering*
- *Journal of Biomedical Optics*
- *Journal of Electronic Imaging*
- *Journal of Micro/Nanolithography, MEMS, and MOEMS*
- *Journal of Applied Remote Sensing*
- *Journal of Nanophotonics*
- *Journal of Photonics for Energy*

### eBooks

Approximately 200 SPIE Press eBook Titles;

5,000 eBook Chapters.

(See page 8 for details)

# Home Page

- 1. Search** – Perform a basic search using the new SPIE Optics & Photonics taxonomy, coupled with semantic technology.
- 2. Personal Account Sign-in** – See page 4 for more information.  
**\*Institutional subscriber access does not require sign-in.** Access is triggered by IP-based authentication which occurs automatically.
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- 4. New Content** – View the newest proceedings, journal articles, and eBooks on the SPIE Digital Library.
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The screenshot shows the SPIE Digital Library homepage. At the top is a navigation bar with the SPIE logo, a search bar (callout 1), and links for Sign in or create a personal account, Subscribe, View Cart, Contact Us, and Help. Below the navigation bar is a large banner image with the text "The world's largest collection of optics & photonics applied research" and "DIGITAL LIBRARY" (callout 2). To the right of the banner is a "Sign In" form (callout 2) with fields for Username and Password, a "Sign In" button, and a link for "Forgot your password?". Below the banner is a section titled "Top Downloads from SPIE Journals and Proceedings" (callout 3) with a "Last Updated: August 20, 2012" note. This section lists several categories: Astronomy, Biomedical Optics & Medical Imaging, Communications & Information Technology, Defense & Security, Electronic Imaging & Signal Processing, Energy, and Lasers, each with a link to the latest article. To the right of the top downloads is a "New Content" section (callout 4) with links for "Papers from Defense, Security, and (DSS) now published" and "New eBook: Hyperspectral Remote Sensing by Michael T. Eismann". Below the new content is a "Featured Video" section (callout 5) with a video player showing a presentation titled "New optical, acoustic, and electrical diagnostics for the developing world". At the bottom right is an "Announcements" section with the headline "SPIE Digital Library Moves to a New Platform" and details about the move to the Silverchair SCM6 platform, including a list of enhancements and more content.

# My Account

Creating a personal account allows you to manage your user preferences:

- 1. Profile** – Create and edit your personal profile, manage content information and include a bibliography of references of all papers you've published.
- 2. Email Alerts** – Manage email alerts by publication, search topic, topical collection, and content type.
- 3. Saved Figures and Tables** – View and manage saved figures and tables.



The screenshot displays the SPIE Digital Library's 'My Account' interface. At the top, a navigation bar includes the SPIE logo, a user profile 'Andy Wallis (My Account)', and links for 'SIGN OUT', 'Subscribe', 'View Cart', 'Contact Us', and 'Help'. Below this is a search bar with a 'SEARCH' button and an 'ADVANCED SEARCH' link. A secondary navigation bar lists 'HOME', 'PROCEEDINGS', 'JOURNALS', 'eBOOKS', 'TOPIC COLLECTIONS', and 'LIBRARIANS'. The 'My Account' section on the left sidebar has three items: 'My Profile', 'My Email Alerts' (which is highlighted with a red circle and the number 2), and 'My Saved Figures & Tables' (highlighted with a red circle and the number 3). The main content area, titled 'My Email Alerts', informs the user they are signed up for email alerts. It lists four alert types: 'Publication Alerts' (with a link to 'Add/Edit Journal Publication Alerts'), 'Search Alerts' (with a note on how to set up alerts), 'Topic Collection Alerts' (with a note on how to set up alerts), and 'Content Alerts' (with a note on how to set up alerts). The footer contains four columns of links: 'Site Map' (HOME, PROCEEDINGS, JOURNALS, eBOOKS, TOPIC COLLECTIONS), 'Services' (Subscribe, Alerts, Information for Librarians, Privacy Policy, Terms Of Use, Contact Us, About the Digital Library), 'Other Resources' (SPIE.org, SPIE Membership, SPIE Career Center), and 'Information for Authors' (Books, Journals, Proceedings, Reprint Permissions, About Open Access). The bottom of the page features the SPIE logo, copyright information 'SPIE © 1962 - 2012. All Rights Reserved.', and the 'SILVERCHAIR INFORMATION SYSTEMS' logo.

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# Search

1. Search by keyword from any page using the basic search box.

2. Use Advanced Search to:

- A. Search for authors
- B. Search text or figures (journals only) by publication.

## Search Tips:

Simple Boolean AND or OR searches may be performed.

*Example:*

microscope AND fluorescence

Use quotes around search entries when searching for exact terms, phrases, article titles, etc.

*Example:*

"Design of a confocal fluorescence microscope"

3. View results by Best Match or Most Recently Published.

4. Filter search results by:

- A. Content Type
- B. Topic Category
- C. Date Range

5. PDF — Download the full article PDF directly from the results page.

The screenshot displays the SPIE Digital Library website. At the top, a navigation bar includes links for SPIE, Sign in or create a personal account, Subscribe, View Cart, Contact Us, and Help. Below this, the SPIE Digital Library logo is on the left, and a search bar on the right contains the text "microscope AND fluorescence" (marked with a red circle 1). A "SEARCH" button and a link to "ADVANCED SEARCH" are also present. Below the logo, a horizontal menu lists: HOME, PROCEEDINGS, JOURNALS, eBooks, TOPIC COLLECTIONS, and LIBRARIANS. The "Advanced Search" section (marked with a red circle 2) is highlighted. It contains two search boxes: "Search for Authors and Editors" and "Search Text and Figures by Publication". The "Text Search" option is selected. Below these, a "Select Resource(s)" section lists various journals and publications with checkboxes. The search results page (marked with a red circle 3) shows "Search results for microscope AND fluorescence". It includes a "Filter Results" sidebar (marked with a red circle 4) with filters for Content Type (eBooks (22), Journal Articles (67), Proceedings (1175)), Topic (Luminescence (869), Microscopes (846), Microscopy (426), Lasers (311), Scanning (249), Photons (237), Tissues (214), Molecules (162)), and Specify Date Range. The main results area shows "Showing 1-20 of 1264 results" with tabs for "Best Match" and "Most Recent". The first result is a "Proceedings Article" from October 19, 2012, titled "Design of a confocal fluorescence microscope: space saving and affordable" by Christin Bechtel, Jens Knobbe, Heinrich Gruger, Hubert Lakner, and Fabian Reichert. A red circle 5 highlights the "PDF" icon next to the title. The second result is another "Proceedings Article" from October 15, 2012, titled "Spatiotemporal focusing-based widefield multiphoton microscopy for fast optical sectioning of thick tissues" by Li-Chung Cheng, Chia-Yuan Chang, Wei-Chung Yen, and Shean-Jen Chen. The third result is a "JBO Letters" article from October 22, 2012, titled "Effect of axonal micro-tubules on the morphology of retinal nerve fibers studied by second-harmonic generation" by Hyungsik Lim and John Danias. A red circle 5 highlights the "PDF" icon next to the title. A link "Get Alerts on this Search" is visible in the top right of the results area.



# Proceedings Article Pages

## 1. Proceedings pages

— Quickly jump to browse proceedings by conference, year, volume number, or volume title.

## 2. Expand Page

— Expand the article column for ease of reading.

## 3. Author Profile

— An overview of the authors publication record, society activities, biography, etc. Links to SPIE profiles.

## 4. Related Content

— See related journal and proceedings articles, as well as topic collections and related jobs from the SPIE Career Center.

## 5. Text Size

— Adjust text size for ease of reading.

## 6. Tools

— See below.

## 6 Tools

Available on Abstract and Article pages, these tools are available to all users with a free personal account.

**PDF** — Download the full-text PDF of the article.

**Share** — Bookmark and share articles quickly and easily through popular networking sites.

**Get Permissions** — Information and instructions on how to request reprint permission for an article.

**Slideset** — Download journal figures and tables in PowerPoint format where available, for Journal articles only.

**Email** — Email the abstract of the article to yourself, or a colleague.

**Get Citation** — Select one or more citations for export to your bibliographic software (endnote, Bibtek, etc.).

**Article Alerts** — Receive automatic email notification when a correction is posted.

# Journal Article Pages

## 1. Journal Pages –

Quickly jump to the Journal homepage, current issue, or all issues.

For journal articles published after 2001, full text is rendered on the article page.


## 2. Figures and Tables –

Enlarge, save, and download figures and tables to PowerPoint.

Article Figures Tables References

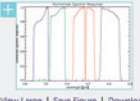
Figures

MSI in various stages of development and integration.




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MSI normalized spectral response (constellation average).




View Large | Save Figure | Download Slide (.ppt) | View in Article Context

Railroad Valley Playa, Nevada, USA\_20 May 2009\_RE4\_red-edge band image.



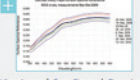
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Ivanpah Playa, California, USA\_07 June 2009\_RE3\_red-edge band image.



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Surface spectral reflectance March–October 2009\_Railroad Valley Playa.



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Special Section On Terahertz And Millimeter Wave Imaging

Image plane coded aperture for terahertz imaging

Orges Furxhi ; Eddie L. Jacobs ; Chrysanthé Preza

[+] Author Affiliations

Opt. Eng. 51(9), 091612 (2012); doi:10.1117/1.OE.51.9.091612

Text Size: A A A

Article Figures References

Abstract

Abstract | Introduction | Two-Dimensional Image Plane Coded Aperture | Image Reconstruction | Implementation Of The Image Plane Coded Aperture And Imaging Setups | Results | Conclusions | References

Abstract. In the absence of detector arrays, a single pixel coupled with an image plane coded aperture has been shown to be a practical solution to imaging problems in the terahertz and sub-millimeter wave domains. The authors demonstrate two laboratory, real-time, two-dimensional, sub-millimeter wave imagers that are based on an image plane coded aperture. These active imaging systems consist of a heterodyne source and receiver pair, image forming optics, a coded aperture, data acquisition hardware, and image reconstruction software. In one of the configurations, the target is measured in transmission, while in the other it is measured in reflection. In both configurations, images of the targets are formed on the coded aperture, and linear measurements of the image are acquired as the aperture patterns change. Once a sufficient number of linearly independent measurements are obtained, the image is reconstructed by solving a system of linear equations that is generated from the aperture patterns and the corresponding measurements. The authors show that for image sizes envisioned for many current applications, this image reconstruction technique is computationally efficient and can be implemented in real time. Measurements are collected with these systems, and the reconstruction results are presented and discussed.

Introduction

Abstract | Introduction | Two-Dimensional Image Plane Coded Aperture | Image Reconstruction | Implementation Of The Image Plane Coded Aperture And Imaging Setups | Results | Conclusions | References

The interest in terahertz imaging is motivated by the ability of terahertz (THz) frequencies to penetrate most manmade materials, particularly clothing.<sup>1–3</sup> Additionally, many harmful

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- Field Guides:** concise quick-reference guides to key information that students, practicing engineers, and scientists need in the lab and in the field.

**Field Guide to Terahertz Sources, Detectors, and Optics**  
 Cr  dhe M. O'Sullivan, J. Anthony Murphy

**Basic Optics for the Astronomical Sciences**  
 James B. Breckinridge

**Hyperspectral Remote Sensing**  
 Michael T. Eismann

**Chemistry and Lithography**  
 Uzodinma Okoroanyanwu

**Nanotechnology: A Crash Course**  
 Ra  l J. Mart  n-Palma, Akhlesh Lakhtakia

**Field Guide to Binoculars and Scopes**  
 Paul R. Yoder Jr., Daniel Vukobratovich

**Author Spotlight**  
 Michael T. Eismann  
 Air Force Research Lab.  
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**Recent work: Hyperspectral Remote Sensing**  
 Published: April 16, 2012

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Technologies

Defense & Security

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Light Sources & Illumination

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- Astronomical Detectors
- Radio & Infrared Astronomy
- Ultraviolet, X-ray & Gamma-ray Astronomy
- Astronomical Adaptive Optics
- Astronomical Spectroscopy
- Telescopes

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#### Biomedical Optics & Medical Imaging

- Biomedical Spectroscopy & Microscopy
- Computer-aided Diagnosis & Therapy
- Medical Image Processing
- Nanobiophotonics
- Photodynamic Therapy
- Tissue Optics
- Ultrasound
- Biosensors & Microfluidics
- Endoscopy
- Molecular Imaging
- Ophthalmic Optics
- Radiology
- Tomography

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#### Communication & Information Technologies

- Data Processing
- Information Security
- Mobile & Wireless Communications
- Optical Communications
- Visual Communications & Multimedia
- Fiber Communications
- Integrated Optics & Photonics
- Networks
- Satellite Communications

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#### Defense & Security

- Acquisition, Tracking & Pointing
- Biological & Chemical Sensing in Defense
- Computer & Network Security
- Military Displays
- Smart & Unattended Sensors
- Unmanned Systems & Vehicles
- Atmospheric Propagation Engineering
- Biometrics
- Infrared Defense Technology
- Radar/Lidar
- THz & mm-wave Imaging

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#### Electronic Imaging & Signal Processing

- Information Security
- Color Imaging
- Displays
- Image Processing
- Signal Processing
- 3D Imaging
- Computer Vision
- Image Analysis
- Image Sensors

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#### Energy

- Energy Efficiency
- Hydrogen Energy
- Solar Energy
- Energy Harvesting
- Laser Energy
- LEDs & OLEDs

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#### Lasers

- Fiber Lasers
- High Power Lasers
- Laser Systems Engineering
- Quantum & Interband Cascade Lasers
- Solid State Lasers
- Gas Lasers
- Laser Materials Processing
- Laser Induced Damage
- Semiconductor Lasers
- Ultrafast Lasers

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#### Light Sources & Illumination

- Displays
- Liquid Crystals
- LEDs & OLEDs
- Colorimetry

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#### Lithography & Microelectronics

- Integrated Optics & Photonics
- Maskless Lithography
- Non-optical Lithography
- Interconnects & Packaging
- MEMS/MOEMS
- Optical Lithography

+ more categories not shown here

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Hours: 8 am to 5 pm Pacific Time (Monday to Friday)

## SPIE Headquarters

1000 20th Street • Bellingham WA 98225-0100 USA  
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