

2023 ASPE Winter Topical Meeting

Precision Optical Metrology Workshop

Tucson, Arizona, USA
6 – 7 March 2023

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Detailed Schedule & Technical Presentations

All events are in the Santa Catalina Ballroom unless otherwise noted.

Monday, March 6, 2023

8:00 AM – 9:00 AM – Registration, Check-In & Continental Breakfast

9:00 AM – 10:00 AM – Keynote Address

The Role of Precision Mechanics in Optical Metrology

Jim H. Burge (Arizona Optical Metrology LLC).....No abstract available

10:00 AM – 10:30 AM – Coffee Break

Session 1

Environmental Metrology

10:30 AM – 11:45 AM

1. **Characterization of Environmental Error Contribution to Laser Interferometry through Statistical Analysis**
Jason Lennert (Raytheon Technologies) 1
2. **Evaluation of OSAM-1 Camera Focus Shift in a Simulated Orbital Pressure Environment**
Kevin H. Miller, Sarah E. Eckert (NASA Goddard Space Flight Center); Stephen Cheney (NASA Marshall Space Flight Center) 6
3. **Optical Metrology for Precision Acceleration Detection**
Adam Hines, Andrea Nelson, Yanqi Zhang, Guillermo Valdes, Jose Sanjuan Felipe Guzman (Texas A&M University) 10

11:45 AM – 1:15 PM – Group Lunch

Session 2

Surface Metrology I

1:15 PM – 2:25 PM

1. **Invited Talk – Optical Metrology for Synchrotron Mirrors at NSLS-II**
Lei Huang, Tianyi Wang, Mourad Idir (Brookhaven National Laboratory) 15
2. **High-Precision Optical Metrology for the Geometric Verification of Press-Fit Zones**
Kerstin Zangl, Reinhard Danzl, Michael Kreil, Franz Helmli (Bruker Alicona).... 21

3. **Surface Figure Metrology Based on Geometric Phase Components**
Hyo Mi Park, Hyo Bin Jeong, **Ki-Nam Joo** (Chosun University);
Young-Sik Ghim (Korea Research Institute of Standards and Science);
Daewook Kim, Charlotte E. Guthery (University of Arizona).....26

2:25 PM – 3:00 PM – Coffee Break

Session 3

Surface Metrology II

3:00 PM – 4:20 PM

1. **Automatic Closed- Loop Ultrafast Laser Stress Figuring Using On-Machine Differential Deflectometry**
Marcos A. Esparza, Kevin A. Laverty, Brandon D. Chalifoux, Daewook Kim (University of Arizona)30
2. **On How to Better Design No-null Surface Figure Interferometers Around the Size of Array Detector Pixels**
Martin Tangari Larrategui (Ruda Optical); Thomas G. Brown (University of Rochester); and Jonathan D. Ellis (Micro-LAM Technologies, Inc.)35
3. **Evaluation of Spatial Resolution of Fizeau Interferometers with Binary Pseudo-Random Array**
Pitor Szwaykowski (Äpre Instruments) No abstract available
4. **Binary Pseudo-Random Test Standards for Characterization of Various Metrology Instruments Over High to Low Spatial Frequencies**
Keiko Munechika, Carlos Pina-Hernandez, Kaito Yamada (HighRI Optics, Inc.); Weilun Chao, Scott Dhuey, Ian Lacey, Valeriy V. Yashchukf (Lawrence Berkeley National Laboratory); Raymond Conley (Argonne National Laboratory); Ulf Griesmann (National Institute of Standards and Technology); Simon Rochester (Rochester Scientific, LLC); Peter Takacs (Surface Metrology Solutions, LLC)41

4:50 PM – 5:00 PM – Load Bus to Sands Club and to Richard F. Caris Mirror Lab in the Steward Observatory at The University of Arizona

If you are planning to drive your own vehicle to the Sands Club and to the Mirror Lab park in the Cherry Ave. Garage. This parking is self-pay. Plan to be at the meeting location by 5:20 PM. From this point, the tour guide will take the group to the Sands Club to see the short video and then walk over to the Mirror Lab. This is only about a 5-minute walk.

5:30 PM – 6:00 PM – Light Hors d'oeuvres & Short Video at the Sands Club about the Richard F. Caris Mirror Lab – Dunlap Room at the Sands Club

6:00 PM – 7:00 PM – Small Group Tours of the Richard F. Caris Mirror Lab

For the tour of the Mirror Lab, plan to wear flat-closed-shoes. There are several flights of ascending and descending stairs along the tour route.

7:00 PM – 9:00 PM – Dinner at the Sands Club – Dunlap Room at the Sands Club

9:00 PM – Bus leaves to return to the Westward Look – Sands Club Lobby

Tuesday, March 7, 2023

8:00 AM – 9:00 AM – Continental Breakfast

Special Session

Can MTF be a Precision Metric?

9:00 AM – 12:00 Noon

1. **Common Mistakes in MTF Measurements**
Stephen D. Fantone (Optikos Corporation)..... 43
2. **Sampling Errors from Relay Magnification in Modulation Transfer Function (MTF) Measurement**
Patrick McKenna (Edmund Optics)..... 47
3. **Why Measure MTF?**
Stephen D. Fantone (Optikos Corporation)..... 51
4. **Is the MTF an Error Plot?**
Peter de Groot, Xavier Colonna de Lega (Zygo Corporation)..... 56

12:00 Noon – 1:30 PM – Group Lunch

Session 4

Novel Sensors and Sensing I

1:30 PM – 2:40 PM

1. **Invited Talk – Metrics for the Analysis of Optical Instrument Performance**
Jose Sanjuan (Texas A&M University) 60
2. **The PTB Multiwavelength Interferometer for Distances up to 5000m**
Paul Köchert, Tobias Meyer, Hongdan Yan, Anni Sauthoff, Günther Prellinger
and Florian Pollinger (Physikalisch-Technische Bundesanstalt (PTB)) 66

3. Physical Ray Tracing with Bessel Beams Robert E. Parks (Optical Perspectives Group, LLC); Daewook Kim (University of Arizona)	72
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2:40 PM – 3:10 PM – Coffee Break

Session 5

Novel Sensors and Sensing II

3:10 PM – 5:00 PM

1. Technical Noise Suppression via Weighted Quadrature Detection Steven R. Gillmer (Massachusetts Institute of Technology Lincoln Laboratory); Julián Martínez-Rincón (Stanford University), Jonathan D. Ellis (Micro-LAM)	77
2. Permanent Traceability of a Nanopositioning and Nanomeasuring Machine Eberhard Manske , U. Blumröder, T. Fröhlich, T. Kissinger, I. Ortlepp, U. Gerhardt, R. Mastylvov (Technische Universität Ilmenau); P. Köchert (Physikalisch Technische Bundesanstalt (PTB))	82
3. Study of Three-Cup Sphere Polishing Monitoring System and Analysis on Material Removal Rate of Monocrystalline Silicon Sphere Polishing Process Wei-Chin Pu (National Taiwan University of Science and Technology)	No abstract available

Discussion, Wrap-up and Closing Remarks

End of Workshop

