2017 Source Workshop

November 6-8, 2017

Dublin ▪ Ireland

Workshop Agenda

EUV LITHO, INC.

WWW.EUVLITHO.COM

2017 Source Workshop

Workshop Co-Organizers

Welcome

Dear Colleagues;

I am delighted to invite you to the 2017 Source workshop in Dublin, Ireland.

Source workshop, now in its 8th year, is the largest annual gathering of EUV and XUV source experts and this meeting continues to grow! This year we are including new topics of broad-band EUV sources and lasers, as these topics have become important for continued success of EUV Lithography. As always workshop will provide a forum for researchers in the EUV and soft X-ray areas to present their work and discuss potential applications of their technology. The workshop proceedings will be published online and made available to all.

This year, the EUV Source Workshop is organized by University College Dublin (UCD) and EUV Litho, Inc. This workshop has been made possible by the support of workshop sponsors, technical working group (TWG), workshop support staff, session chairs and presenters. I would like to thank them for their contributions and making this workshop a success. I look forward to your participation in the workshop.

Best Regards

Vivek Bakshi
Organizing Chair, 2017 Source Workshop

Source Technical Working Group (TWG)

Reza Abhari (ETH Zurich)
Jinho Ahn (Hanyang University)
Peter Anastasi (Silson)
Sasa Bajt (DESY)
Igor Fomenkov (ASML)
Klaus Bergmann (ILT-Fraunhofer)
Davide Bleiner (University of Bern)
John Costello (DCU)
Padraig Dunne (UCD)
Samir Ellwi (ALSphotonics)
Akira Endo (HiLase)
Henryk Fiedorowicz (Military University of Technology, Poland)
Torsten Feigl (OptiXfab)
Debbie Gustafson (Energetiq)
Ahmed Hassanein (Purdue)
Takeshi Higashiguchi (Utsunomia University)
Larissa Juschkin (Aachen University)
Hiroo Kinoshita (Hyogo University)
Konstantin Koshelev (ISAN)
Rainer Lebert (Bruker)
Peter Loosen (ILT-Fraunhofer)
Eric Louis (University of Twente)
James Lunney (Trinity College, Dublin)
John Madey (University of Hawaii)
Shunko Magoshi (EIDEC)
Hakaru Mizoguchi (Gigaphoton)
Udo Dinger (Carl Zeiss)
Katsuhiko Murakami (Nikon)
Patrick Naulleau (LBNL)
Oscar Versolato (ARCNL)
Fergal O'Reilly (UCD)
Gerry O'Sullivan (UCD)
Yuriy Platonov (RIT)
Martin Richardson (UCF)
Jorge Rocca (University of Colorado)
David Ruzic (University of Illinois)
Akira Sasaki (JAEA)
Leonid Shmaenok (PhysTex)
Emma Sokell (UCD)
Hironari Yamada (PPL)
Mikhail Yurkov (DESY)
Sergey Zakharov (NAEXTSTREAM)
Vivek Bakshi (EUV Litho, Inc.) - Organizing Chair
Padraig Dunne (UCD)– Co-Chair

Workshop Agenda

2017 Source Workshop

Agenda Outline

Monday, November 6, 2017

Location: Ardmore House, UCD Campus Dublin
http://www.ucd.ie/crhservices/ardmore-house/

5:30 - 7:00 PM	On-site Registration Reception and Speaker Prep
	Bus Pickup at *Newman House (4:15 PM)* http://www.ucd.ie/conferences/venues/newman-house/
	Mespil (4:45 PM) http://www.mespilhotel.com/
	Radisson Hotel (5:00 PM)
	Talbot Stillorgan Park (5:15 PM) http://www.talbothotelstillorgan.com/
	Arrive at UCD (5:30 PM)

Please plan to be at one of these locations which is close to your hotel. Buses will be available to take attendees back to Newman house, Mespil Hotel and Stillorgan Park after the reception

Tuesday, November 7, 2017

Location: George Moore Auditorium, UCD Campus, Dublin

7:30 AM	Bus Pickup *Newman House (7:30 AM)* *Mespil (8:00 AM)* *Radisson (8:15 AM)* *Stillorgan Park (8:30 AM)* Arrive at UCD (8:45 AM)
8:45 AM -9:15 AM	Tea/Coffee and Biscuits Registration
9:15 AM – 1:00 PM	Workshop Presentations
1:00 PM – 2:00 PM	Lunch
2:00 PM – 5:20 PM	Workshop Presentations
5:40 PM – 7:00 PM	Poster Session

(Buses will be available to take workshop attendees to downtown after the poster session – Stillorgan, Mespil and Newman House)

Wednesday, November 8, 2017

Location: George Moore Auditorium, UCD Campus, Dublin

7:30 AM	Bus Pickups *Newman House (7:30 AM)* *Mespil (8:00 AM)* *Radisson (8:15 AM)* *Stillorgan Park (8:30 AM)* Arrive at UCD (8:45 AM)

8:45 AM -9:15 AM	Tea/Coffee and Biscuits
9:15 – 1:00 PM	Workshop Presentations
1:00 PM - 2:30 PM	Lunch (Cafeteria) Working Steering Committee Meeting (TBA)
2:30 PM – 6:00 PM	Oral Presentations
6:15 PM	Depart for off-site Dinner

(Buses will be available to take participants to the off-site dinner location near downtown Dublin. Buses will take people back to their hotels.)
Please see website for detailed bus pickup information.

WORKSHOP AGENDA

2017 Source Workshop

November 6-8, 2017, Dublin, Ireland

Monday, November 6, 2017 (Ardmore House, UCD Campus)

5:30 - 7:00 PM Reception and Speaker Prep

Tuesday, November 8, 2017 (George Moore Auditorium, UCD Campus, Dublin)

9:15 AM Announcements and Introductions

Welcome -2017 Source Workshop
Vivek Bakshi
EUV Litho, Inc., USA

Welcome to UCD
Orla Feely
UCD

Announcements and Introductions (Intro-1)
Padraig Dunne
UCD

9:40 AM Session 1: Keynote Session -1

Session Chair: Padraig Dunne (UCD)

EUV Source for High Volume Manufacturing: Performance at 250 W and Key Technologies for Power Scaling (S1) (Keynote Presentation)
Igor Fomenkov
Cymer LLC, An ASML Company, San Diego, CA 92127, USA

10:40 AM Session 2: Fundamental Data

Session Chairs: Ronnie Hoekstra (ARCNL) and James Colgan (LANL)

Tin Ion Spectroscopy on Plasma Sources of EUV Light (S14) (Invited)
Ronnie Hoekstra
Advanced Research Center for Nanolithography (ARCNL), Science Park 110, 1098 XG Amsterdam, the Netherlands and
Zernike Institute for Advanced Materials, University of Groningen, 9747 AG Groningen, the Netherlands

Atomic Data of Low-charged Sn ions for Lithography Applications (S11) (Invited)
J. Colgan, D. P. Kilcrease, J. Abdallah, Jr., M. E. Sherrill, C. J. Fontes, and P. Hakel
Los Alamos National Laboratory, Los Alamos, NM 87545

EUV Spectra of Highly Charged-ions Observed with a Compact Electron Beam Ion Trap (S12) (Invited)
Nobuyuki Nakamura[1], Safdar Ali[1], Hiroyuki Kato[1], and Emma Sokell[2]
[1]Institute for Laser Science, the University of Electro-Communications, Tokyo 182-8585, Japan
[2]School of Physics, University College Dublin, Belfield, Dublin 4, Ireland

Fundamental Studies of Sn^{7+}-Sn^{14+} Ions with Applications for Laser Produced Plasma Sources (S13) (Invited)
H. Bekker (1), F. Torretti (2, 3), A. Windberger (1, 2), A. Borschevsky (4), A. Ryabtsev (5, 6), S. Dobrodey (1), E. Eliav (7), U. Kaldor (7), E. V. Kahl (8), J. C. Berengut (8), W. Ubachs (2, 3), R. Hoekstra (2, 9), J. R. Crespo Lopez-Urrutia (1), and O. O. Versolato (2)
1 Max-Planck-Institut fur Kernphysik, Heidelberg, Germany
2 Advanced Research Center for Nanolithography, Amsterdam, The Netherlands
3 Department of Physics and Astronomy, and LaserLaB, Vrije Universiteit, Amsterdam, The Netherlands
4 Van Swinderen Institute, University of Groningen, Groningen, The Netherlands
5 Institute of Spectroscopy, Russian Academy of Sciences, Troitsk, Moscow, Russia
6 EUV Labs, Ltd., Troitsk, Moscow, Russia
7 School of Chemistry, Tel Aviv University, Tel Aviv, Israel 10
8 School of Physics, University of New South Wales, Sydney, Australia10
9 Zernike Institute for Advanced Materials, University of Groningen, Groningen, The Netherlands

11:40 AM Break (20 Minutes)

12:00 PM Session 3: Lasers

Session Chairs: Thomas Metzger (Trumf) and Akira Endo (HiLase)

High Average Power and High Energy Ultrafast Thin-Disk Amplifiers (S31)
Thomas Metzger
TRUMPF Scientific Lasers GmbH & Co. KG, Feringastr. 10a, 85774 Unterföhring, Germany

High-harmonic Generation for Metrology Applications (S32) (Invited)
Johannes Weitenberg [1,2], Ioachim Pupeza [1,3], Akira Ozawa [1], Tobias Saule [3], Jan Schulte [2], Hans-Dieter Hoffmann [2], Thomas Udem [1], Peter Rußbüldt [2], Reinhart Poprawe [2,4], Theodor W. Hänsch [1,5]
[1] Max-Planck Institute of Quantum Optics, Hans-Kopfermann-Str. 1, 85748 Garching, Germany
[2] Fraunhofer Institute for Laser Technology, Steinbachstr. 15, 52074 Aachen, Germany
[3] Ludwig-Maximilian University Munich, Faculty of Physics, Chair of Experimental Physics - Laser Physics, Am Coulombwall 1, 85748 Garching, Germany
[4] RWTH Aachen University, Chair for Laser Technology, Steinbachstr. 15, 52074 Aachen, Germany
[5] Ludwig-Maximilian University Munich, Faculty of Physics, Chair of Experimental Physics, Schellingstr. 4/III, 80799 München, Germany

Development of kW-level Picosecond Thin-disk Pre-pulse Laser for High-power EUV Sources (S33)
J. Mužík, M. Smrž, M. Chyla, O. Novák, A. Endo, T. Mocek
HiLASE Centre, Institute of Physics CAS,
Za Radnicí 828, 252 41 Dolní Břežany, Czech Republic

1:00 PM Lunch (60 Minutes)

2:00 PM Session 4: High Power LPP Sources for HVM

Session Chairs: Hakaru Mizoguchi (Gigaphoton) and Oscar Versolato (ARCNL)

High Power LPP-EUV Source with Long Collector Mirror Lifetime for High Volume Semiconductor Manufacturing (S41) (Invited)
Hakaru Mizoguchi, Hiroaki Nakarai, Tamotsu Abe, Krzysztof M Nowak, Yasufumi Kawasuji, Hiroshi Tanaka, Yukio Watanabe, Tsukasa Hori, Takeshi Kodama, Yutaka Shiraishi, Tatsuya Yanagida, Georg Soumagne, Tsuyoshi Yamada, Taku Yamazaki and Takashi Saitou
Gigaphoton Inc. Hiratsuka facility
3-25-1 Shinomiya Hiratsuka Kanagawa,254-8567, JAPAN

Two-dimensional Electron density and Temperature Profiles of EUV Light Sources with 4.0% CE (S42) (Invited)
Kentaro Tomita[1], Yuta Sato[1], Syoichi Tsukiyama[1], Raimu Fukada[1], Fumitaka Ito[1], Kiichiro Uchino[1], Kouichiro Kouge[2], Tatsuya Yanagida[2], Hiroaki Tomuro[2], Yasunori Wada[2], Masahito Kunishima[2], Takeshi Kodama[2], Hakaru Mizoguchi[2]
[1] Interdisciplinary Graduate School of Engineering and Sciences, Kyushu University, 6-1, Kasugakoen, Kasuga, Fukuoka 816-8580, JAPAN
[2] Gigaphoton Inc., 400 Yokokurashinden Oyama,Tochigi, 323-8558, JAPAN

Short-wavelength Out-of-band EUV emission from Sn Laser-produced Plasma (S43)
Francesco Torretti
EUV Plasma Processes group, Advanced Research Center for Nanolithography (ARCNL), Science Park 110, 1098XG Amsterdam

Vapor shielding of tin under intense plasma bombardment (S45) (Invited)
T.W. Morgan, G.G. van Eden, D.U.B. Aussems, V. Kvon, M.A. van den Berg, K. Bystrov, M.C.M. van de Sanden
DIFFER—Dutch Institute for Fundamental Energy Research, De Zaale 20, 5612 AJ Eindhoven, The Netherlands

ARCNL Source Project Update (S46) (Invited)
Oscar Versolato
ARCNL

3:40 PM Break and Group Photograph (20 Minutes)

4:00 PM Session 5: EUV Source Modeling

Session Chair: Howard Scott (LLNL) and Padraig Dunne (UCD)

Towards High-Fidelity Simulations of EUV Production from Laser-Produced Plasma (S22) (Invited)
Howard Scott
Lawrence Livermore National Laboratory, Livermore, CA, USA

Modeling of Particle Debris from the Target of Laser Produced Plasma EUV Sources (S24)
Akira Sasaki
Kansai Photon Science Institute, National Institutes for Quantum and Radiological Science and Technology, 8-1 Umemidai, Kizugawa-shi, Kyoto 619-0215, Japan

Atomic and Radiative Processes in High-Z Plasmas and their Applications in EUV Lithography and "Water Window" Imaging (S21)
Bowen Li[1], Takeshi Higashiguchi[2], Takamitsu Otsuka[2,5], Hayato Ohashi[3], Chihiro Suzuki[4], Emma Sokell[5], Padraig Dunne[5], Yang li[1], Xiaokai Xu[1], Ximeng Chen[1], and Gerry O'Sullivan[5]
[1] School of Nuclear Science and Technology, Lanzhou University, Lanzhou 730000, China
[2]Department of Advanced Interdisciplinary Sciences, Center for Optical Research & Education (CORE), and Optical Technology Innovation Center (OpTIC), Utsunomiya University, Yoto 7-1-2, Utsunomiya, Tochigi 321-8585 Japan
[3] Graduate School of Science and Engineering for Research, University of Toyama, Toyama, Toyama 930-8555, Japan
[4] National Institute for Fusion Science (NIFS), Toki, Gifu 509-5292, Japan
[5] School of Physics, University College Dublin, Belfield, Dublin 4, Ireland

Soft X-ray Spectroscopy of Dy, Er and Tm Ions Excited in Laser-Produced Plasmas (S23)
John Sheil[1], Takeshi Higashiguchi[2], Domagoj Kos[1], Takanori Miyazaki[1,2], Fergal O'Reilly[1], Gerry O'Sullivan[1], Paul Sheridan[1], Emma Sokell[1], Chihiro Suzuki[3] and Deirdre Kilbane[1]
[1]School of Physics, University College Dublin, Belfield, Dublin 4, Ireland
[2]Department of Electrical and Electronic Engineering, Faculty of Engineering and Center for Optical Research and Education (CORE), Utsunomiya University, Yoto 7-1-2, Utsunomiya, Tochigi 321-8585, Japan
[3]National Institute for Fusion Science, 322-6 Oroshi-cho, Toki 509-5292, Japan

5:20 PM Break (20 Minutes)

5:40 PM Session 6: Poster Session

Session Chair:

Measurements and Numerical Simulations of Sn ion Stopping in Low-pressure H_2 Atmosphere (S25)
D. B. Abramenko[1,2], D. I. Astakhov[2,3], P. V. Kraynov[1,4], V. M. Krivtsun[1,2], V. Medvedev[1,2,3], and K. N. Koshelev[1,2]
[1] RnD-ISAN/EUV Labs, Sirenevy Bulevard Str. 1, Troitsk, Moscow 108840, Russia.
[2] Institute for Spectroscopy RAS, Fizicheskaya str. 5, Troitsk, Moscow 108840, Russia
[3] ISTEQ BV, High Tech Campus 9, Eindhoven, The Netherlands
[4] Moscow Institute of Physics and Technology (State University), Institutskiy pereulok str. 9, Dolgoprudny, Moscow region 141701, Russia

Configuration Interaction Effects in Unresolved np^6nd^{N+1}-np^5nd^{N+2}+$np^6nd^Nnf^1$ Transition Arrays; Contrasting Behaviour for n=4 and n=5" (S26)
Luning Liu, Deirdre Kilbane, Padraig Dunne, John Sheil, Xinbing Wang and Gerry O'Sullivan

Modelling of hybrid pumping of nitrogen recombination laser (S34)
P. Vrba[1], M. Vrbova[2]
[1]Institute of Plasma Physics, Czech Academy of Sciences, 182 00 Prague 8, CR,
[2]Czech Technical University, Faculty of Biomedical Engineering, 272 01 Kladno, CR

Expansion dynamics after laser-induced cavitation in liquid tin microdroplets (S44)
D. Kurilovich[1,2], T. Pinto[1,2], R. Schupp[1], F. Torretti[1,2], J. Scheers[1,2], A. Stodolna[1,2], W. Ubachs[1,2], R. Hoekstra[1,3], S. Witte[1], O.O. Versolato[1]
[1]Advanced Research Center for Nanolithography (ARCNL), Science Park 110, 1098 XG Amsterdam, The Netherlands
[2]Department of Physics and Astronomy, and LaserLaB, Vrije Universiteit, De Boelelaan 1081, 1081 HV Amsterdam, The Netherlands
[3]Zernike Institute for Advanced Materials, University of Groningen, Nijenborgh 4, 9747 AG Groningen, The Netherlands

Development of a collective Thomson scattering system for laser-produced high-Z plasmas for soft X-ray light sources (S47)
Yuta Sato[1], Syoichi Tsukiyama[1], Raimu Fukada[1], Kentaro Tomita[1], Kiichiro Uchino[1]
[1] Interdisciplinary Graduate School of Engineering and Sciences, Kyushu University, 6-1, Kasugakoen, Kasuga, Fukuoka 816-8580, JAPAN

Ion Stage Velocity Evolution in CO_2-generated Laser Plasma Plumes (S48)
Frank McQuillan, Emma Sokell and Padraig Dunne
UCD Physics, Dublin, Ireland

EUV/SXR Spectroscopy of Ge Laser-Produced Plasma (S57)
O. Maguire, D. Kos, E. Sokell
Atomic, Molecular and Plasma (Spec) group, School of Physics, University College Dublin, Belfield Dublin 4 Ireland

Colliding Laser Produced Plasmas Analysis: Fast Imaging and Spectroscopic Study (S58)
Domagoj Kos[1,2], O. Maguire[1], F. O'Reilly[1], P. Dunne[1], E. Sokell[1]
[1]School of Physics, University College Dublin, Belfield, Dublin 4, Ireland
[2]Faculty of Nuclear Sciences and Physical Engineering, Czech Technical University in Prague, Brehova 7,511519 Praha 1, Czech Republic

High-brightness Broadband Light Source for Various Industrial Applications (S64)
Samir Ellwi[1,2]
1. RnD-ISAN/EUV Labs, Troitsk, 108840 Russia
2. ISTEQ, 5656 AG Eindhoven

Laboratory Tomographic Microscopy with Compact Plasma based Extreme ultraviolet and Soft X-ray Sources (S74)
Daniel Vicario[1], Alexander von Wezyk[2], Klaus Bergmann[2], Larissa Juschkin[1]
[1]RWTH Aachen University, Chair for Experimental Physics of EUV, JARA-FIT, Steinbachstr. 15, 52074 Aachen, Germany
[2] Fraunhofer-Institute for Laser Technology, Steinbachstr. 15, 52074 Aachen, Germany

An Extreme Ultraviolet Monochromator for use with a Laser Produced Plasma Source (S86)
Carmen Vela Garcia, Emma Sokell, Padraig Dunne & Fergal O'Reilly
UCD School of Physics, University College Dublin, Belfield, Dublin 4, Ireland

A compact, desk-top near edge soft X-ray absorption fine structure spectroscopy system based on a laser plasma double stream gas puff target source
M. Duda[2], P. Wachulak[1], A. Bartnik[1], A. Sarzyński[1], Ł. Węgrzyński[1], M. Nowak[1], H. Fiedorowicz[1], L.Pina[2] and A. Jancarek[2]
[1] Institute of Optoelectronics, Military University of Technology, 2 Kaliskiego Str., 00-908 Warsaw, Poland
[2] Faculty of Nuclear Sciences and Physical Engineering, Czech Technical University in Prague, Prague, Czechia

Commercial Posters

EUV Light Source Development at Energetiq
Matthew J. Partlow, Stephen F. Horne, Donald K. Smith, Matthew M. Besen, Paul A. Blackborow, Deborah S. Gustafson
Energetiq

Laser Drive Light Source from Energetiq
Huiling Zhu, Stephen F. Horne, Donald K. Smith, Matthew M. Besen, Paul A. Blackborow, Deborah S. Gustafson, Matthew J. Partlow
Energetiq

Wednesday, November 8, 2017
(George Moore Auditorium, UCD Campus, Dublin)

9:15 AM Announcements and Introductions

Announcements (Intro-2)
Padraig Dunne
UCD

9:20 AM Session 7: Keynote Session -2

Session Chair: Padraig Dunne (UCD)
Imaging Biological Cells using Soft X-ray Tomography (S2)*(Keynote Presentation)*
Carolyn Larabell
University of California San Francisco School of Medicine and Lawrence Berkeley National Laboratory

10:00 AM Session 8: EUV Metrology Sources

Session Chairs: Klaus Bergmann (ILT) and Samir Ellwi (ISTEQ)

Plasma based XUV Sources for Metrology Applications (S53) (Invited)
Klaus Bergmann, Alexander von Wezyk, Jochen Vieker
Fraunhofer Institute for Laser Technology – ILT, Steinbachstr. 15, 52074 Aachen, Germany

Characterization of Laser-assisted and laser-driven EUV sources for Metrology Applications (S51) (Invited)
Yusuke Teramoto[1], Bárbara Santos[1], Guido Mertens[1], Margarete Kops[1], Ralf Kops[1], Alexander von Wezyk[2], Klaus Bergmann[2], Hironobu Yabuta[3], Akihisa Nagano[3], Takahiro Shirai[3], Yoshihiko Sato[3], Kunihiko Kasama[3]
[1]BLV Licht- und Vakuumtechnik GmbH, Steinbachstrasse 15, 52074 Aachen, Germany
[2]Fraunhofer ILT, Steinbachstrasse 15, 52074 Aachen, Germany
[3]Ushio Inc., 1-90 Komakado, Gotemba 412-0038, Japan

Actinic Light Source based on LPP for HVM Mask Inspection Applications (S55) (Invited)
Konstantin Koshelev[1,2], Alexander Vinokhodov[1], Oleg Yakushev[1], Alexey Yakushkin[1], Dimitri Abramenko[1], Alexander Lash[1], Mikhail Krivokorytov[1,2], Yuri Sidelnikov[2], Vladimir Ivanov[2], Vladimir Krivtsun[2], Vyacheslav Medvedev[1], Denis Glushkov[3], Pavel Seroglazov[3], Samir Ellwi[3]
1 – RnD-ISAN/EUV Labs, Troitsk, 108840 Russia;
2 – Institute for Spectroscopy RAS, Troitsk, 108840 Russia;
3 – ISTEQ, 5656 AG Eindhoven

Laser Induced Shockwave Droplet Breakup Dynamics (S52)
Duane Hudgins, Alex Nieland and Reza S. Abhari
Laboratory for Energy Conversion, Swiss Federal Institute of Technology Zurich (ETHZ), Switzerland

A High-brightness Accelerator-based EUV source for EUV Actinic Mask Inspection (S54) (Invited)
Y. Ekinci, T. Garvey, A. Streun, A. Wrulich and L. Rivkin
Paul Scherrer Institute, Villigen, Switzerland

Compact X-ray Sources and Applications for Semiconductor Metrology (S56) (Invited)
R. Joseph Kline
National Institute of Standards and Technology, USA

12:00 PM Break (15 Minutes)

12:15 PM Session 9: Broad-band EUV Sources

Session Chairs: Ilya Bezel (KLA-Tencor) and Stephen Horne (Energetiq)

Industry Requirements for Broad Band EUV Sources for Wafer Inspection Applications (S61)
Vivek Bakshi
EUV Litho, Inc.

High Power Laser-Sustained Plasma Light Sources for KLA-Tencor Broadband Wafer Inspection Tools (S63) (Invited)
I. Bezel, M. Derstine, K. Gross, A. Shchemelinin, J. Szilagyi, and D. Shortt
Technology Group, WIN Division, KLA-Tencor Corp, One Technology Drive, Milpitas, CA 95035

The Electrode-less Z-Pinch as a Metrology Source in the 40-50 nm range (S62) (Invited)
Stephen F. Horne, Matthew M. Besen, Paul A. Blackborow, Deborah Gustafson, Matthew J. Partlow, Donald K. Smith
Energetiq Technology Inc., 7 Constitution Way, Woburn MA 01801

1:00 Lunch (90 Minutes)

2:30 PM Session 10: EUV and XUV Applications

Session Chairs: Fergal O'Reilly (UCD) and Larissa Juschkin (RWTH Aachen University)

Soft X-ray Microscopes for Biology: The Source (S71) (Invited)
Gerry McDermott, Ph.D.
Department of Anatomy, UCSF and Lawrence Berkeley National Laboratory

Chromatin Reorganization during Viral Infection (S72)(Invited)
Vesa Aho1, Markko Myllys1, Carolyn A. Larabell2,3 and Maija Vihinen-Ranta4
1. Department of Physics and Nanoscience Center, University of Jyvaskyla, Jyvaskyla, Finland
2. Department of Anatomy, University of California San Francisco, San Francisco, California, USA
3. Physical Biosciences Division, Lawrence Berkeley National Laboratory, Berkeley, California, USA
4. Department of Biological and Environmental Science, University of Jyvaskyla, Jyvaskyla, Finland

Exploring the Soft X-ray Radiance of Laser Plasmas (S73) (Invited)
Fergal O'Reilly and Gladson Joseph
UCD School of Physics, University College Dublin, Belfield, Dublin 4, Ireland.

Relativistic Plasma Control using Two-colour Fields (S75) (Invited)
Brendan Dromey[1], Mark Yeung[1], Sergey Rykovanov[2], Jana Bierbach[2,3], Lu Li[1], E. Eckner[3], Stephan Kuschel[2,3], Abel Woldegeorgis[2,3], Christian Rödel[2,3,4], Alexander Sävert[3], Gerhard G. Paulus[2,3], Mark Coughlan[1], and Matthew Zepf[1,2,3]
[1] Department of Physics and Astronomy, Queen's University Belfast, Belfast, UK
[2] Helmholtz Institute Jena, Fröbelstieg 3, Jena, Germany
[3] Institut für Optik und Quantenelektronik, Friedrich-Schiller-Universität Jena, Max-Wien-Platz 1, Jena, Germany
[4] SLAC National Accelerator Laboratory, 2575 Sand Hill Road, Menlo Park, California, USA

Spectroscopic EUV reflectometry for characterization of thin films systems and determination of optical constants (S76) (Invited)
Larissa Juschkin[1,2], Maksym Tryus[1], Konstantin Nikolaev[3],Igor Makhotkin[3], Daniel Wilson[2], Lidia Kibkalo[2], Jürgen Schubert[2], Angelo Giglia[4], Piergiorgio Nicolosi[5], and Serhiy Danylyuk[6]
[1] RWTH Aachen University, Chair for Experimental Physics of EUV, JARA-FIT, Germany
[2] Forschungszentrum Jülich GmbH, Peter Grünberg Institut 9, JARA-FIT, Germany
[3] University of Twente, Faculty of Science and Technology, Enschede, The Netherlands
[4] CNR - Istituto Officina Materiali, Trieste, Italy
[5] Universita' degli Studi di Padova, Dipartimento di Ingegneria dell'Informazione, Italy
[6] RWTH Aachen University, Chair for Technology of Optical Systems, JARA-FIT, Germany

4:10 PM Break (20 Minutes)

4:30 PM Session 11: Optics and Metrology

Session Chairs: Eric Louis (Univ. Twente) and V V Medvedev (ISAN)

REFURBISHMENT OF COLLECTOR MIRRORS FOR WATER WINDOW MICROSCOPY (S81)
T. Feigl, H. Pauer, M. Perske, T. Fiedler, P. Naujok
optiX fab GmbH, Hans-Knöll-Str. 6, 07745 Jena, Germany
F. Scholze, C. Laubis
Physikalisch-Technische Bundesanstalt, Abbestr. 2-12, 10587 Berlin, Germany

EUVL Optics for Free Electron Laser Sources: Damage Threshold Studies and the Use of Adjusted Wavelengths (S82) (Invited)
Eric Louis
MESA+ Institute for Nanotechnology, University of Twente, P.O. Box 217, 7500 AE, Enschede, The Netherlands

Novel Spectrometers for Broad-band Characterization of EUV-Emitting Plasmas (S83)
V V Medvedev
RnD-ISAN, Promyshlennaya 1A, Troitsk, Moscow, Russia
EUV Labs, Sirenevy bulevard 1, Troitsk, Moscow, Russia
ISTEQ BV, High Tech Campus 9, Eindhoven, The Netherlands

Broadband Spectral Characterization of EUV light Sources with a Transmission Grating Spectrometer (S85)

Muharrem Bayraktar[1]*, Fei Liu[2], Bert Bastiaens[3], Caspar Bruineman[4] and Fred Bijkerk[1]

[1] Industrial Focus Group XUV Optics, MESA + Institute for Nanotechnology, University of Twente, The Netherlands

[2] ASML Netherlands B.V., De Run 6501, 5504 DR Veldhoven, The Netherlands

[3] Laser Physics and Nonlinear Optics, MESA + Institute for Nanotechnology, University of Twente, The Netherlands

[4] Scientec Engineering, The Netherlands

5:50 PM Announcements

Vivek Bakshi

EUV Litho, Inc.

Workshop Adjourned and Depart for off-site Dinner


EUV
LITHO, INC.