2013 International Workshop on EUV and Soft X-Ray Sources

November 3-7, 2013

Dublin ▪ Ireland

Workshop Agenda

EUV LITHO, INC.

2013 International Workshop on EUV and Soft X-ray Sources

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Workshop Agenda

2013 International Workshop on EUV and Soft X-Ray Sources

Agenda Outline

Short Courses

Location: *TBA* Lecture Hall, UCD Campus

Sunday November 3 - November 4, 2013

Sunday, November 3, 2013, 8:30 AM- 4:30 PM
Fundamental Principals of Optical Lithography
Instructor: Dr. Chris Mack

Monday, November 4, 8:30 AM -12:30 PM
Introduction to EUV Lithography
Instructor: Dr. Vivek Bakshi

Separate Registration Required for Short Course. Please visit www.euvlitho.com for course information and registration.

Monday, November 4, 2013

Location: Newman House, Stephen's Green, Dublin

6:00 - 7:00 PM	Reception and Speaker Prep

Tuesday, November 5, 2013

Location: George Moore Auditorium, UCD Campus, Dublin

7:45 AM	Pickup at the Hotel (Stephen's Green and Burlington Hotel)
8:30 AM – 11:30 AM	Workshop Presentations
12:05 AM - 1:20 PM	Lunch
1:20 PM – 5:30 PM	Workshop Presentations
5:30 PM – 6:30 PM	Poster Session and Reception
6:30 PM	Depart for Off-Site Dinner (Pickup at Auditorium)

Wednesday, November 6, 2013

Location: George Moore Auditorium, UCD Campus, Dublin

7:45 AM	Pickup at the Hotel (Stephen's Green and Burlington)
8:30 AM – 1:15 PM	Workshop Presentations
1:15 PM	Depart for off-site Lunch and tour
	Tour: Battle of the Boyne (http://www.battleoftheboyne.ie/) (Pickup at the Auditorium)

Thursday, November 7, 2013

Location: Newman House, Stephen's Green, Dublin

Technical Working Group (TWG) Meeting

8:30 AM	Continental Breakfast
9:00 AM – 10:00 AM	TWG Meeting

WORKSHOP AGENDA

2013 International Workshop on EUV and Soft X-Ray Sources

November 3-7, 2013, Dublin, Ireland

Monday, November 4, 2013 (Newman House)

6:00 PM – 7:00 PM Reception and Registration

Tuesday, November 5, 2013 (George Moore Auditorium)

8:30 AM Session 1: Welcome and Announcements

Introduction and Announcements (Intro-1)

Joe Carthy, UCD

Vivek Bakshi, EUV Litho, Inc., USA

8:40 AM Session 2: Keynote Session -1

Session Chair: Katsuhiko Murakami (Nikon)
EUV Lithography: Current and Future Requirements and Options? (S2)
Vadim Banine
ASML, Netherlands

Enabling EUVL for HVM Insertion (S3)
Mark Phillips
Intel Corporation

Awards and Announcements – Padraig Dunne (UCD)

Break 10:10 AM

10:25 AM Session 3: HVM EUV Sources

Session Co-Chairs: Vadim Banine (ASML) and Hakaru Mizoguchi (Gigaphoton)

Update of High CE, High Power HVM LPP-EUV Source Development (S21) (Invited)

Hakaru Mizoguchi[1], Hiroaki Nakarai[2], Tamotsu Abe[2], Takeshi Ohta[2], Krzysztof M Nowak[2], Yasufumi Kawasuji[2], Hiroshi Tanaka[2], Yukio Watanabe[2], Tsukasa Hori[2], Takeshi Kodama[2], Yutaka Shiraishi[2], Tatsuya Yanagida[2], Tsuyoshi Yamada[2], Taku Yamazaki[2], Shinji Okazaki[1] and Takashi Saitou[2]
[1]*Gigaphoton Inc. Oyama facility, JAPAN*
[2]*Gigaphoton Inc. Hiratsuka facility, JAPAN*

BEUV Nanolithography: 6.7 or 11 nm? (S19) (Invited)

N. I. Chkhalo and N. N. Salashchenko
Institute for physics of microstructures of RAS, Nizhny Novgorod, Russia

Development of High Brightness and High Average Power Picosecond Thin Disc Laser for Short Wavelength Light Sources in HiLASE Project (S24)

Taisuke Miura[1], Michal Chyla[1,2], Martin Smrž[1], Siva Sankar Nagisetty[1,2], Patricie Severová[1,2], Ondřej Novák[1], Pawel Sikocinski[1,2], Akira Endo[1], and Tomáš Mocek[1]
[1]*HiLASE Project, Institute of Physics AS, CR, Na Slovance 2, 182 21 Prague 8, Czech Republic*
[2]*Czech Technical University in Prague, Břehová 7, 115 19, Prague, Czech Republic*

Research Review on Plasma-based EUV Sources at RnD-ISAN/EUV Labs (S40)

V. M. Krivtsun[1, 2], R.R. Gayasov[1, 2], O. F. Yakushev[1], D. B. Abramenko[1], A. Yu. Vinokhodov[1] and K. K. Koshelev[1, 2]
[1] *RnD-ISAN /EUV Labs, Moscow, Troitsk, Russia*
[2] *Institute for Spectroscopy RAS, Moscow, Troitsk, Russia*

A Systematic Study of Colliding Plasmas for EUVL (S25)

Emma Sokell, Colm O'Gorman, Bowen Li, Thomas Cummins, Padraig Dunne, Fergal O'Reilly, Paddy Hayden, and Gerry O'Sullivan
School of Physics, University College Dublin, Belfield, Dublin 4, Ireland

Lunch 12:05 PM

1:20 PM Session 4: Modeling

Session Co-Chairs: Padraig Dunne (UCD) and Chihiro Suzuki (NIFS, Japan)

Development of Radiation Hydrodynamic code STAR for EUV Plasmas (S15)

Atsushi Sunahara[1], Katsunobu Nishihara[2], Akira Sasaki[3], Nozomi Tanaka[2], Shinsuke Fujioka[2], and Hiroaki Nishimura[2]

[1] *Institute for Laser Technology, Japan*

[2] *Institute of Laser Engineering, Osaka University, Japan*

[3] *Kansai Photon Science Institute, Japan Atomic Energy Agency, Japan*

Modeling of the Laser Plasma Interaction for the Development of Efficient EUV Sources (S17)

Akira Sasaki

Quantum Beam Science Directorate, Japan Atomic Energy Agency, Kyoto, Japan

Observations of EUV Spectra from Highly Charged Heavy Ions in Optically Thin Plasmas for Benchmarking of Models (S16)

Chihiro Suzuki[1], Fumihiro Koike[2], Izumi Murakami[1], Naoki Tamura[1], Shigeru Sudo[1], Takeshi Higashiguchi[3], Gerry O'Sullivan[4]

[1]*National Institute for Fusion Science, 322-6 Oroshi-cho, Toki 509-5292, Japan*

[2]*Sophia University, 7-1 Kioi-cho, Chiyoda-ku, Tokyo 102-8554, Japan*

[3]*Utsunomiya University, 7-1-2 Yoto, Utsunomiya 321-8585, Japan*

[4]*University College Dublin, Belfield, Dublin 4, Ireland*

Fundamental Atomic Process in Source Development for Beyond EUV Lithography and "Water Window" Imaging (S38)

Bowen Li[1], Takeshi Higashiguchi[2], Takamitsu Otsuka[1], Weihua Jiang[3], Akira Endo[4], Emma Sokell[1], Padraig Dunne[1], and Gerry O'Sullivan[1]

[1]*School of Physics, University College Dublin, Belfield, Dublin 4, Ireland*

[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]*Department of Electrical Engineering, Nagaoka University of Technology, Kami-tomiokamachi 1603-1, Nagaoka, Niigata 940-2188 Japan*

[4]*HiLASE Project, Institute of Physics AS, CR, Prague 8, Czech Republic*

Advances in Modeling of Physical Processes in Plasma-based Sources of EUV Radiation (S39)

V.V. Ivanov[1, 2], V. G. Novikov[1, 3], A.S. Grushin[1, 3], I. Yu. Vichev[1, 3], D.A. Kim[1, 3], V. Konovalov[1, 3], A.D. Solomyannaya[1, 3], K.K. Koshelev[1, 2], V. M. Krivtsun[1, 2], A.M. Yakunin[4], A. Bratchenia[4], V.Y. Banine[4]

[1] *RnD-ISAN, Troitsk, 142190 Russia*

[2] *Institute for Spectroscopy RAS, Troitsk, 142190 Russia*

[3] *Keldysh Institute of Applied Mathematics RAS, Moscow, 125047 Russia*

[4] *ASML, Veldhoven, The Netherlands*

Pulsed-power Based Bright EUV Light Source for Metrology (S48)
S. Zakharov
NAEXTSTREAM, France

Break 3:20 PM (15 Minutes)

3:35 PM Session 5: Optics

Session Co-Chairs: Yuriy Platonov (RIT) and Torsten Feigl (optiXfab)

Collector Development with IR Suppression and EUVL Optics Refurbishment at RIT (S30) (Invited)
Yuriy Platonov[1], Michael Kriese[1], Raymond Crucet[1], Yang Li[1], Vladimir Martynov[1], Licai Jiang[1], Jim Rodriguez[1], Ulrich Mueller[2], Jay Daniel[2], Shayna Khatri[2], Adam Magruder[2], S. Grantham[3], C. Tarrio[3], T. B. Lucatorto[3]
[1]Rigaku Innovative Technologies, Auburn Hills, MI, USA
[2]Integrated Optical Systems – Tinsley, Richmond, CA, USA
[3]National Institute of Standards and Technology, Gaithersburg, MD, USA

EUV Optical Elements with Enhanced Spectral Selectivity for IR Radiation (S31)
V. V. Medvedev[1], A. E. Yakshin[1], R. W. E. van de Kruijs[1], V. M. Krivtsun[2], E. Louis[1,3] and F. Bijkerk[1,3]
[1]FOM Institute DIFFER, P.O. Box 1207, 3430 BE Nieuwegein, The Netherlands
[2]Institute for Spectroscopy RAS, Fizicheskaya Str., 5, Troitsk, Moscow Region, 142190 Russia
[3]MESA+ Institute for Nanotechnology, University of Twente, P.O. Box 217, 7500 AE Enschede, The Netherlands

Design of Freestanding Film Elements for HVM tools of EUV Nanolithography (S28) (Invited)
Alexey Yakovlevich Lopatin, Nikolay Nikolaevich Salashchenko
Institute for Physics of Microstructures, Nizhny Novgorod, Russia

Characterization of Metrology Tools and Optical Components for HVM EUV Sources (S35) (Invited)
F. Scholze[a], C. Laubis[a], A. Gottwald[a], and T. Feigl[b]
[a]Physikalisch-Technische Bundesanstalt, Abbestr. 2-12, 10587 Berlin, Germany
[b]optiX fab GmbH, Hans-Knöll-Str.6, 07745 Jena, Germany

LPP Collector Mirrors – Coating, Metrology and Refurbishment (S34) (Invited)

Torsten Feigl[a], Marco Perske[a], Hagen Pauer[a], Tobias Fiedler[a], Christian Laubis[b], Frank Scholze[b]
[a]*optiX fab GmbH, Hans-Knöll-Str.6, 07745 Jena, Germany*
[b]*Physikalisch-Technische Bundesanstalt, Abbestr. 2-12, 10587 Berlin, Germany*

5:30 PM – 6:30 PM Session 7: Poster Session

7:00 PM Depart for Off-site Dinner (Marion Hotel)

End of Day 2

5:30 PM Session 7: Poster Session

Session Chair: Greg Denbeaux (University of Albany)

Topic: HVM Sources

Energy Fraction of CO_2 Laser Absorbed in EUV Source Plasma (S14)
Shinsuke Fujioka[1], Teruyuki Ugomori[1], Kensuke Yoshida[1], Chaogang Li[1], Atsushi Sunahara[2], Katsunobu Nishihara[1], Nozomi Tanaka[1], and Hiroaki Nishimura[1]
[1] *Institute of Laser Engineering, Osaka University, Japan*
[2] *Institute for Laser Technology, Japan*

Radiation of Gd and Tb Plasmas in 6.X nm Spectral Region (S46)
V. Krivtsun, O. Yakushev, R. Gayazov, D. Abramenko and K. Koshelev
RnD-ISAN / EUV Labs, Troitsk, Moscow

Topic: EUV Sources for Mask Metrology

Microwave EUV Light Sources for Photolithography (S13)
Sho Oe[1], Saya Tashima[1], Masami Ohnishi[1], Waheed Hugrass[2] and Hodaka Osawa[1]
[1]*Kansai university, Faculty of Engineering Science, Department of Electrical and Electronic Engineering, 3-3-35 Yamate-cho, Suita-shi, Osaka 564-8680, Japan*
[2]*University of Tasmania, School of Computing and Information Systems, Private Bag, 1359, Newnham, Tasmania 7250, Australia*

The Energetiq EQ-10 EUV Source for metrology - Review of Recent Data (S29)
Stephen F. Horne, Matthew J. Partlow, Deborah S. Gustafson, Matthew M. Besen, Donald K. Smith, Paul A. Blackborow
Energetiq Technology Inc., Woburn, MA, USA

Effect of Misalignment in Laser-droplet Interaction on the Three Dimensional EUV Emission and Ion Distribution (S37)
Andrea Giovannini and Reza S. Abhari
Laboratory for Energy Conversion, Swiss Federal Institute of Technology Zurich (ETHZ), Switzerland

2D-Gas Dynamics Transient Modeling of Hot Gas Bubble Formation EUV Source Chamber (S43)
V. Konovalov[1,3], V.G. Novikov[1,3], V.V. Ivanov[2,3], K. N. Koshelev[2,3], A.M. Yakunin[4], V. Y. Banine[4]
[1] *Keldysh Institute of Applied Mathematics, Moscow, Russia*
[2] *Institute for Spectroscopy RAS, Troitsk, Russia*
[3]*RnD-ISAN/RnD-M, Troitsk, 142190 Russia*
[4]*ASML, Veldhoven, Netherlands*

Transmission Grating Spectrometer for EUV Source Characterization from the UV to the EUV (S47)

H.M.J. Bastiaens[1], C. Bruineman[2], B. Vratzov[1,3], and F. Bijkerk[1,4]
[1] *MESA+ Institute for Nanotechnology, University of Twente, The Netherlands*
[2] *Scientec Engineering, The Netherlands*
[3] *NT&D -Nanotechnology and Devices, Germany*
[4] *FOM Institute DIFFER, The Netherlands*

Transmission Grating Spectrometer for EUV Source Characterization from the UV to the EUV (S52)

H.M.J. Bastiaens[1], C. Bruineman[2], B. Vratzov[1,3], and F. Bijkerk[1,4]
[1] *MESA+ Institute for Nanotechnology, University of Twente, The Netherlands*
[2] *Scientec Engineering, The Netherlands*
[3] *NT&D -Nanotechnology and Devices, Germany*
[4] *FOM Institute DIFFER, The Netherlands*

Comparison of ns vs ps Laser Assisted Vacuum Arc EUV Source (S53)

Girum A. Beyene[1], Enda Scally[1], Patrick Hayden [1], Larissa Juschkin[2], Vasily S. Zakharov[3], Sergey V. Zakharov[3], Padraig Dunne [1], Gerry O'Sullivan[1] and Fergal O'Reilly [1]
[1] *School of Physics, University College Dublin, Ireland,*
[2] *Department of Physics, RWTH Aachen University, Germany*
[3] *EPPRA sas, Villebon sur Yvette, France*

Topic: Applications of EUV Sources

Fast Rigorous Model for Mask Spectrum Simulation in EUV Lithography (S11)

Xiaolei Liu[a,b], Xiangzhao Wang[a], Sikun Li[a], Guanyong Yan[a,b], Andreas Erdmann[c]
[a] *Laboratory of Information Optics and Opt-Electronic Technology, Shanghai Institute of Optics and Fine Mechanics, Chinese Academy of Sciences, Shanghai 201800, China*
[b] *Graduate School of the Chinese Academy of Sciences, Beijing 100039, China*
[c] *Fraunhofer Institute of Integrated Systems and Device Technology, Schottkystrasse 10, 91058 Erlangen, Germany*

Topic: Modeling

Hydrodynamics Modeling of Liquid Droplet Deformation with Laser Pulses (S44)

I. Yu. Vichev[1, 2], V. G. Novikov[1, 2], V. V. Ivanov[1, 3], V. V. Medvedev[3, 4], V. M. Krivtsun[1, 3], K. N. Koshelev[1, 3], A. M.Yakunin[5], A. Bratchenia[5], V. Banine[5]
[1] *RnD-ISAN, Troitsk, Russia*
[2] *Keldysh Institute of Applied Mathematics RAS, Moscow, Russia*
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[4] *FOM Institute DIFFER, Nieuwegein, The Netherlands*
[5] *ASML, Veldhoven, The Netherlands*

RZLINE Code Modeling of Sn Laser-produced Plasma Sources of EUV Radiation (S45)

A.S. Grushin[1,3], D.A. Kim[1,3], V.V. Medvedev[4], V.V. Ivanov[1,2], V. G. Novikov[1,3], V. M. Krivtsun[1,2], A.M. Yakunin[5], V. Y. Banine[5] and K. N. Koshelev[1,2]
[1] RnD-ISAN/RnD-M, Troitsk, 142190 Russia
[2] Institute for Spectroscopy RAS, Troitsk, 142090 Russia
[3] Keldysh Institute of Applied Mathematics RAS, Moscow, 125047 Russia
[4] FOM Institute DIFFER, Nieuwegein, The Netherlands
[5] ASML, Veldhoven, Netherlands

Radiative Properties of Krypton Plasma in Water-window Spectral Range (S49)

Vassily S. ZAKHAROV, Sergey Zahkarov
EPPRA sas, Villebon/Yvette 91140, France
Keldysh Institute of Applied Mathematics RAS, Moscow 125047, Russia
NRC Kurchatov Institute, Moscow 123182, Russia

Topic: XUV

"Water Window" Laser-Produced Plasma Sources based on High-Z Alloys

Elaine Long[1], Takamitsu Otsuka[1,2], Bowen Li[1] Gerry O'Sullivan[1], Padraig Dunne[1], Emma Sokell[1] & Fergal O'Reilly[1]
[1]*UCD School of Physics, University College Dublin,Belfield, Dublin 4, Ireland*
[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*

Studies of Mixed Lead-Tin Alloys as Targets for EUV LPP Sources

Enda Scally, Paul Sheridan, Gerry O'Sullivan & Fergal O'Reilly
UCD School of Physics, University College Dublin,Belfield, Dublin 4, Ireland

Tailored Multilayer Optics for New X-ray Source Types

Stephen O'Rourke[1], Markus Krämer[1], Reiner Dietsch[1], David Windt[2], Thomas Holz[1], Danny Weißbach[1]

[1] *AXO DRESDEN GmbH, 01237 Dresden, Germany*

[2] *Reflective X-Ray Optics LLC, New York, NY 10027, USA*

Wednesday, November 6, 2013

8:30 AM Announcements

Introduction and Announcements (Intro-2)
Vivek Bakshi, EUV Litho, Inc.

Announcements
Padraig Dunne (UCD)

8:40 AM Session 7: Keynote Session - 2

Session Chair: Padraig Dunne (UCD)

Coherent X-Rays from Tabletop Femtosecond Lasers and Applications in Nanometrology (S1)
Margaret Murnane
University of Colorado, Boulder, CO

9:20 AM Session 8: XUV

Session Dedicated to the Memory of Prof. Alan Michette

Session Co-Chairs: Takeshi Higashiguchi (Utsunomiya University) and Klaus Mann (Laser-Laboratorium Göttingen)

Efficient Light Sources at BEUV & Water Window Soft X-ray Wavelengths (S41) (Invited)
Takeshi Higashiguchi[1], Yuhei Suzuki[1], Masato Kawasaki[1], Hayato Ohashi[1], Nobuyuki Nakamura[2], Ryoichi Hirose[3], Takeo Ejima[3], Weihua Jiang[4], Taisuke Miura[5], Akira Endo[5], Chihiro Suzuki[6], Kentaro Tomita[7], Masaharu Nishikino[8], Shinsuke Fujioka[9], Hiroaki Nishimura[9], Atsushi Sinahara[10], Daisuke Nakamura[7], Akihiko Takahashi[7], Tatsuo Okada[7], Shuichi Torii[11], Tetsuya Makimura[11], Bowen Li[12], Padraig Dunne[12], and Gerry O'Sullivan[12] *[1]DEEE & CORE, Utsunomiya University*
[2]Institute for Laser Science, The University of Electro-Communications
[3] Institute of Multidisciplinary Research for Advanced Materials, Tohoku University
[4]Nagaoka University of Technology [5]HiLASE Project, Institute of Physics AS
[6]National Institute for Fusion Science [7]Kyushu University, Japan
[8]Japan Atomic Energy Agency [9]Institute of Laser Engineering (ILE), Osaka University
[10]Institute of Laser Technology (ILT) [11]Institute of Applied Physics, University of Tsukuba
[12]School of Physics, University College Dublin

A Tunable Source of Quasi-Phase-Matched Coherent EUV Radiation (S23)
Kevin O'Keeffe, David Lloyd, Simon Hooker
Clarendon Laboratory, Parks Road, Oxford, OX1 3PU, United Kingdom

Complete Spatial Characterisation of EUV Harmonic Wavefronts (S22)
David Lloyd, Kevin O'Keeffe, Simon Hooker
Clarendon Laboratory, Department of Physics, University of Oxford

Table-top EUV/Soft X-ray Source and Wavefront Measurements at Short Wavelengths (S18) (Invited)
K. Mann, J. O. Dette, F. Kühl, M. Lübbecke, T. Mey, M. Müller, B. Schäfer
Laser-Laboratorium Göttingen e.V., Göttingen, Germany

In Memory of Prof. Alan Michette (S54)
Peter Anastasi
Silson

10:40 AM Break (15 minutes)

10:55 AM Session 9: Metrology

Session Co-Chairs: Reza Abhari (ETHZ) and Paul Sheridan (NewLambda Technologies)

Droplet-based LPP Light Source for HVM Inspection Applications (S36)
Bob Rollinger, Nadia Gambino, Andrea Giovannini, Luna Bozinova, Flori Alickaj, Konrad Hertig, Reza S. Abhari and Fariba Abreau[1]
Laboratory for Energy Conversion, Swiss Federal Institute of Technology Zurich (ETHZ), Switzerland
[1]*Adlyte Ltd., Zug, Switzerland*

Laser Produced Plasmas using Cryogenic Xe for Actinic Metrology and Inspection Tools (S20)
Mark Tillack and Andrew Effenberger
University of California San Diego, La Jolla, CA

Dynamics of a Laser-assisted Z-pinch EUV Source (S27)
I. Tobin[a], L. Juschkin[b] and J. G. Lunney[a]
[a]*School of Physics, Trinity College Dublin, Dublin 2, Ireland.*
[b]*Department of Physics, RWTH Aachen University, Aachen, Germany.*

Influence of an Intensive UV Preionization on Evolution and EUV-emission of the Laser Plasma with Xe Gas Target (S12)
Serguei Kalmykov, Alexey Mozharov, Mikhail Petrenko, Maxim Sasin, and Ruben Seisyan

A. F. Ioffe Physico-Technical Institute of the Russian Academy of Sciences
194021 St.-Petersburg, Russia

Development of Microwave Discharge Plasma for Extreme Ultraviolet Lithography (S10)
Saya TASHIMA, Masami OHNISHI, Waheed HUGRASS[1], Hodaka OSAWA and Sho OE
Department of Electrical and Electronic Engineering, Faculty of Engineering Science, Kansai University, 3-3-35 Yamate-cho, Suita, Osaka 564-8680, Japan
[1]School of Computing and Information Systems, University of Tasmania, Locked Bag 1359, Launceston, Tasmania 7250, Australia

Tunable, High Brightness Lab-Scale Soft X-Ray Photons (S32)
P. Sheridan[1,2], F. O'Reilly[1,2], and K. Fahy[1,2]
[1]NewLambda Technologies Ltd, Science Center North, Belfield, Dublin 4
[2]School of Physics, University College Dublin, Dublin 4

12:40 PM Workshop Summary and Announcements

Workshop Summary and Announcements (S51)
Vivek Bakshi, EUV Litho, Inc.

1:15 PM Workshop Adjourned

1:15 PM Leave for Lunch and Tour (Battle of Boyne)

Thursday, November 7, 2013

Location: Newman House, Stephen's Green, Dublin

Technical Working Group (TWG) Meeting

8:30 AM	Breakfast
9:00 AM – 10:00 AM	TWG Meeting


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