2019 Source Workshop

November 4-6, 2019

Amsterdam ▪ The Netherlands

Workshop Proceedings

2019 Source Workshop

2019 Source Workshop, Nov. 4-6, ARCNL, Amsterdam, The Netherlands

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Vivek Bakshi (EUV Litho, Inc.), Chair

Oscar Versolato (ARCNL), Co-Chair

Joost Frenken (ARCNL), Co-Chair

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WORKSHOP PROCEEDINGS

2019 Source Workshop

November 4-6, 2019, Amsterdam, The Netherlands

Location: WCW Congress Center

Day 1: Monday November 4, 2019

9:30 – 9:35 AM Welcome and Announcements

9:35 AM Session 1: Plasma Modeling and Code Comparison

Session Chairs: John Sheil (ARCNL) and Katsunobu Nishihara (Osaka)

Radiation hydrodynamic simulations of λ = 2 μm irradiation of tin microdroplets and slab targets (S91)

J. Sheil[1], M. M. Basko[2], R. Hoekstra[1,3], W. Ubachs[1,4], A. J. Neukirch[5], J. Colgan[5], and O. O. Versolato[1]
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[4]Los Alamos National Laboratory, Los Alamos, NM 87545, USA

Radiation Hydrodynamic Simulation on EUV light from 2μm Laser-irradiated Tin Droplet (S92) (Invited Presentation)

Atsushi Sunahara[1], Katsunobu Nishihara[2] and Akira Sasaki[3]
[1] Center for materials under extreme environment (CMUXE), Purdue Univ., USA
[2.] Institute of Laser Engineering, Osaka University. JAPAN
[3.] Kansai Photon Science Institute National Institute for Quantum and Radiological Science and Technology, JAPAN

On the Optimal Choice of the Wavelength of Laser Radiation for LPP EUV Sources (S93) (Invited Presentation)

V. V. Ivanov[1,2], V.M. Krivtsun[1,2], V.V. Medvedev[1,2], and K.N. Koshelev[1,2]
[1]Institute of Spectroscopy of the Russian Academy of Science (ISAN), Moscow, Troitsk, Russia
[2]EUV Labs, Moscow, Troitsk, Russia

10:50 AM Break (20 min.)

Simulations of EUV Sources Driven by CO_2 and Thulium Lasers (S94) (Invited Presentation)

Steven Langer, Emily Link, Tom Galvin, Howard Scott, and Craig Siders
Lawrence Livermore National Laboratory

Modelling Radiation from High-Z elements in Tokamak Plasmas and Similarities with X-ray and VUV sources (S95) (Invited Presentation)

M G O'Mullane[1], N R Badnell[1] and S S Henderson[2]
[1] Department of Physics, University of Strathclyde, Glasgow, G4 0NG, UK
[2] UKAEA, Culham Science Centre, Abingdon, OX14 3DB, UK

Open Discussion for Next Steps (S96)

Modertors - John Sheil (ARCNL) and Vivek Bakshi (EUV Litho, Inc.)

12:30 PM – 1:30 PM Lunch

1:30 PM Session 2: ARCNL Program Showcase

Session Chairs: Joost Frenken (ARCNL) and Oscar Versolato (ARCNL)

ARCNL: the Advanced Research Center for Nanolithography (S101)

Joost Frenken
The Advanced Research Center for Nanolithography (ARCNL)

ARCNL's Metrology Department: New Light on Nanostructures (S102)

Stefan Witte
The Advanced Research Center for Nanolithography (ARCNL)

The Materials Department: A Superficial Research in Depth (S103)

Sonia Castellanos
The Advanced Research Center for Nanolithography (ARCNL)

ARCNL's Source Department: Physics of Plasma Sources of EUV Light (S104)

Oscar Versolato
The Advanced Research Center for Nanolithography (ARCNL)

High-harmonic generation and EUV science (S105)

Peter Kraus
ARCNL, Science Park 106, 1098 XG Amsterdam, The Netherlands

Improving Optical Overlay Metrology Using Computational Imaging (S106)

C. Messinis, [1,2,*] V.T. Tenner, [1,2,3] J.F. de Boer, [1] S. Witte, [1,2] and A.J. den Boef [1,2,3]

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

2:50 PM - 3:05 PM Coffee Break

A DC Injector for a Compact Free Electron Laser (S107)

Tom Lucas
The Advanced Research Center for Nanolithography (ARCNL)

Interactions of Multiply Charged Fast Tin Ions with Solid Targets and Neutral Gases (S108)

S. Rai[1, 2], M.J. Deuzeman[1, 2], O.G. Tjepkema[1], W. Noordam[1], S. A. Koeleman[1], O.O. Versolato[1] and R. Hoekstra[1, 2]
[1] *Zernike Institute for Advanced Materials, University of Groningen, Nijenborgh4, 9747 AG Groningen, the Netherlands*
[2] *Advanced Research Center for Nanolithography (ARCNL), Science Park 110, 1098 XG Amsterdam, the Netherlands*

The Transition from Short to Long Timescale Pre-pulses: Laser-pulse Impact on Tin Microdroplets (S109)

Randy Meijer[1,2], Dmitry Kurilovich[1,2], Oscar O. Versolato[1], Kjeld S.E. Eikema[1,2], Stefan Witte[1,2]
[1]*Advanced Research Center for Nanolithography (ARCNL), Science Park 106, 1098 XG Amsterdam, The Netherlands*
[2]*LaserLaB, Department of Physics and Astronomy, Vrije Universiteit, De Boelelaan 1105, 1081 HV Amsterdam, The Netherlands*

Detection of Hidden Gratings tHrough Multilayer Nanostructures using Light and Sound (S110)

Stephen Edward[1], Hao Zhang[1], Irwan Setija[2], Vanessa Verrina[1], Alessandro Antoncecchi[1], Stefan Witte[1], and Paul Planken[1]
[1] Advanced Research Center for Nanolithography (ARCNL), Science Park 106, 1098 XG Amsterdam, The Netherlands
[2] ASML Netherlands B. V., De Run 6501, 5504 DR Veldhoven, the Netherlands

EUV Spectroscopy of Highly-charged Sn ions in an Electron-beam Ion Trap (S111)

J. Scheers[1,2], C. Shah[3], A. Ryabtsev[4], H. Bekker[3], F. Torretti[1,2], J. Sheil[1], J. Berengut[5], W. Ubachs[1,2], R. Hoekstra[1,6], J. R. C. Lopez-Urrutia[3]and O. O. Versolato[1]
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[3]Max-Planck-Institut für Kernphysik, Saupfercheckweg 1, 69117 Heidelberg, Germany
[4]Institute of Spectroscopy, Russian Academy of Sciences, Troitsk, Moscow 108840, Russia [4]Max-Planck-Institut fur Kernphysik, Saupfercheckweg 1, 69117 Heidelberg, Germany
[5]School of Physics, University of New South Wales, Sydney 2052, Australia
[6]Zernike Institute for Advanced Materials, University of Groningen, Nijenborgh 4,

***In situ* Monitoring the Effect of Corrosion on the Surface Morphology of Crystalline Silicon (S112)**

F.M. Elam[1], F.-C. Hsia[1,2], B.A. Weber[1,2] and S.E. Franklin[1,3]
[1] Advanced Center for Nanolithography (ARCNL), Science Park 110, 1098 XG Amsterdam, The Netherlands
[2] Van der Waals-Zeeman Instituut, University of Amsterdam, Science Park 904, 1098 XH Amsterdam, The Netherlands
[3] ASML, De Run 6501, 5504 DR Veldhoven, The Netherlands

Location: Co - creatieruimte Matrix VII / Theater, ARCNL (Map link)

4:30 PM – 6:30 PM Lab tour ARCNL

6:30 PM – 8:00 PM Reception, Speaker Prep and Registration

Day 2: Tuesday November 4, 2019

Location: WCW Congress Center (Map Link)

9:30 AM Announcements (Intro-1)
Vivek Bakshi
EUV Litho, Inc.

9:55 AM Session 3: Keynote

Session Chair: Joost Frenken (ARCNL)

EUV Source for Lithography in HVM: Performance and Prospects (S1)
Igor Fomenkov
ASML

Challenge of High Power LPP-EUV Source with Long Collector Mirror Lifetime for Semiconductor HVM (S2)
Hakaru Mizoguchi
Gigaphoton

11:15 AM Break (20 Min.)

11:35 AM Session 4: HVM Sources

Session Chair: Oscar Versolato (ARCNL)

Drop Deformation and Splashing upon Impact: Drop dynamics in the EUV source (S71)
Hanneke Gelderblom[1,3], Marise V. Gielen[2,3], Alexander L. Klein[2,3], Sten A. Reijers[3], Rielle de Ruiter[2], Robin B.J. Koldeweij[3],Henri Lhuissier[4], Emmanuel Villermaux[4], Dmitry Kurilovich[5], Oscar Versolato[5], Jacco H. Snoeijer[3], and Detlef Lohse[3]
[1] Fluids & Flows, Department of Applied Physics,
Eindhoven University of Technology, The Netherlands,
[2] ASML Netherlands B.V.,
[3] Physics of Fluids, Faculty of Science & Technology, University of Twente, The Netherlands,

Thickness Profile of a Stretched, Transparent Sheet of Liquid Metal Formed by Laser-prepulse Impact (S72)

Bo Liu[1,2], Dmitry Kurilovich[3], Hanneke Gelderblom[4] and Oscar O. Versolato[1]
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[4] *Department of Applied Physics, Eindhoven University of Technology, Den Dolech 2, 5600 MB, Eindhoven, Netherlands.*

In-situ Cryogenic Cleaning Techniques for Tin-contaminated EUV Mirrors (S73)

Norbert Böwering[1,2], CHristian Meier[1]
[1]*Molecular and Surface Physics, Bielefeld University, 33615 Bielefeld, Germany*
[2]*BökoTech, Ringstr. 21, 33619 Bielefeld, Germany*

12:35 Lunch and Group Photograph (1 hour 25 Minutes)

2:00 PM Session 5: Metrology Sources

Session Chairs: Reza Abhari (ETH) and Klaus Bergmann (Fraunhofer)

Light source Development for Mask and Wafer Inspection HVM Tools (S61) (Invited Presentation)

Reza Abhari
ETH Zurich, Switzerland

Ultra-clean High-brightness LPP EUV and VUV Source with Rotating-target for Metrology Applications (S63) (Invited Presentation)

Konstantin Koshelev[1,2], Alexander Vinokhodov[1], Oleg Yakushev[1], Yuri Sidelnikov[1,2], Vladimir Ivanov[1,2], Vladimir Krivtsun[1,2], Alexander Lash[1], Dimitri Abramenko[1,2], Mikhail Krivokorytov[1,2], Vyacheslav Medvedev[1,2], Denis Glushkov[3], Pavel Seroglazov[3], Samir Ellwi[3]
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[2] *Institute of Spectroscopy of the Russian Academy of Science (ISAN), Moscow, Troitsk, Russia*
[3] *ISTEQ, Eindhoven, The Netherlands*

Performance improvement of laser-assisted and laser-driven EUV sources for metrology applications (S64) (Invited Presentation)

Yusuke Teramoto
Ushio

Advances in Laser-heated Discharge Plasma: Increased EUV Emission and Change in Plasma Parameters (S65)

Florian Melsheimer[1,2,3,4], Detlev Grützmacher[1,4,5], Larissa Juschkin[1]
[1] Forschungszentrum Jülich GmbH, Institute for Semiconductor Nanoelectronics, Peter Grünberg Institut-9, 52425 Jülich Germany
[2] RWTH Aachen University, Templergraben 55, 52056 Aachen, Germany
[3] Fraunhofer Institute for Laser Technology, Steinbachstraße 15, 52074 Aachen, Germany
[4] JARA-FIT, Forschungszentrum Jülich GmbH and RWTH Aachen University, Germany
[5] Forschungszentrum Jülich GmbH, JARA-Institute for Green-IT, Peter Grünberg Institute -10, 52425 Jülich, Germany

Characterization of discharge based plasmas in the spectral range of 20 - 50 nm (S62) (Invited Presentation)

Klaus Bergmann[1], Jochen Vieker[1], Florian Melsheimer[2]
[1]Fraunhofer Institute for Laser Technology – ILT Steinbachstr. 15, 52074 Aachen, Germany
[2]Institute of Semiconductor Nanoelectronics (PGI-9), Forschungszentrum Jülich, 52425 Jülich, Germany

3:40 PM Break (20 Minutes)

4:00 PM Session 6: Spectroscopy

Session Chairs: Padraig Dunne (UCD) and Ronnie Hoekstra (ARCNL)

Fundamental Structure and Interaction Quantities of Ionic Tin Quantities (S81) (Invited Presentation)

Ronnie Hoekstra[1,2], Lars Behnke[1], Zoi Bouza[1], Mart Johan Deuzeman[1,2], Walewein Noordam[2], Lucas Poirier[1], Subam Rai[1,2], Joris Scheers[1,3], Ruben Schupp[1,3], John Sheil[1], Diko Hemminga[1,3], Francesco Torretti[1,3], Wim Ubachs[1,3], Oscar Versolato[1]
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[3] Department of Physics and Astronomy and LaserLaB, Vrije Universiteit, Amsterdam, the Netherlands

Unexpectedly Large Radiative Emission between Highly-excited States in Sn Laser-produced Plasma (S82) (Invited Presentation)

J. Colgan[1], A. J. Neukirch[1], F. Torretti[2], J. Sheil[2], R. Schupp[2], M. M. Basko[3], M. Bayraktar[4], R. A. Meijer[2], S. Witte[2], W. Ubachs[2], R. Hoekstra[2], and O. O. Versolato[2]
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XUV Spectroscopy of Strontium Laser Produced Plasmas (S83) (Invited Presentation)

T. Miyazaki, G. O'Sullivan and P. Dunne
School of Physics, University College Dublin, Belfield, Dublin 4, Ireland

5:20 PM Break (10 Minutes)

5:30 PM Session 7: Poster Session (90 Minutes)

Session Chair: Padraig Dunne (UCD)

Further Enhancement of the Xe LPP 11-nm Radiation Source Efficiency – A Study of the Laser-energy Absorption at Varied Parameters of the Gas-target Irradiation (S26)

P. S. Butorin, S. G. Kalmykov, V. A. Maximov, M. E. Sasin
Ioffe Institute, St. Petersburg, Russia

Scaling of Electron Temperature and Soft x-ray Intensity in Laser-produced Heavy Element Highly Charged Ions (S27)

Hiromu Kawasaki,[1] Atsushi Sunahara,[2] Yuta Shimada,[1] Takeo Ejima,[3] Weihua Jiang,[4] Gerry O'Sullivan,[5] Masaharu Nishikino,[6] Shinichi Namba,[7] and Takeshi Higashiguchi[1]
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Optimized Highly-charged Ion Production for Strong Soft X-ray Sources with UTA Spectra (S28)

Yuta Shimada,[1] Hiromu Kawasaki,[1] Kanon Watanabe,[2] Hiroyuki Hara,[1] Kyoya Anraku,[1] Misaki Shoji,[1] Toru Oba,[3] Masaru Matsuda,[4] Weihua Jiang,[5] Atsushi Sunahara,[6] Masaharu Nishikino,[7] Shinichi Namba,[8] Gerry O'Sullivan,[9] and Takeshi Higashiguchi[1,2]
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Calibrated Broadband Spectroscopy using Transmission Gratings in the EUV to DUV Wavelengths (S35)

Muharrem Bayraktar[1], Bert Bastiaens[2], and Fred Bijkerk[1]
[1] Industrial Focus Group XUV Optics, MESA + Institute for Nanotechnology, University of Twente, The Netherlands
[2] Laser Physics and Nonlinear Optics, MESA + Institute for Nanotechnology, University of Twente, The Netherlands

Towards High-Resolution Imaging at 13.5 nm using a Fiber Laser Driven High-order Harmonic Source (S36) **# 1 Place – Best Poster Award**

Wilhelm Eschen[1,2], Getnet K. Tadesse[1,2], Robert Klas[1,2], Herbert Gross[2], Jens Limpert[1,2,3], JanRothhardt[1,2,3]
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[3]Fraunhofer Institute of Applied Optics and Precision Engineering, Albert-Einstein-Str. 7, 07745 Jena, Germany

Plasma-induced Blister Formation and Deuterium Retention in EUV Mirrors (S37)

Shih-Chi Wang, Wim Arnold Bik and Thomas Morgan
DIFFER, Eindhoven, The Netherlands

Thin Films Behaving Badly (S38)

Görsel Yetik, Cristina Sfiligoj, Victor Vollema, Jan Verhoeven, Joost Frenken
Advanced Research Center for Nanolithography, Science Park 106, 1098 XG Amsterdam, The Netherlands

Edwards Contribution to future EUV Lithography scaling (S39)

Jos Donders*, Anthony Keen**, Mohamed Noorani*, Niall Walsh*, Amedeo Bellunato*, Rene Heijink*, David Engerran**
**Edwards Vacuum, De Run 6807, 5504DW Veldhoven, The Netherlands*
***Edwards Vacuum, Innovation Drive RH15 9TW, UK*

XUV Coherence Tomography (XCT) (S40)

Julius Reinhard[1,2], Silvio Fuchs[1,2], Martin Wünsche[1,2], Jan Nathanael[1,2], Johann Jakob Abel[1], Felix Wiesner[1], Slawomir Skruszewicz[1], Christian Rödel[1,2], Gerhard G. Paulus[1,2]
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[2] Helmholtz Institute Jena, Fröbelstieg 3, 07743 Jena, Germany

Towards High Harmonic Generation in Laser-Produced Tin Plasma (S56)

 # 3 Place – Best Poster Award

Jan Mathijssen, Amelie Schulte, Kjeld Eikema, Stefan Witte
ARCNL

High-flux XUV Beam-lines Driven by Fiber-based Few-cycle Laser sources (S57)

Steffen Hädrich[1], Nico Walther[1], Maxim Tschernajew[1], Fabian Stutzki[1], Marco Kienel[1], Florian Just[1], Sven Breitkopf[1], Tino Eidam[1] and Jens Limpert[1,2,3,4]
[1]Active Fiber Systems GmbH, Ernst-Ruska-Ring 11, 07745 Jena, Germany
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Divergence Control of High-harmonic Generation Enables High-brightness extreme-ultraviolet sources (S58)

Sylvianne Roscam Abbing, Filippo Campi, Faegheh Sajjadian, Peter M. Kraus
Advanced Research Center for Nanolithography (ARCNL), Amsterdam, The Netherlands

The Effect of Gas Admixture on the Operation of a Discharge based EUV-Source (S68)

Jochen Vieker, Sophia Schröder and Klaus Bergmann
Fraunhofer Institute for Laser Technology – ILT, Steinbachstr. 15, 52074 Aachen, Germany

Modelling of laser triggered hollow electrode capillary discharge as a coherent EUV source at 13.38nm wavelength (S69)

S.V. Zakharov[1, 2], A. Jancarek[1], M. Nevrkla[1], P. Vrba[1]
[1]Czech Technical University in Prague, Faculty of Nuclear Sciences and Physical Engineering, Czech Republic
[2] NRC Kurchatov Institute, Moscow, Russia

Table-Top Water-Window Microscope Using Z-pinching Capillary Discharge Source (S70)

T. Parkman[1], M. Nevrkla[2], M. F. Nawaz[3], A. Jancarek[2], D. Panek[1], J. Turnova[1], M. Vrbova[1]
[1]Czech Technical University in Prague, Faculty of Biomedical Engineering, nam. Sitna 3105, 272 01 Kladno, Czech Republic
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[3]ASML, De Run 6501,5504 DR, Veldhoven, The Netherlands

Xenon plus Additives in the Energetiq EQ-10: Initial Results (S121)

Kosuke Saito[A,B], Stephen F. Horne[B], Michael Roderick[B] , Donald K. Smith[B], Matthew M. Besen[B], Matthew J. Partlow[B], Deborah Gustafson[B], Paul Blackborow[B]
[A]Hamamatsu Photonics K.K., [B]Energetiq Technology, Inc.

Playing with the Temporal-shape of a High-power Nanosecond 1064 nm Laser pulse to Explore EUV Generation and Different Droplet-deformation Regimes (S74) **# 2 Place – Best Poster Award**

Zeudi MAZZOTTA
Advanced Research Center for Nanolithography (ARCNL)

Observation of the Whole Thomson Scattering Spectrum for Diagnostics of EUV and Soft X-ray Light Source Plasmas (S75)

Kentaro Tomita[1], Fumitaka Ito[1], Jyunya Hotta[1], Syouichi Sakamoto[1], Kiichiro Uchino[1]
[1]Interdisciplinary Graduate School of Engineering and Sciences, Kyushu University, 6-1, Kasugakoen, Kasuga, Fukuoka 816-8580, JAPAN

Research of Tin-droplet Generation, Diagnosis and Synchronization with Laser (S76)

Wang Xinbing, Wang Junwu, Zuo Duluo
Wuhan National Laboratory for Optoelectronics
Huazhong University of Science & Technology, Wuhan 430074, China.

Ion energy distributions from laser-produced tin plasmas (S77)

Lucas Poirier, Diko Hemminga, John Sheil, Ronnie Hoekstra, Wim Ubachs, Oscar Versolato
ARCNL

Spectroscopic Measurements of Sn Laser-Produced Plasmas (S84)

Lars Behnke[1], Zoi Bouza[1], Ruben Schupp[1], Joris Scheers[1,2], Francesco Torretti[1,2], Muharrem Bayraktar[3], Ronnie Hoekstra[1,4], Wim Ubachs[1,2], Oscar Versolato[1]
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Wednesday, November 6, 2019

Location: WCW Congress Center

9:30 AM Announcements (Intro-2)

Lifetime Achievement Award

9:40 AM Session 8: Blue-X

Session Chairs: Craig Siders (LLNL) and Torsten Feigl (optiXfab)

Blue-X (EUVL extension) an Update (S21)
Vivek Bakshi
EUV Litho, Inc.

Efficient High-power Laser drivers for Next-generation High Power EUV sources (S22) (Invited Presentation)
Craig Siders
LLNL

Collector Mirrors for the Water-window (S23) (Invited Presentation)
Torsten Feigl
optiXfab

Optical Properties of Multilayers for Operational Wavelengths between 6.6 and 13.5 nm (S24)
A.E. Yakshin, A.A. Zameshin, D. Kuznetsov, I. Milov, I. Makhotkin, E. Louis, and F. Bijkerk
Industrial Focus Group XUV Optics, MESA+ Institute for Nanotechnology, University of Twente

Progress on a High Radiance Water Window Source for Imaging (S25) (Invited Presentation)
F. O'Reilly[1,2], W. Fyans[2], S. Brady[2], A. Manzoni[2], D. Rogers[2], J. Howard[1,2], D. Skoko[2], M. Donnellan[2], K. Wilson[2], J. Costello[2], I. Tobin[2], T. McEnroe[2], K. Fahy[2] and P. Sheridan[2]
[1]School of Physics, University College Dublin, Belfield, Dublin 4, Ireland
[2]SiriusXT Ltd., 9 Holly Ave, Stillorgan Business Park, Dublin, Ireland

11:20 AM Break (20 Minutes)

Session 9: Optics and Metrology

Session Chairs: Ladislav Pina (Rigaku) and Larissa Juschkin (KLA)

Status of EBL2, an EUV irradiation facility at TNO and upcoming upgrades (S31) (Invited Presentation)
Norbert Koster, Herman Bekman, Michel van Putten, Rory de Zanger, Rob Ebeling, Arnold Storm, Chien-Ching Wu, Jetske Stortelder, Peter van der Walle, Jochem Janssen
TNO, The Netherlands

Laboratory XUV GI optics and metrology (S32) (Invited Presentation)
Ladislav Pina
Rigaku

XUV Scatterometry and Fluorescence for Nano-structured Surfaces (S33) (Invited Presentation)
Frank Scholze
PTB, Department Radiometry with Synchrotron Radiation, Abbestr. 2-12, 10587 Berlin, Germany

Design, development and verification of holographic masks for proximity lithography with EUV radiation (S34) (Invited Presentation)
Larrisa Juschkin
KLA

1:00 PM Lunch and Steering Committee Meeting (1 hr 30 Minutes)

2:30 PM Session 10: Lasers, HHG and Applications

Session Chairs: Stefan Witte (ARCNL) and Thomas Metzger (Trumpf)

Lensless Imaging with Coherent Extreme-ultraviolet Radiation (S51) (Invited Presentation)
Stefan Witte
Advanced Research Center for Nanolithography and Vrije Universiteit Amsterdam

From mW-scale HHG Sources to Extreme-ultraviolet Frequency Combs (S52) (Invited Presentation)
Christoph Heyl
DESY

High Harmonics of Visible Lasers (S53) (Invited Presentation)
Ofer Kfir
University of Göttingen

Progress in Development of kW-class Picosecond Thin-disk Laser Systems for High-power EUV Sources (S54) (Invited Presentation)
M. Smrž, J. Mužík, M. Chyla, S. S. Nagisetty, P. Sikocinski, O. Novák, and T. Mocek
HiLASE Centre, Institute of Physics CAS

Ultrafast Thin-Disk Amplifiers (S55) (Invited Presentation)
Thomas Metzger
TRUMPF Scientific Lasers GmbH & Co. KG, Feringastr. 10a, 85774 Unterföhring, Germany

4:10 Break (20 Minutes)

4:30 Session 11: FEL

Session Chairs: Gerardo D'Auria (*Elettra) and Hiroshi Kawata (KEK)*

The CompactLight Design Study Project (S41) (Invited Presentation)
Gerardo D'Auria
Elettra

Development to Realize the EUV-FEL High-power Light-source for Future Lithography (S42) (Invited Presentation)
Ryukou Kato, Hiroshi Sakai, Kimichika Tsuchiya, Yasunori Tanimoto, Yosuke Honda, Tsukasa Miyajima, Miho Shimada, Norio Nakamura, and Hiroshi Kawata
High Energy Accelerator Research organization (KEK)

Storage Ring EUV Light Source Based on Steady-state Microbunching Mechanism (S43)
Xiujie Deng
Tsinghua University, Beijing, China (On behalf of the SSMB Collaboration)

5:30 PM Announcements

Vivek Bakshi, EUV Litho, Inc.

5:30 PM Depart for Dinner

Workshop Adjourned

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