



## Learn about the technology that's key driver of Moore's Law - Final Agenda Announced for 2021 EUVL Source Workshop and Short Courses

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EUV Sources are the main drivers of EUVL scanners and metrology and will continue to be the key enabler of Moore's Law for high NA EUVL and Blue-X (various potential options for extending patterning beyond High NA EUVL).

There are several challenges ahead: 1) the necessity for more source power at 13.5 nm (1 kW and beyond), 2) the need to increase conversion efficiency and reduce debris generated from sources, and 3) how to reduce power consumption for lasers and generate more powerful sources at Blue-X wavelengths (probably at 6.x nm and/or at wavelengths of water window).

Research on EUV Sources is continuing to grow and we are happy to announce the final agenda for the 2021 Source Workshop (October 23-28, 2021). I am looking forward to hosting 68 presentations from leading experts and graduate students working within the field. The Source Workshop is the largest annual workshop that covers EUV Source Technology for semiconductor manufacturing.

In this blog, I will cover some of the highlights of what we expect to see during workshop presentations. Please see the final agenda and abstracts on our website, [www.euvlitho.com](http://www.euvlitho.com).

- Keynote talks this year include:
  - Takeo Watanabe of Hyogo University will talk about challenges of extending EUVL to shorter wavelengths.
  - Margaret Murnane of the University of Colorado will present on high harmonic generation (HHG) as the enabler of metrology and nanoelectronics in general.
  - Hakaru Mizoguchi of Gigaphoton will provide an update on high power Sn LPP.
  - We also will have an invited talk from ASML on the latest results from their Sn LPP sources.
- Metrology sources are needed to drive and enhance mask defect detection capabilities. There will be presentations on metrology sources from Energetiq, ETHZ, Fraunhofer, ISAN, Purdue, and Ushio.
- For the extension of EUVL beyond current CO<sub>2</sub> powered Sn LPP in the Blue-X region, we may have light sources driven by 2 μm solid state lasers, which are more energy efficient, scalable to much higher power than CO<sub>2</sub> lasers, and may deliver higher conversion efficiency due to pulse shaping capabilities. I am looking forward to the latest presentations from LLNL and ARCNL on development and performance data from such lasers and sources driven by them. There also will be a presentation on EUV-FEL by KEK (Japan); and on Steady State Microbunching (SSMB) based storage rings as potential high power EUV sources.
- ARCNL, co-organizer of this year's workshop, is now the leading R&D institute for EUV Sources and its Blue-X extension. I am looking forward to the 14 showcase presentations from ARCNL on Monday, October 25th.
- Plasma modeling will play an increasingly important role in the development of next-generation EUV sources. We will spend an entire day (Tuesday, October 26th) comparing results from



various plasma modeling codes on solving three “standard problems.” This will allow various codes to be compared, made more efficient, and improved. Eleven groups from around the world will participate in this session.

- **Short Courses: Learn from leading experts about the fundamentals that are driving EUV Sources and Moore’s Law**
  - We have two days of short courses planned to be taught by the world’s leading experts:
    - In the first course on Saturday, October 23, we will learn about the fundamentals and current future challenges of EUVL from leading experts on EUV masks, resist and patterning, optics, and sources. The course will be taught by Vivek Bakshi (EUV Litho), Patrick Naulleau (CXRO/LBL), Jinho Ahn (Hanyang University), and Sascha Migura (Zeiss).
    - The second course, on Sunday, October 24, will focus on the fundamentals of EUV Sources.
      - The first section titled “Physics of EUV and Short Wavelength Sources with Focus on Atomic Physics,” will be taught by Prof. Gerry O’Sullivan of the School of Physics, UCD, Dublin.
      - The second section titled “EUV/X-ray Interaction with Matter, Sources, Optics, and Applications” will be taught by Prof. David Attwood of the University of California, Berkeley.

I look forward to seeing you online this year during the workshop and short courses. The complete final agenda, abstract book, details on short courses, and registration information is available on our website at [www.euvlitho.com](http://www.euvlitho.com).