Proposed List of Topics for Workshop

1. Power scaling of EUV sources (500-1000 W) to support extension of EUV Lithography beyond 3 nm node

Papers to address challenges to power scaling of plasma sources on following topics:

Power scaling of CO_2 lasers

Power scaling of pico second lasers

Innovative tin fuel delivery systems, including mist targets

Debris mitigation systems (ionic and neutral debris)

New methods to improve CE to predicted theoretical maximum (Currently 8%)

Designs to improve collector lifetime including in-situ cleaning

Technologies for filtering out-of-band (OOB) radiation at UV, IR and 10.6μ wavelengths – including spectral purity filters, coatings and new ML collector designs

Development of new metrology techniques to support power scaling

Development of modelling tools to support power scaling (Modelling of source plasma and its interaction with source components) including analytical theory as well as new fundamental atomic data input

FEL sources

Review of current FEL designs to support EUVL power requirements of 500- 1000 W

Innovative designs to address current challenges of FEL to support EUVL

Characteristics of FEL sources (brightness, power, source size, repetition frequency, techniques for altering coherence, foot print and cost of ownership)

EUVL Optics for FEL sources - challenges and innovative designs

Economics of FEL sources – Cost of ownership (foot print, cost of source and cost of operation), time lines for technology readiness and R&D funding requirements

2. 13.5 nm laser produced plasma (LPP) sources of 250-500 W to support high volume manufacturing (HVM) scanners

Update on performance of high power EUV Sources (LPP)

Approaches to increase uptime of current sources

Methods for power scaling to enable 250 -500 W sources

Refurbishment of multi-layer collectors for LPP sources

Metrology techniques to support increasing source performance and uptime

CO_2 laser amplifiers for 250-500 W sources

Modelling of sources, collectors and its components to improve source uptime, including analytical theory as well as new fundamental atomic data input

Synchrotron based metrology for HVM source collectors, filters, sensors and detectors

3. EUV Source for Mask Defect Metrology

Development status of sources to support EUV mask defect metrology (LPP, DPP, HHG etc.) and EUV mask pellicle inspection

New source designs to support mask defect metrology and mask pellicle inspection tools

Source brightness requirements for EUV mask defect metrology tools

Limits of brightness for LPP and DPP mask defect metrology sources

Lasers for supporting mask defect metrology sources

Hybrid sources for mask defect metrology (Combination of laser produced plasma and discharge, e.g., LDP sources)

Spectral purity filters for metrology sources

Debris mitigation strategies for metrology sources

4. XUV / Water window sources (~1 nm- 100 nm / 10 eV to 1 keV)

XUV Sources (plasma and non-plasma sources, incoherent and coherent) and its development status (power, brightness, wavelength region, repetition frequency, cost of ownership, lifetime, commercial readiness)

Collector optics for XUV sources (GI and ML)

Spectral purity filters and debris mitigation

Optics for XUV metrology (normal and grazing angle optics, filters, and gratings)

Detectors for XUV metrology

XUV metrology applications including water window microscopy, applications supporting EUV and BEUV Lithography and microscopy

BEUV (6.x nm) sources and 6.x nm optics for Lithography Applications