

KrF laser driven Xenon plasma light source of a small field exposure tool (SFET)

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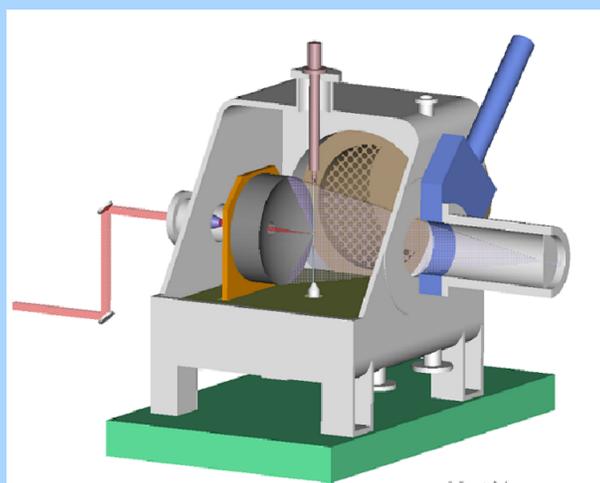
3. GIGAPHOTON INC, 400 Yokokurashinden, Oyama, 323-8558 Japan

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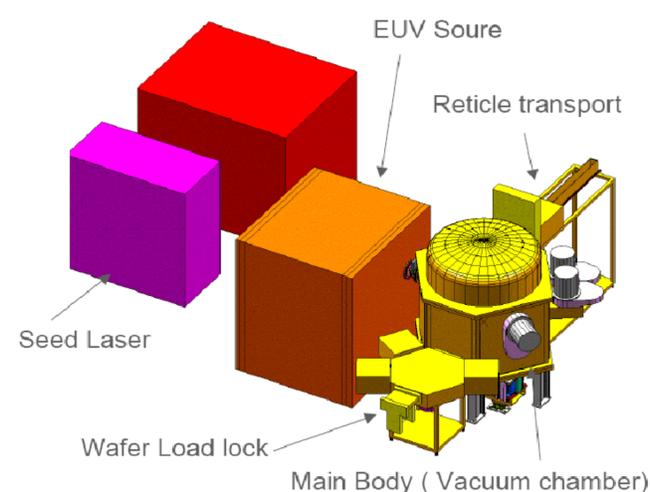
Abstract

A small field exposure tool (SFET) is currently being developed in Japan under the guidance of EUVA and Canon Inc. The EUV exposure tool will be installed at a Japanese research center next year for development on EUVL exposure related topics, for example resists and masks.

EUV Light Source Schematic



SFET Schematic



Xe Jet



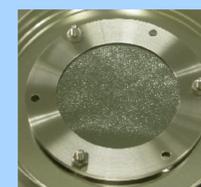
material	Xenon
speed	< 30 m/s
diameter	50 μ m
vacuum pressure	0.2 Pa (with jet) 10^{-6} Pa (w/o jet)

Collector Mirror



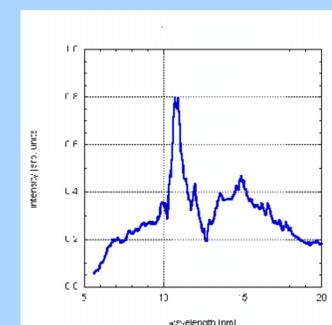
center wavelength	13.5 nm
average reflectivity	60 %
material	Mo/Si
clear aperture	290 mm
substrate	Si
surface shape	ellipsoidal

Spectral Purity Filter



material	Si/Zr/Si
thickness[nm]	50/50/50
clear aperture	50 mm

EUV & Out-of-band Radiation

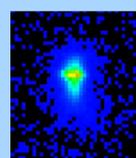


wavelength range (nm)	rel. radiation (%) (2% in-band)
< 130	95
> 130	5
6 to 18	38
18 to 80	34
80 - 130	23
130 to 370	4
> 370	1

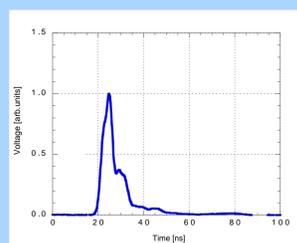
Excimer Laser



spot size [fwhm] (f=100mm)
vertical 65 μ m, horizontal 53 μ m



temporal pulse shape



excimer laser	KrF
wavelength	248 nm
max. pulse energy	145 mJ
max. rep.rate	4 kHz
max power	580 W
pulse length	15 ns

Main Target Specifications

EUV power	0.5 W at IF
target material	Xenon (jet)
driver laser	KrF (248nm)
max. repetition rate	4 kHz
collector mirror lifetime	> 150 Mpls

Time Schedule

- 2005/E set-up of SFET vacuum chamber and full light source system completed
- 2006/B light source installed into SFET
- 2006/06 SFET installation at Research Center

Acknowledgments

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