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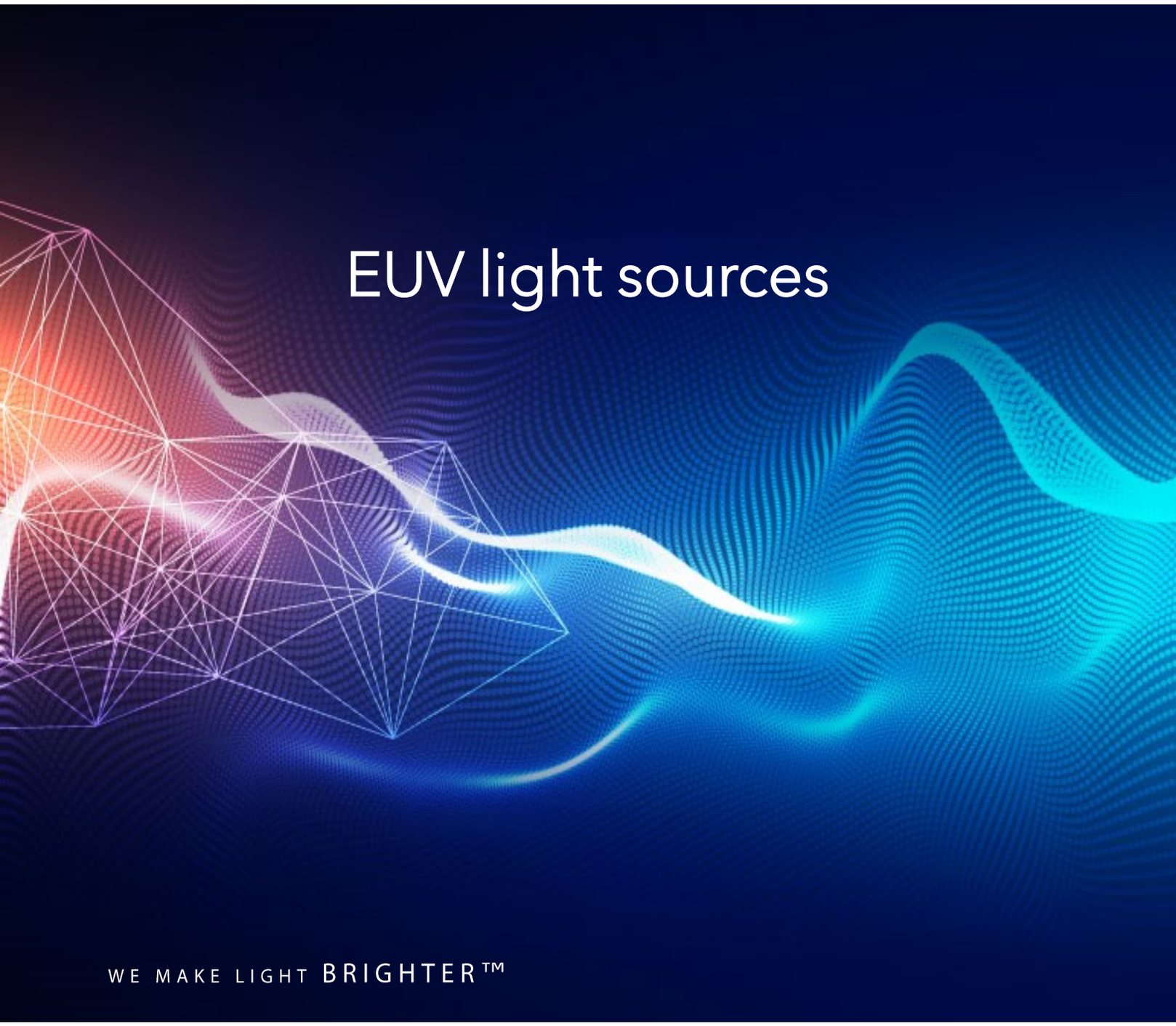


EUV light sources

WE MAKE LIGHT BRIGHTER™

LASER World of PHOTONICS

TEUS - LPP EUV light source with high brightness and low debris

Isteq Group has been working on this technology since the industry chose to follow the EUV path. We have developed an EUV source based on laser-produced plasma (LPP). The source has extremely high brightness along with extremely high stability. It also has refreshable fuel with no interruption and no need to exchange fuel cartridges, hence giving the industry extremely high uptime.

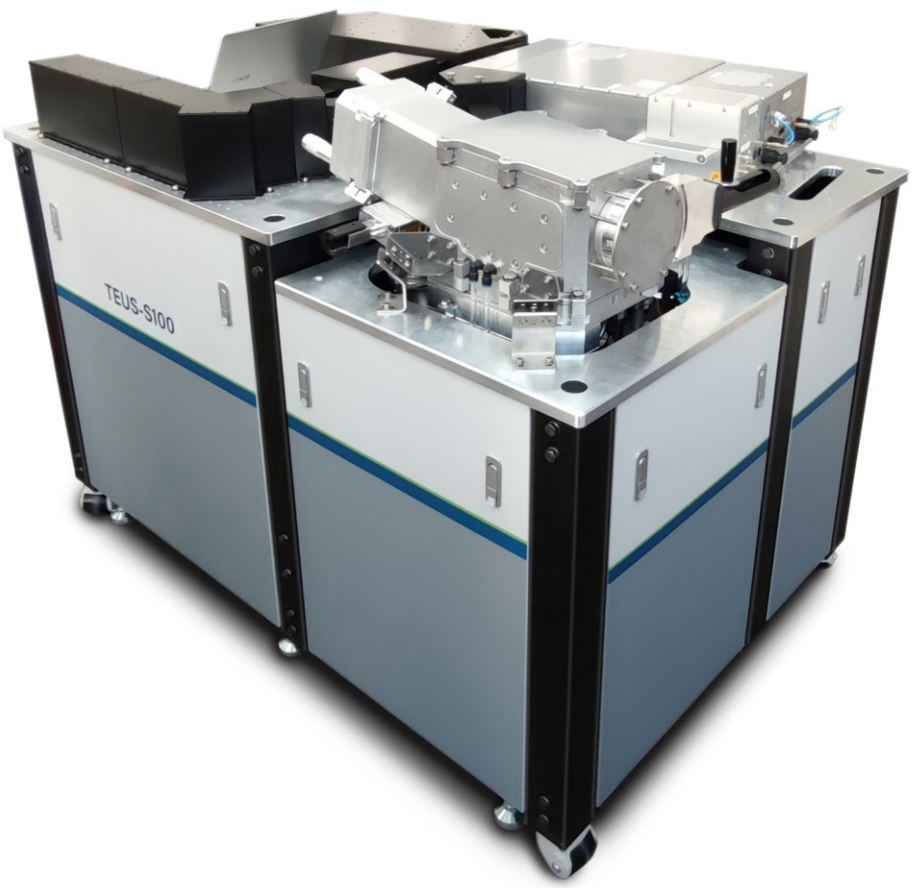
The fuels we have developed for the LPP source are specific for the spectral range for a certain application. However, for mask inspection applications we have developed a high-frequency tin rotating target, which has been granted patents worldwide.

The technique that we are using to produce the EUV has many advantages over other competitors due to the experience and know-how that our team has gained in the field.

APPLICATION FIELDS

- Mask and surface inspections:
- Patterning Mask Inspection (PMI)
- Areal Mask Inspection (AIMS)
- Mask Blank Inspection (MBI)
- EUV optics chain in the EUV scanner inspection
- Material science
- Wafer inspection

Clean photon EUV source



LPP EUV source based on fast rotating liquid metal target

MAIN ADVANTAGES

- high brightness (means high throughput) along with excellent stability,
- absolute minimum debris,
- extremely high uptime,
- high duty cycle and turnkey operation (user-friendly along with automated protocol to ensure the system runs smoothly with no risk and interruption).

EUV Light Source TEUS - S 100 Specifications

Main Specifications	Option A	Option B
Laser average power	100W	
Solid angle of collectable EUV power	0.05 sr	
Pulse repetition rate (adjustable)	25 kHz	70 kHz
Plasma size*, μm	≤ 60	40
Conversion efficiency in-band (13.5 nm±1%) radiation	2 % @2π·sr	1.6% @2π·sr
EUV flux inside collection angle after debris mitigation system in-band (13.5nm±1%)	11 mW	9 mW
Spectral brightness after debris mitigation system in-band (13.5nm±1%), W/mm^2·sr	≥ 80	≥ 140
Plasma stability**	3% RMS	

System Lifetime and Maintenance Requirements

Collector lifetime with degradation of 10% without using a special membrane filter in 24/7 mode of operation	not less than 8 months
Collector lifetime with degradation of 10% using a special membrane filter in 24/7 mode of operation	not less than 18 months
Maintenance time every 4 month	1 day
Uptime in 24/7 mode of operation***	4 months

Electrical Power, System Dimensions and Weight

Electrical power	6.5 kW
Dimensions (L×W×H)	1500×1000×1200 mm
Weight, including laser components	770 Kg

Facility Requirements

Room cleanliness class	ISO7
Water flow rate	10 L/min

* : 1/e^2

** : determined mainly by laser stability

*** : with shutting off the EUV beam for 5mins every 2 months for membrane magazine replacement

For full-band (13.5nm ± 2%) conversion efficiency is 4%@2π, giving double brightness and double the collected EUV power.

EUV Light Source TEUS - S 200 Specifications

Main Specifications	Option A	Option B
Laser average power	200 W	
Solid angle of collectable EUV power	0.05 sr	
Pulse repetition rate (adjustable)	50 kHz	135kHz
Plasma size*	≤ 60 μm	≤ 40 μm
Conversion efficiency in-band (13.5 nm±1%) radiation; % @2π·sr	2%	1.60%
EUV flux inside collection angle after debris mitigation system in-band (13.5nm±1%)	22 mW	18 mW
Spectral brightness after debris mitigation system in-band (13.5nm±1%)	≥ 160 $W/mm^2 \cdot sr$	≥ 280 $W/mm^2 \cdot sr$
Plasma stability**	3% RMS	

System Lifetime and Maintenance Requirements

Collector lifetime with degradation of 10% without using a special membrane filter in 24/7 mode of operation	not less than 4 months
Collector lifetime with degradation of 10% using a special membrane filter in 24/7 mode of operation	not less than 9 months
Maintenance time every 3 months	2 day
Uptime in 24/7 mode of operation***	3 months

Electrical Power, System Dimensions and Weight

Electrical power	8.5 kW
Dimensions (L×W×H)	1500×1000×1200 mm
Weight, including laser components	770 Kg

Facility Requirements

Room cleanliness class	ISO7
Water flow rate	15 L/min

* : 1/e2

** : determined mainly by laser stability

***: with shutting off the EUV beam for 5mins every month for membrane magazine replacement

For full-band (13.5nm ± 2%) conversion efficiency is 4%@2π, giving double brightness and double the collected EUV power.

EUV Light Source TEUS - S 400 Specifications

Main Specifications	Option A	Option B
Laser average power	400 W	
Maximum pulse repetition rate	100k Hz	200 kHz
Solid angle of collectable EUV power	0.05sr	
Plasma size*	≤ 60 μm	≤ 45 μm
Conversion efficiency in-band (13.5 nm±1%) radiation	2 % @2π·sr	1.8 % @2π·sr
EUV flux inside collection angle after debris mitigation system in-band (13.5nm±1%)	44 mW	40 mW
Spectral brightness after debris mitigation system in-band (13.5 nm±1%)	≥ 310 (≥ 500) W/mm^2·sr	
Plasma stability**	3% RMS	

System Lifetime and Maintenance Requirements

Collector lifetime with degradation of 10% without using a special membrane filter in 24/7 mode of operation	not less than 2 months
Collector lifetime with degradation of 10% using a special membrane filter in 24/7 mode of operation	not less than 4 months
Maintenance time every 2 months	1 day
Uptime in 24/7 mode of operation***	1 months

Electrical Power, System Dimensions and Weight

Electrical power	10.5 kW
Dimensions (L×W×H)	1500×1000×1200 mm
Weight, including laser components	770Kg

Facility Requirements

Room cleanliness class	ISO7
Water flow rate	25 L/min

* : 1/e2

** : determined mainly by laser stability

***: with shutting off the EUV beam for 5mins every 2 weeks for membrane magazine replacement

For full-band (13.5nm ± 2%) conversion efficiency is 4%@2π, giving double brightness and double the collected EUV power

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WE MAKE LIGHT BRIGHTER™

ISTEQ B.V. is located in the High Tech Campus Eindhoven which is famous as the "**smartest km²**" in The Netherlands. The campus holds more than 125 companies and institutes with more than 10,000 researchers, developers and entrepreneurs working on developing future cutting edge technologies and products.

You are always welcome to contact ISTEQ for more information

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