Metrology for EUVL Sources

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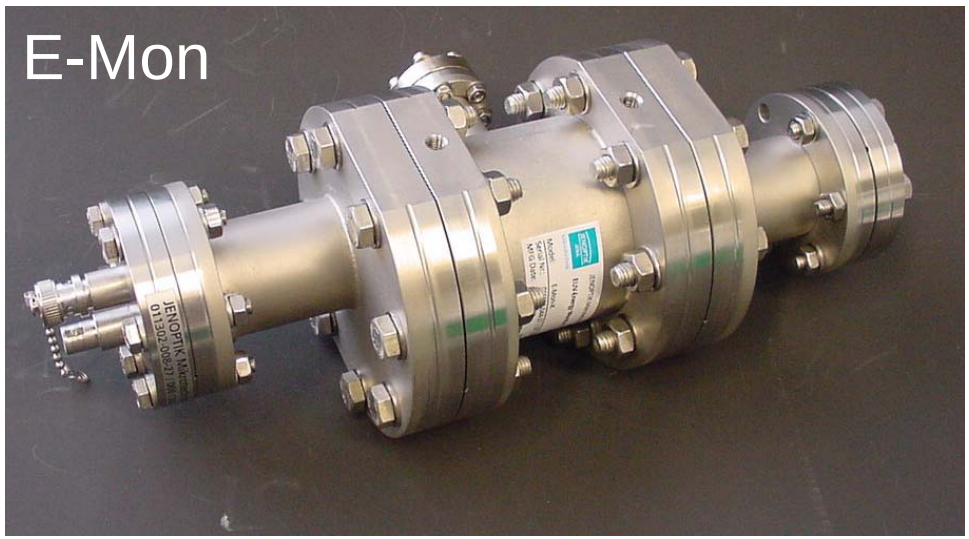
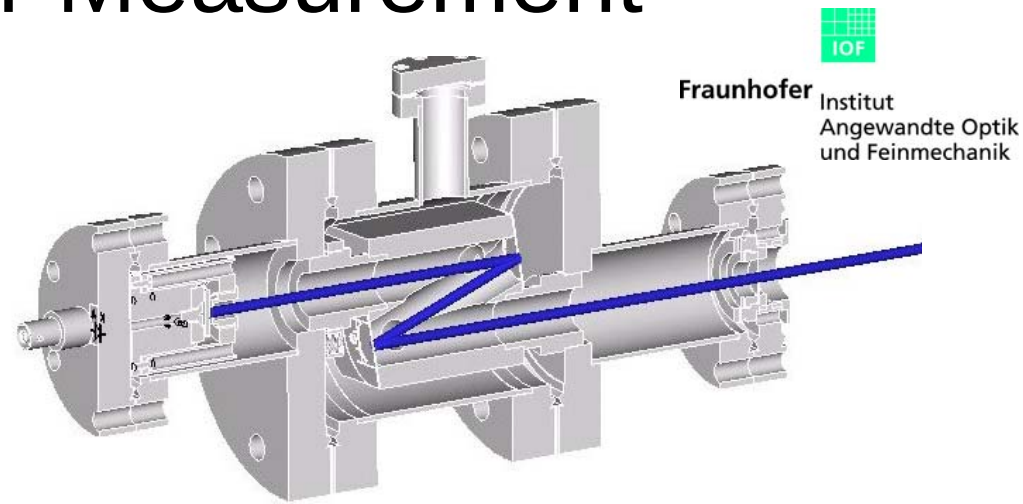
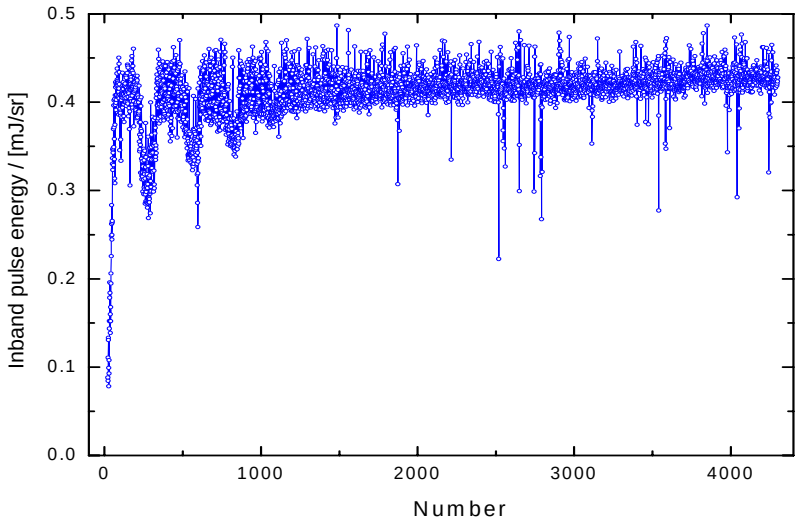
EUV Inband Power Measurement



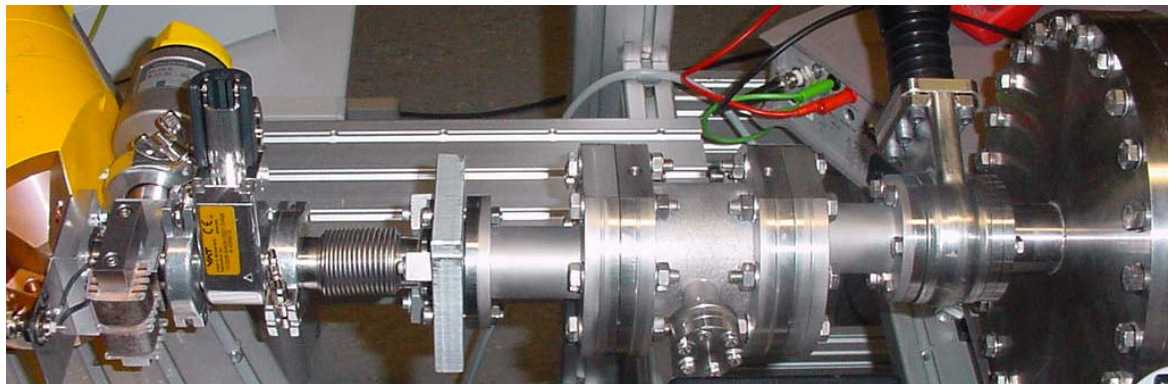


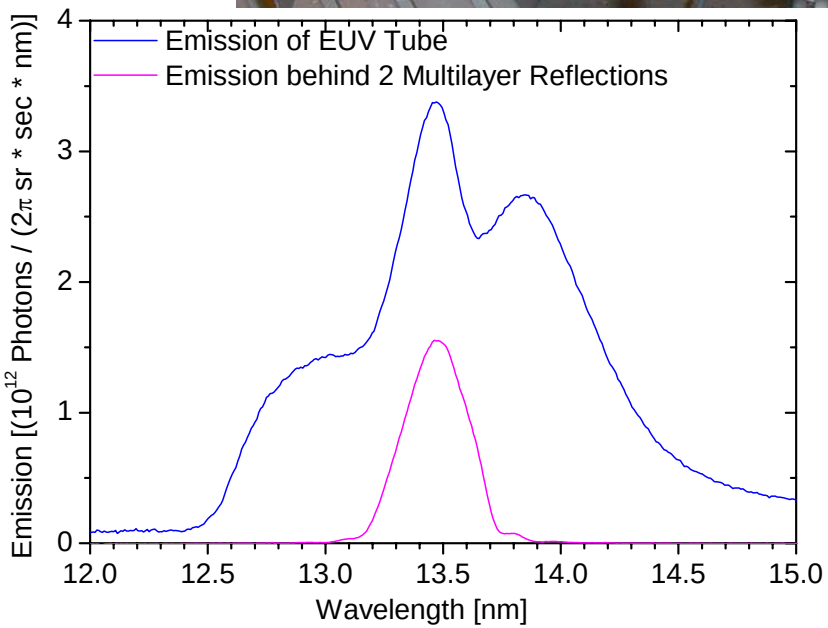
New design of filter flange.

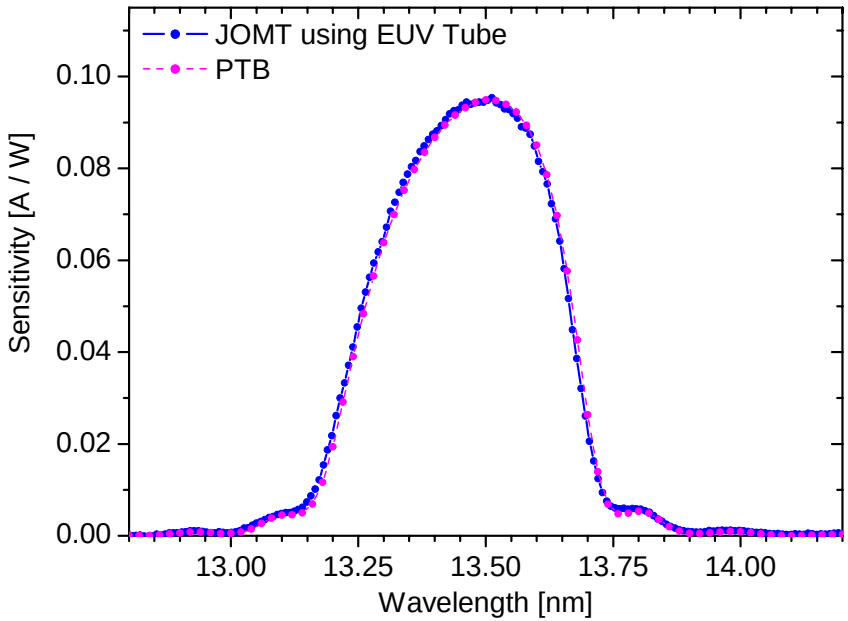
Hand-held analogous signal integration unit for fast data accumulation and analysis.



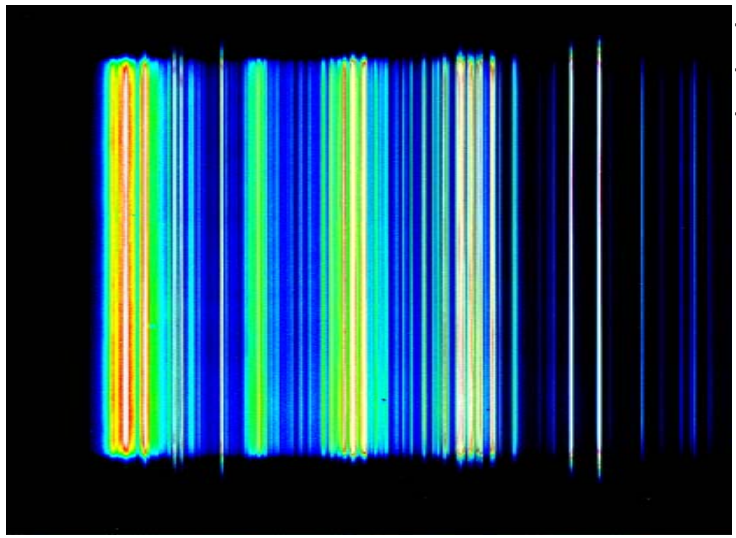
Improved Calibration Strategies



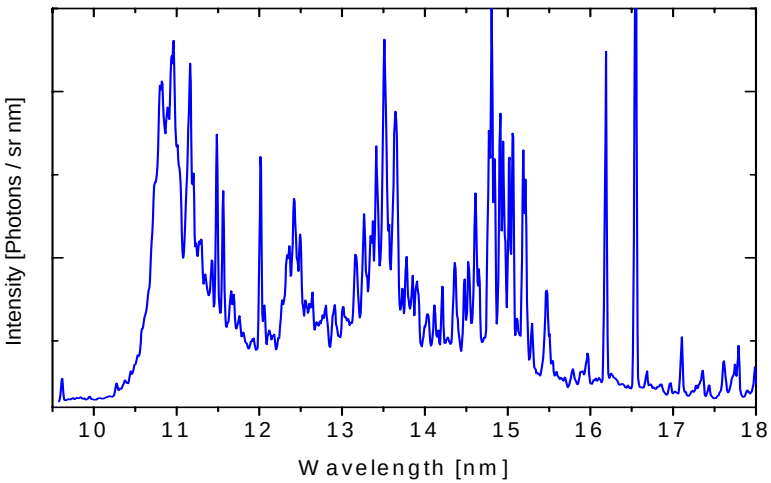


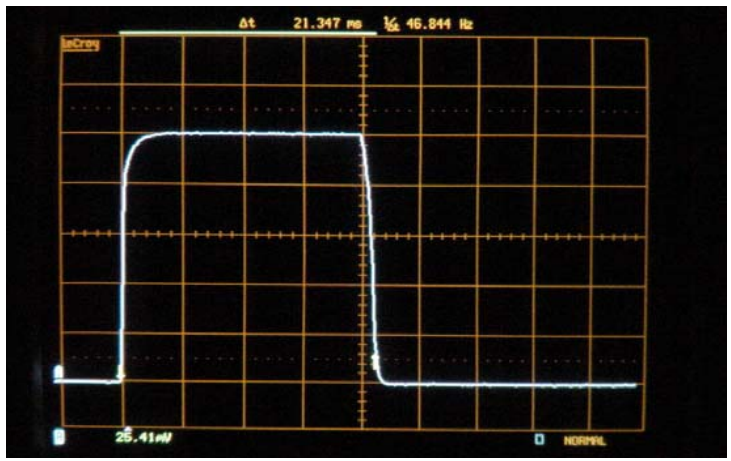


EUV Spectroscopy



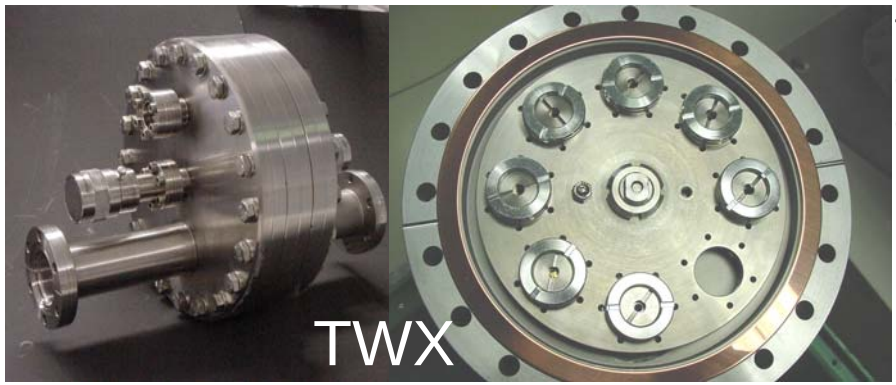
-High resolution
-High sensitivity
-Absolute calibration





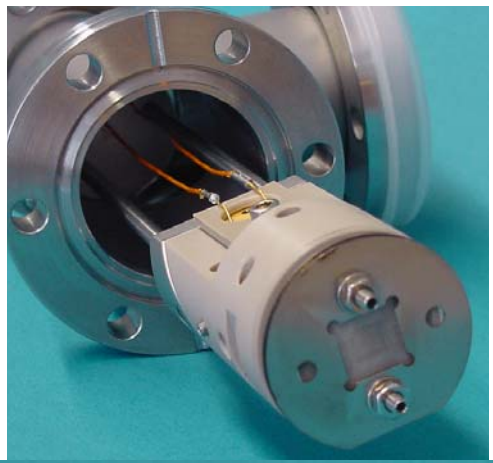
Enhanced shutter performance

Metrology Tools

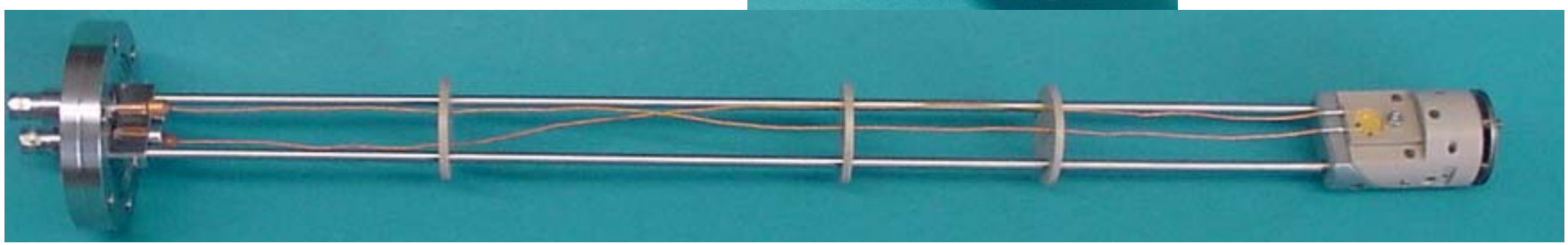


Tool wheel “TWX” for the change of in-beam components without breaking the vacuum.

Standardized filter mount.

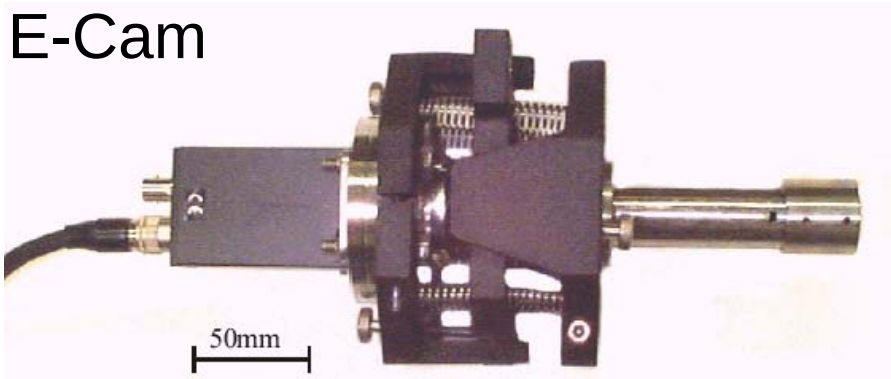


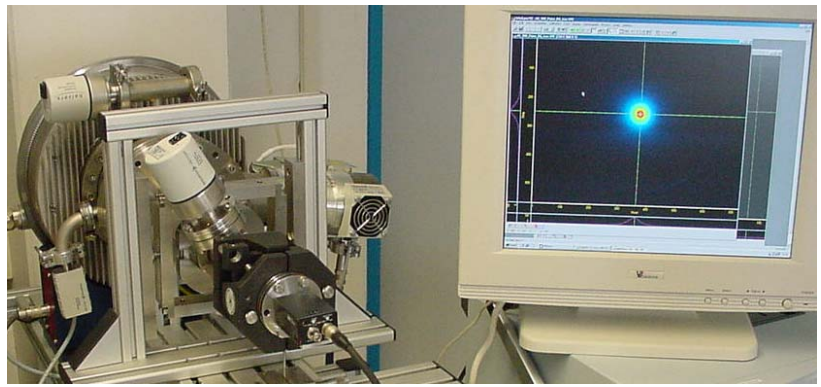
Mini inband energy monitor for flexible mounting.

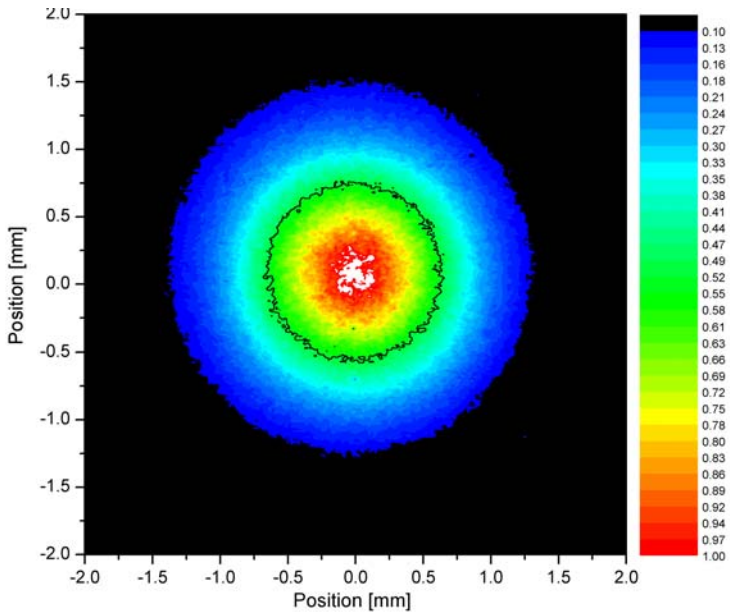


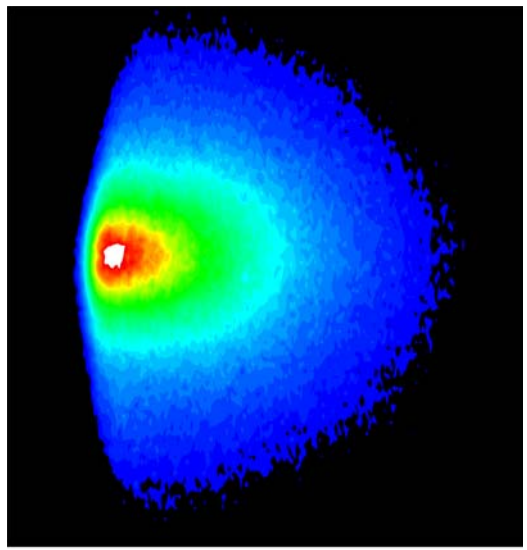
EUV Plasma Imaging

E-Cam

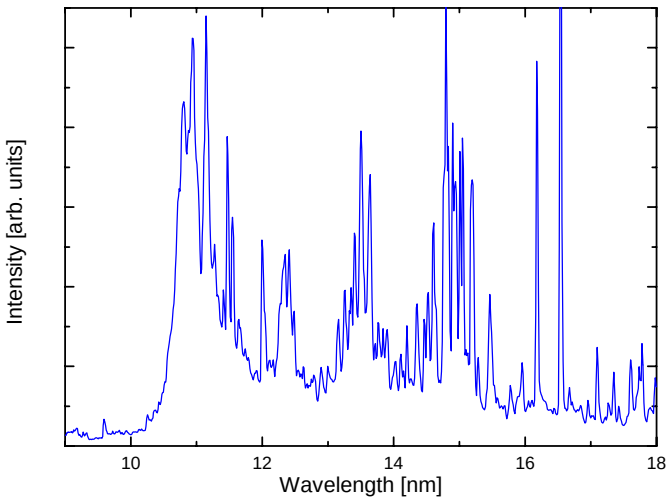


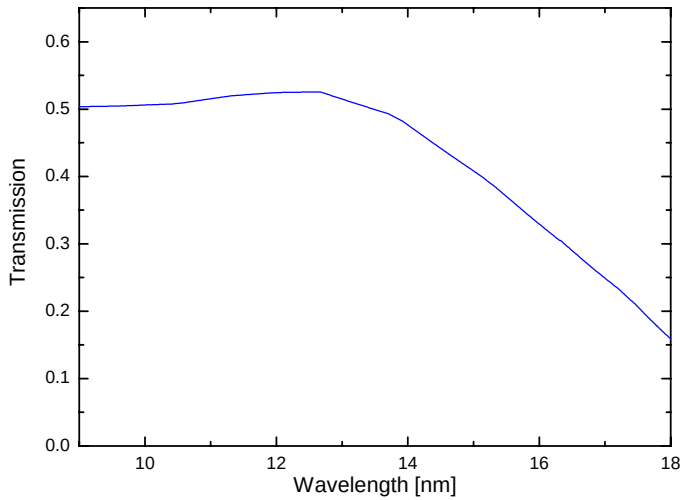


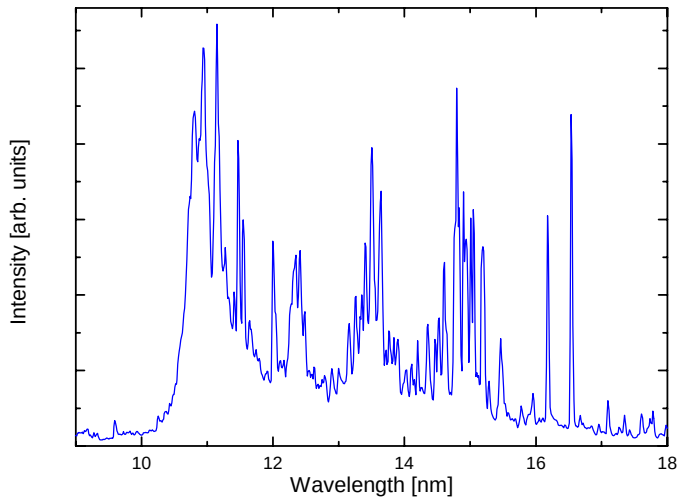




Inband vs. Broadband EUV

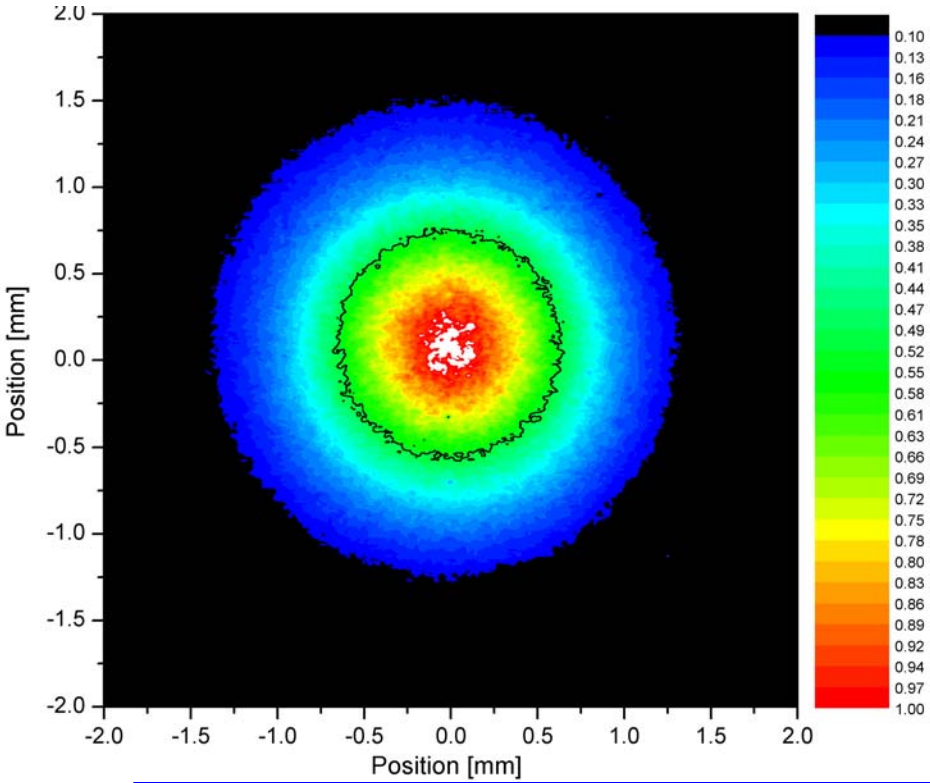


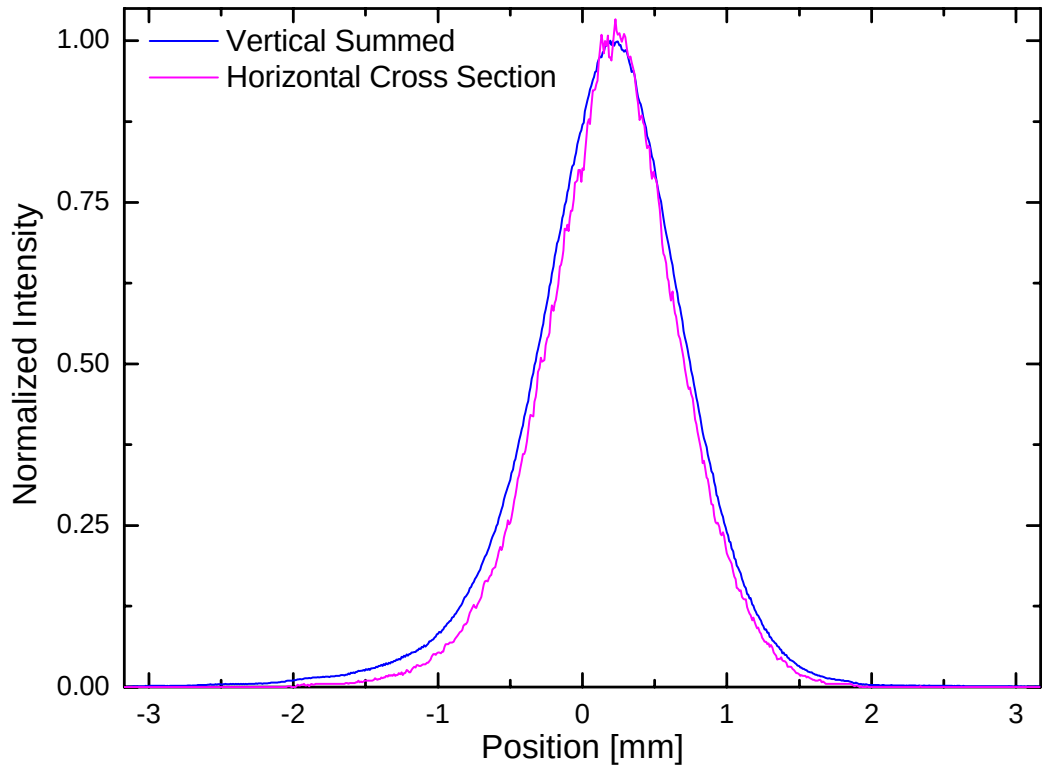




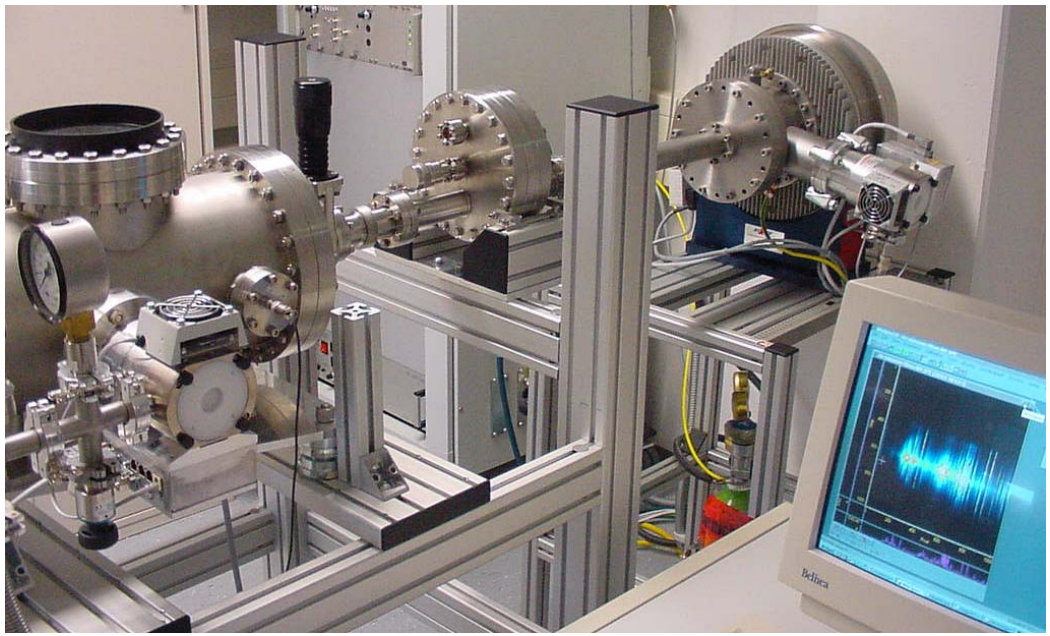
Spatial Intensity Distributions

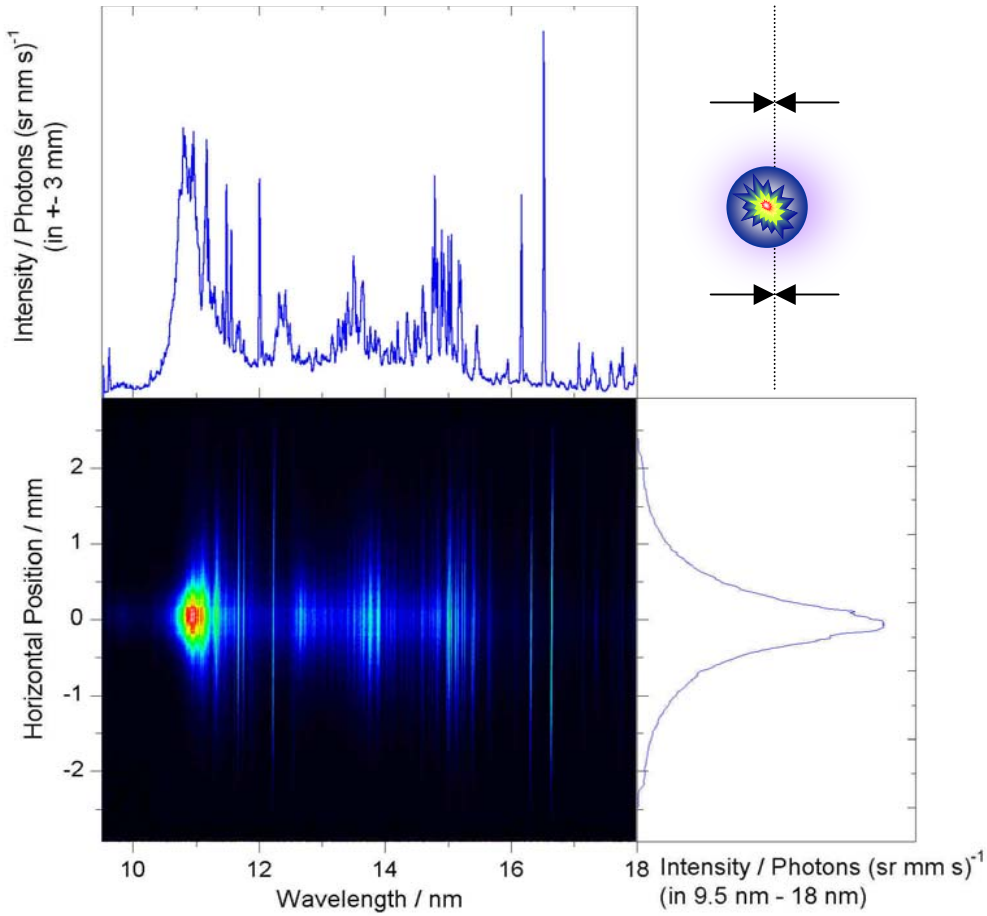
AIXUV´s GDPP Source



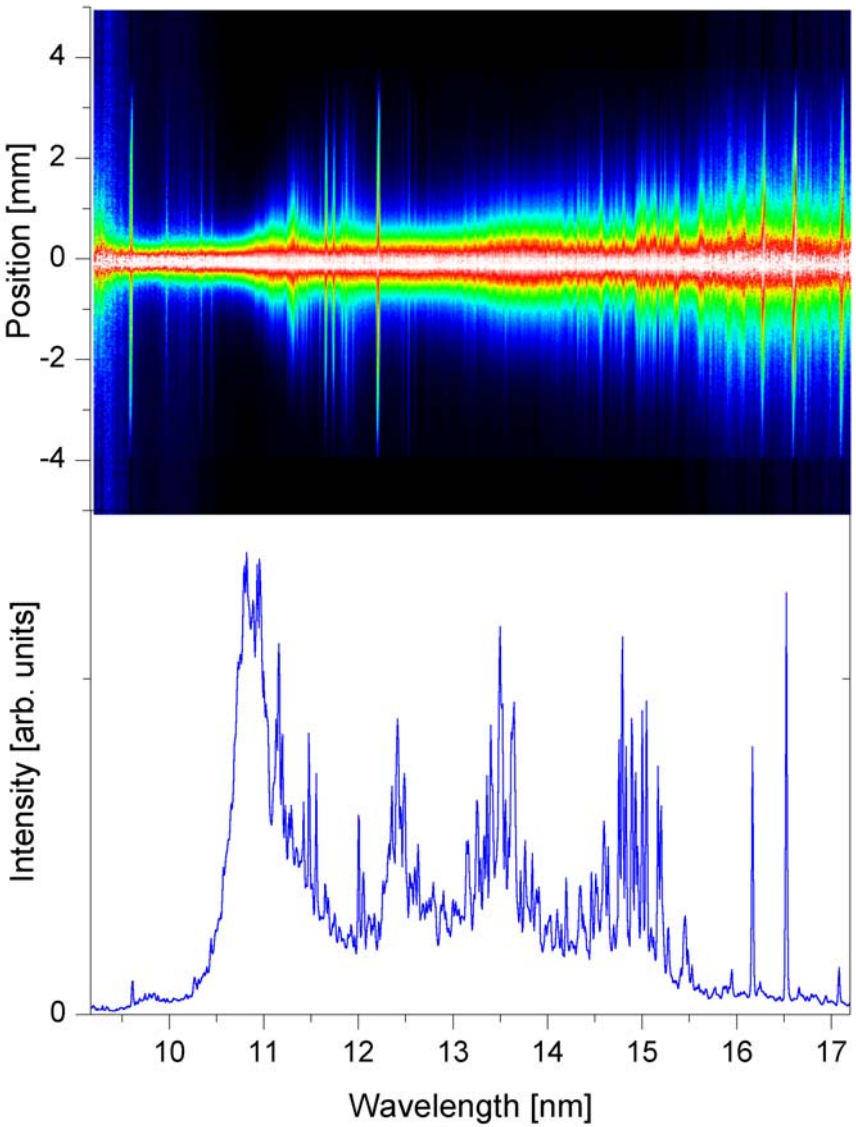


Spatial Resolved EUV spectroscopy

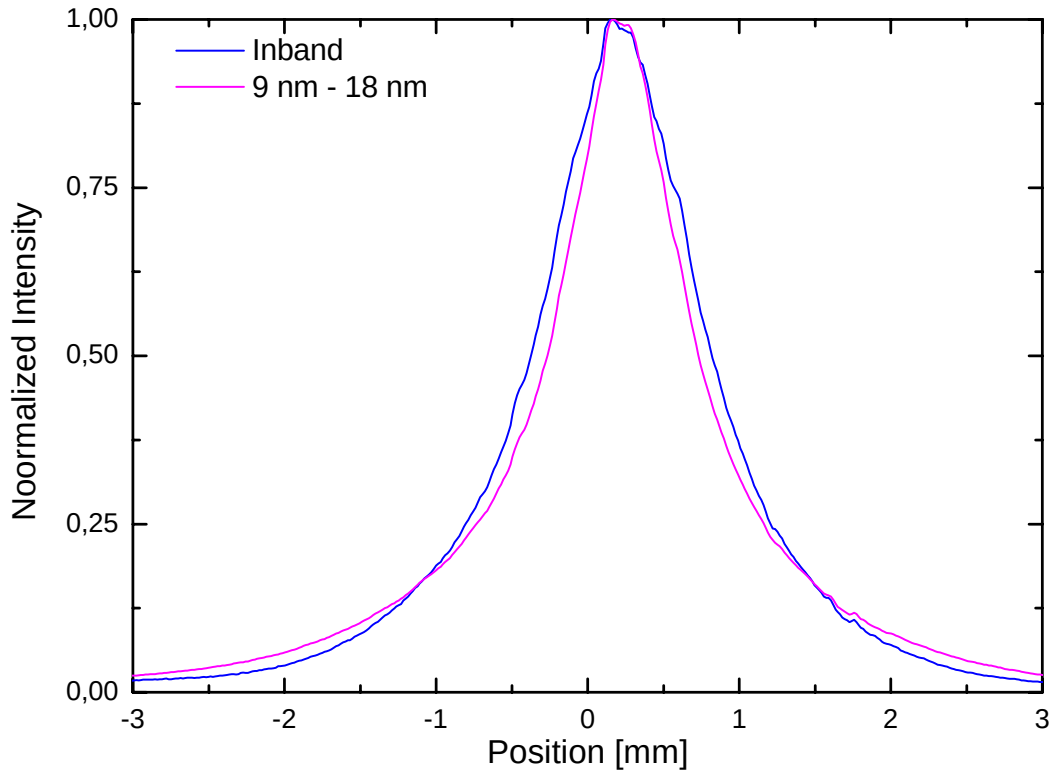




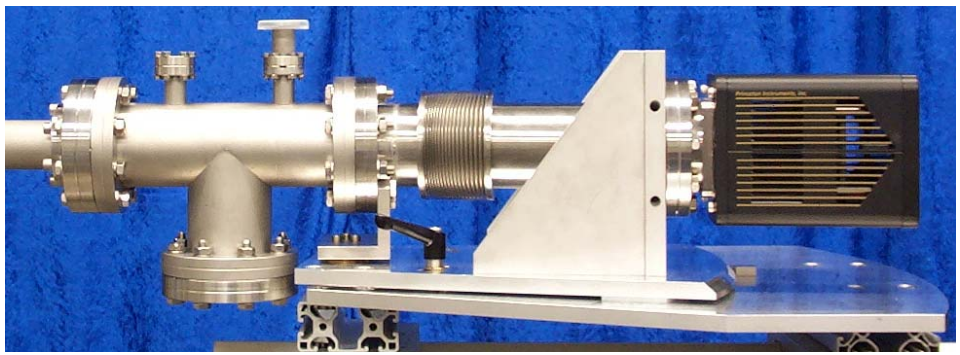
Inband vs. Out of Band EUV

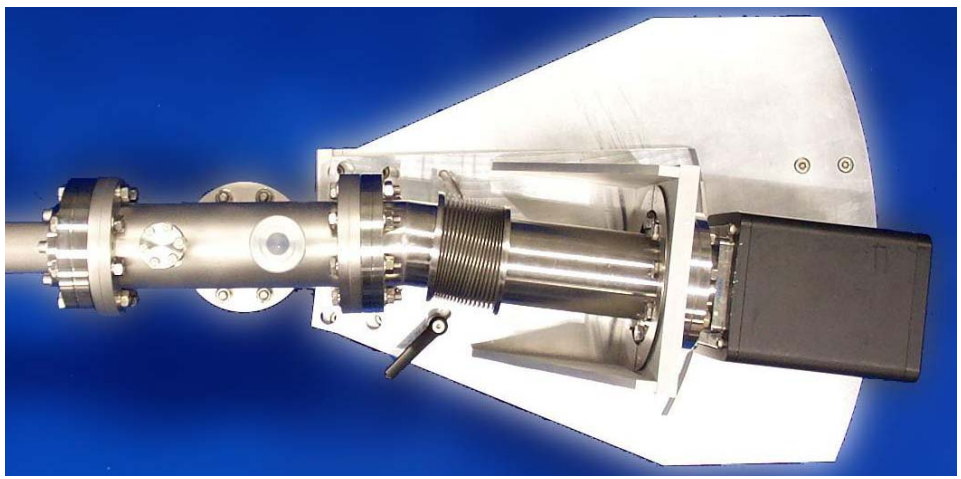


AIXUV´s GDPP Source

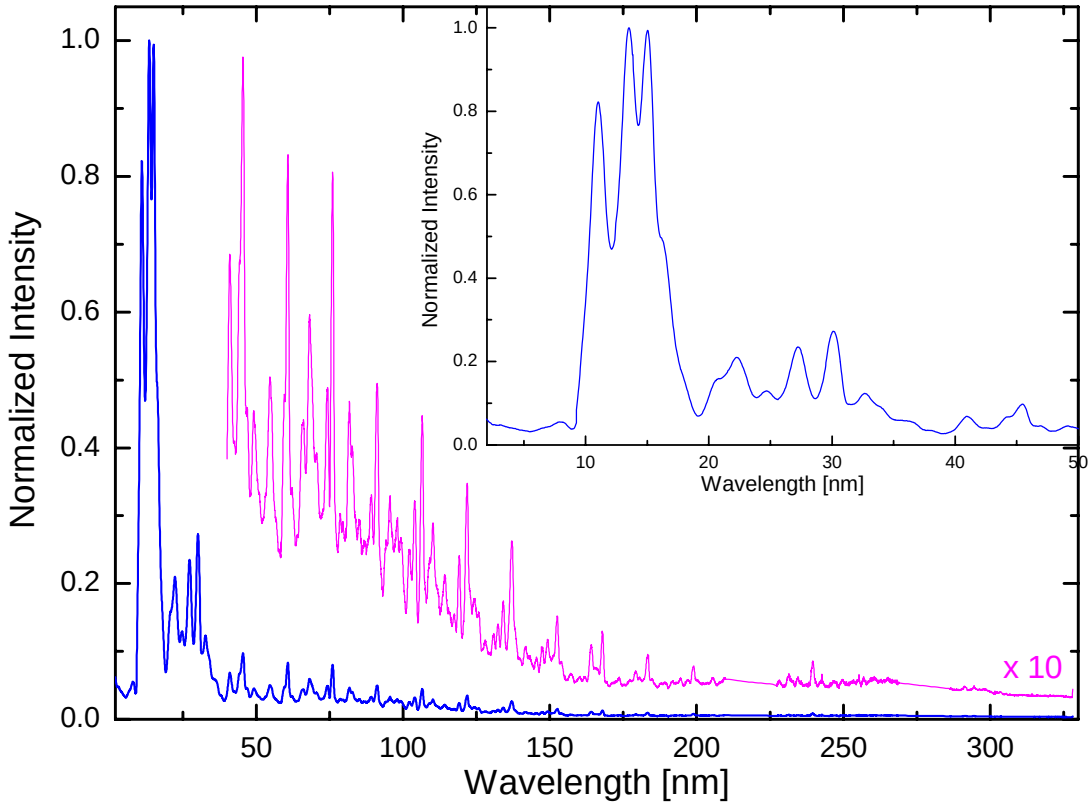


Transmission Grating Spectrograph



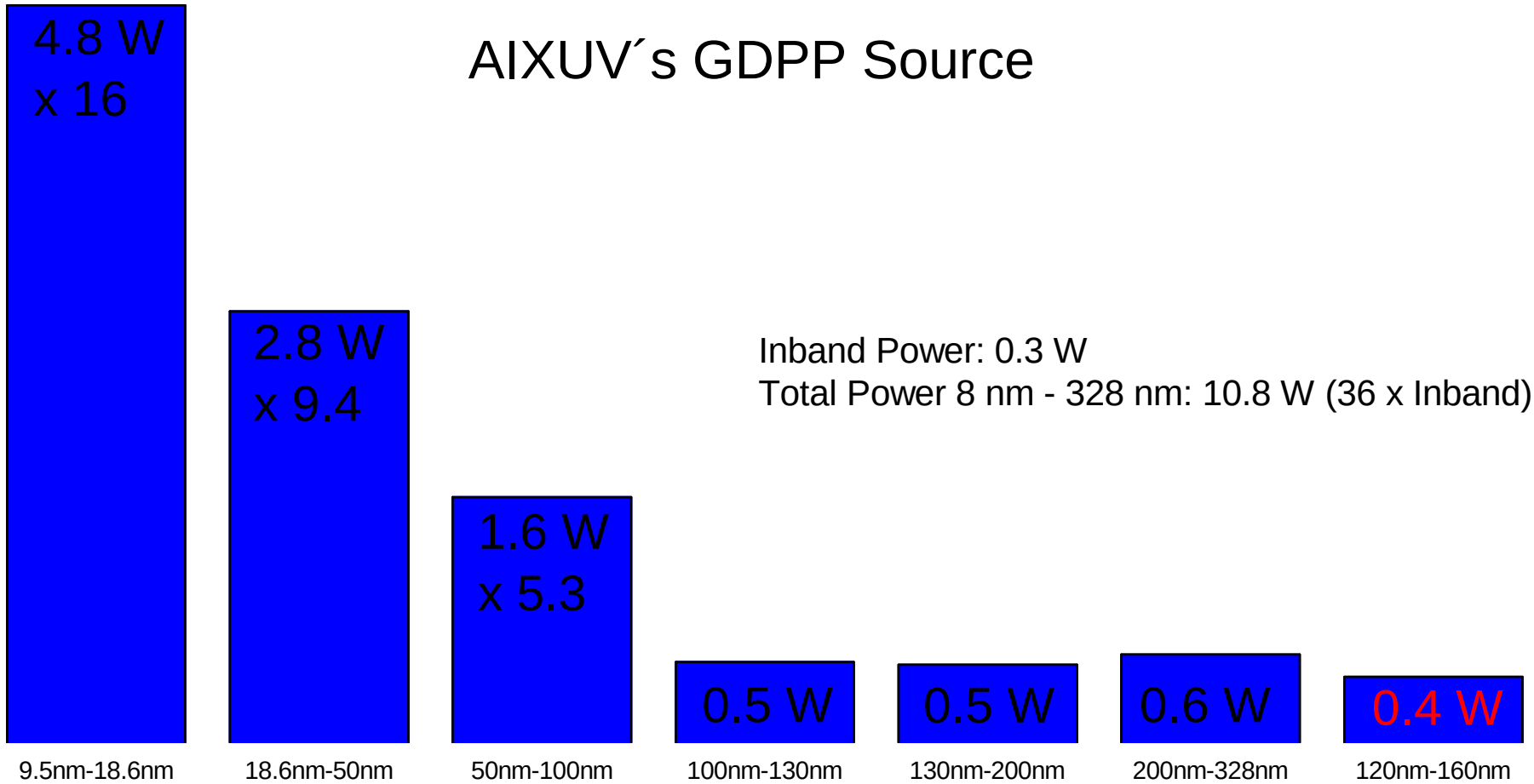


AIXUV´s GDPP Source



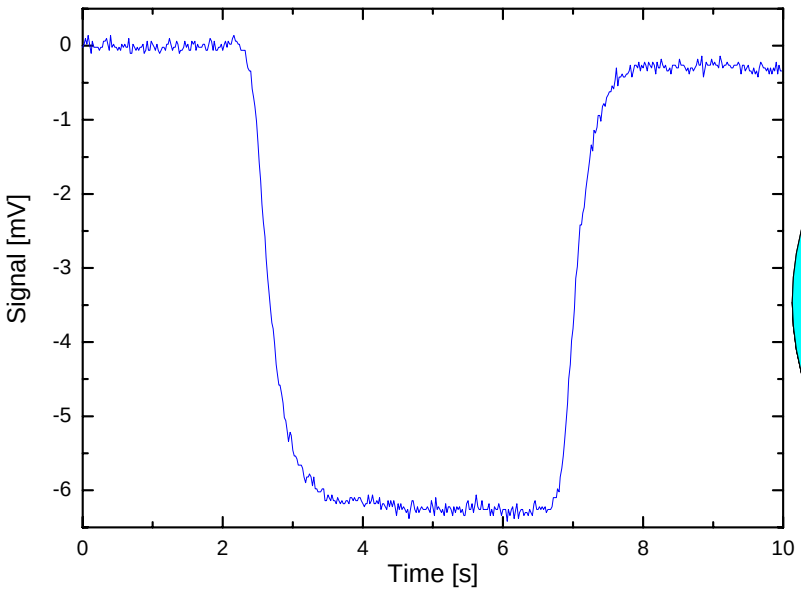
Spectral Power / 4πsr

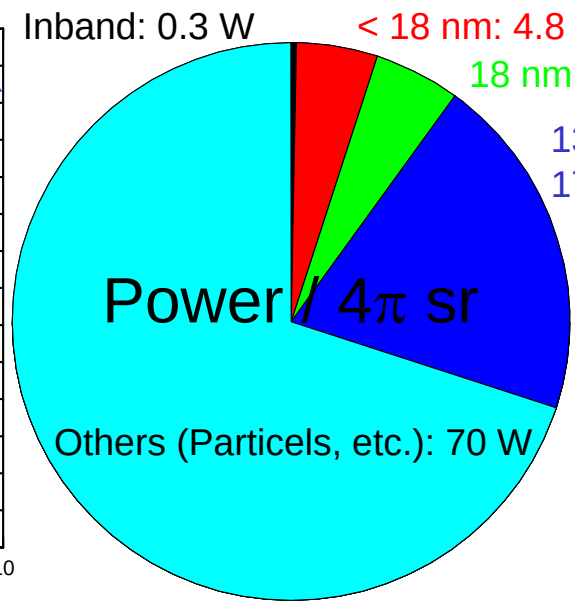
AIXUV´s GDPP Source



Inband Power: 0.3 W
Total Power 8 nm - 328 nm: 10.8 W (36 x Inband)

Thermal Detectors



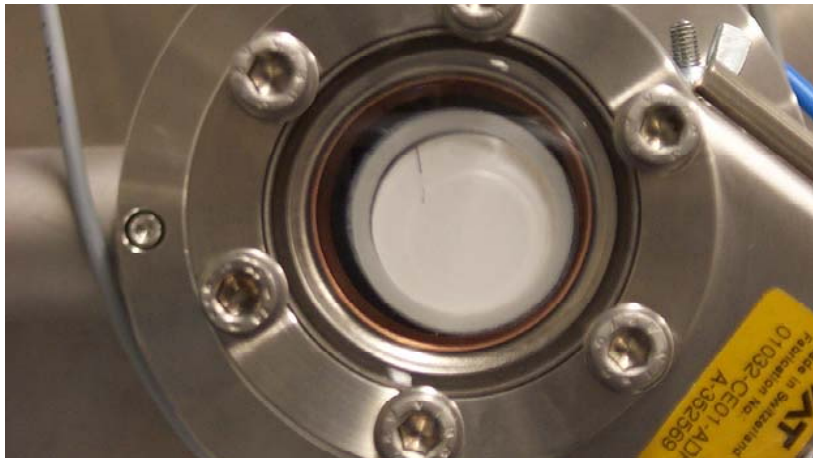


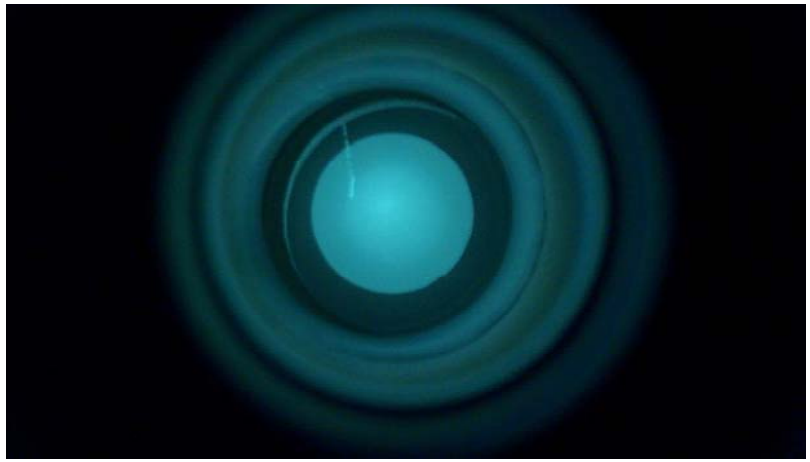
AIXUV´s GDPP Source

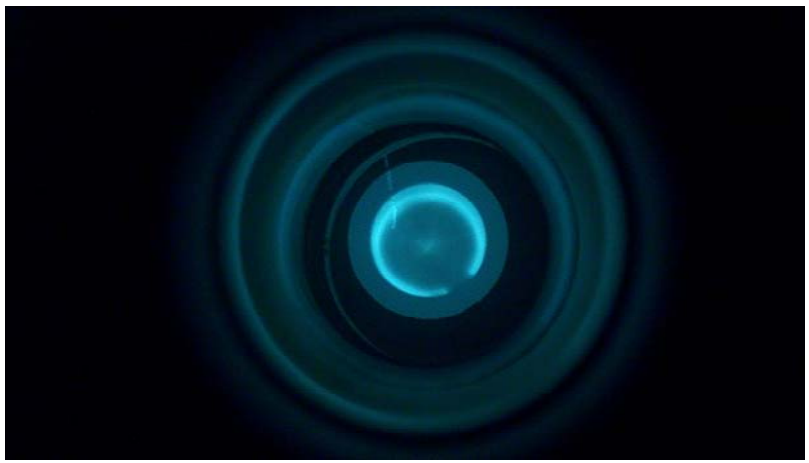
Source Electrical Input:100 W

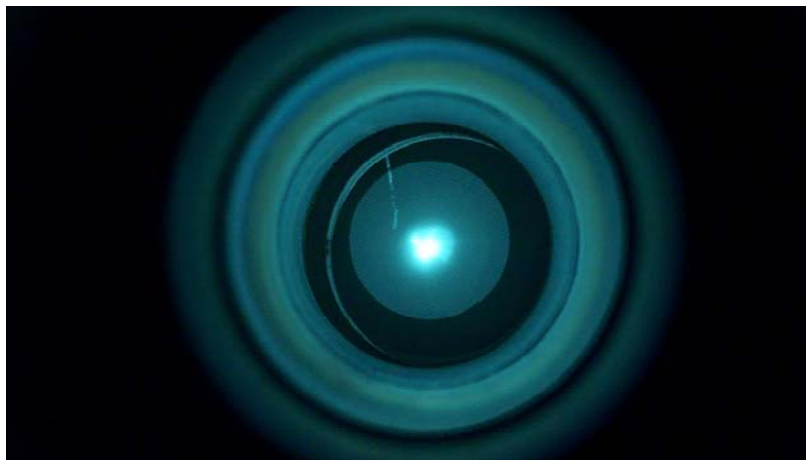
Measured with Thermal Detector (no Filter): 95 W

Quantum Converter Screens



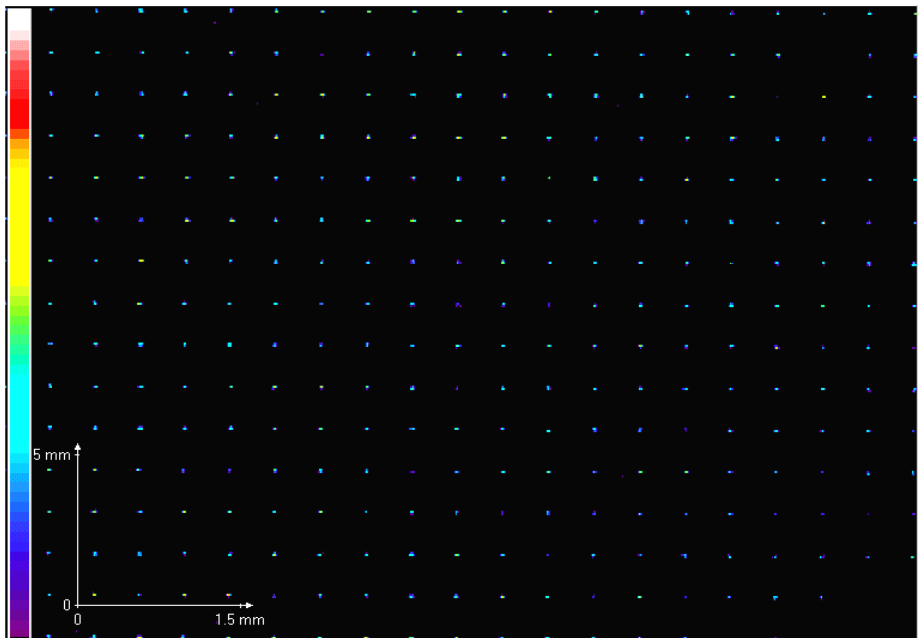


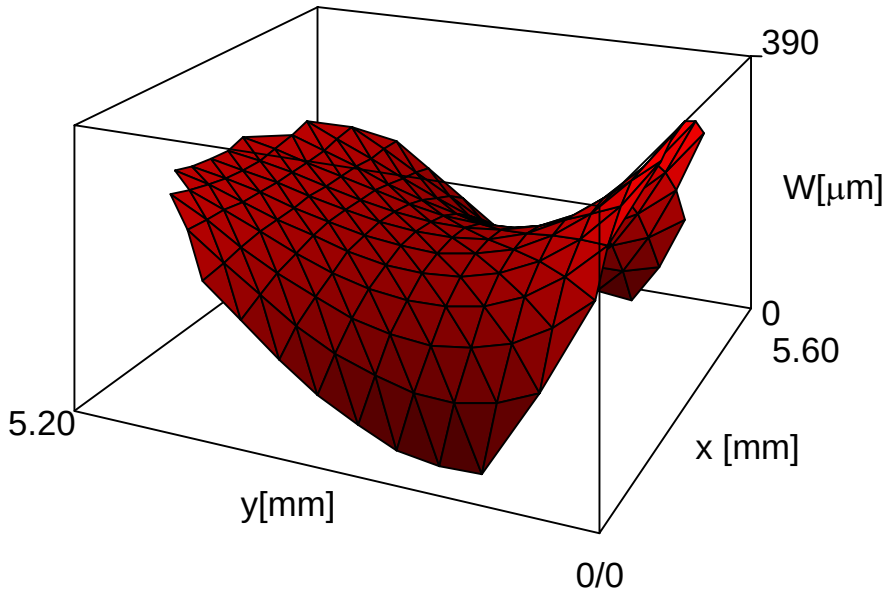




EUV Wavefront Measurement

Spot distribution after reflection from bent Mo/Si mirror (10 deg):





- EUV optics characterization
- on-line ´at wavelength´ monitoring
- Zernike analysis ⇒ optics adjustment
- High sensitivity: < λ/20 @13nm

Summary

Metrology for EUVL sources

Tools:

- Inband power
- EUV spectroscopy
- Out of band spectroscopy
- Plasma imaging
- Utilities

Concepts / Prototypes:

- Improved calibration strategies
- Debris
- Thermal sensors
- Quantum converter screens
- Wavefront measurement

Co-operation

Development of concepts and prototypes in general

Laser-Laboratorium Göttingen e.V.

Development of a EUV camera system
for pinhole imaging and Hartmann sensor

Consulting in analysis of metrology concepts
calibration of EUV components and tools

Development of concepts and prototypes
industrial upgrading of metrology tools, marketing of tools

Further co-operation in European and National EUVL programs

Acknowledgement

Bundesministerium für Bildung und Forschung (BMBF) 13N8133