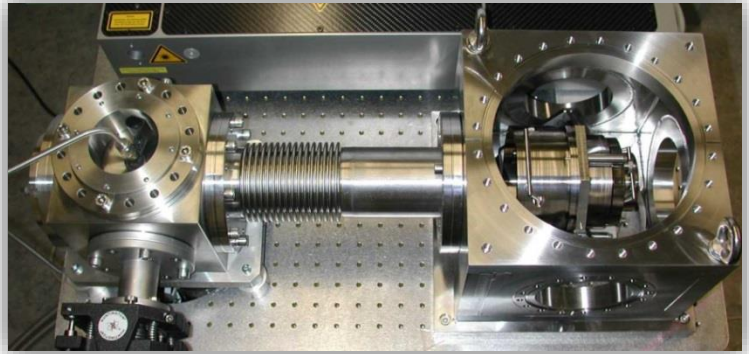
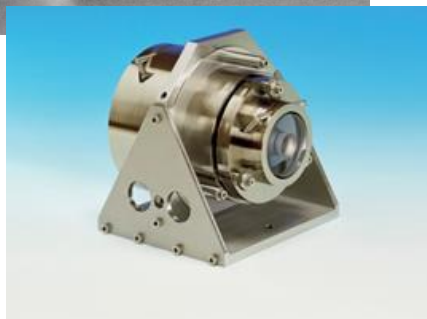


EUV Schwarzschild Objective

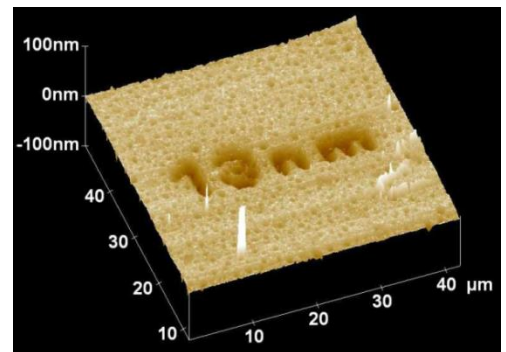
A modified Schwarzschild objective for 13.5nm radiation was designed and adapted to a table-top EUV source. The optics consist of two spherical ULE substrates mounted in a separate vacuum chamber, providing a numerical aperture of 0.4 and a demagnification factor of 10 with respect to the plasma source. The substrates were coated with high reflectivity Mo/Si multilayers @ $\lambda = 13.5$ nm.



With the help of this compact EUV source and optics system a focal spot with a diameter $< 30\mu\text{m}$ at energy densities of $\sim 100\text{mJ}/\text{cm}^2$ can be generated. Thus, using mask projection, direct structuring of different materials is possible. One example is the direct writing of color centers in LiF crystals with a spot size of $5\mu\text{m}$.

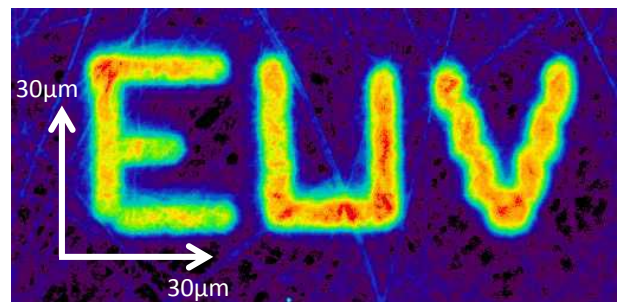


- ▶ Mo/Si multilayer mirrors
- ▶ Ablation of PMMA by focused EUV radiation



Specifications

- | | |
|-----------------------------------------------------|---------------------------------|
| ▶ Numerical aperture | 0.4 |
| ▶ Demagnification | 10x |
| ▶ Mo/Si multilayer coating
Reflectivity @ 13.5nm | >65% |
| ▶ Focus diameter | $< 30\mu\text{m}$ |
| ▶ Resolution | $< 200\text{nm}$ |
| ▶ EUV fluence | $\sim 100\text{mJ}/\text{cm}^2$ |



- ▶ Direct writing of color centers in LiF crystal by raster scanning an EUV spot ($5\mu\text{m}$ diameter)