

Irradiation systems for accelerated testing of EUVL components

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Fraunhofer ILT has been developing EUV sources for more than 2 decades. In collaboration with Philips and Ushio, ILT has contributed to the development of discharge-based sources, which have been operated in the first EUV lithography scanners for chip production.

Having the know-how on EUV sources and their implementation into optical system at hand, ILT has been developing multitude of applications in collaboration with RWTH Aachen University, e.g., EUV laboratory-scale lithography for patterning and resist testing with demonstrated resolution of 28 nm HP or EUV reflectometry for surface sensitive analysis.

The talk will focus on the **Fraunhofer high Irradiance Tool (FIT)** for testing of optical components. It is based on our proven FS5440 high power EUV source, whose emission is focused on a sample in controllable atmosphere. Using strong vacuum separation and particle mitigation, an extremely low operating pressure at the irradiation position can be achieved without pumping orifices in the vicinity the focal spot. Thus, clean, unbiased experimental conditions can be achieved. The expected performance of the FIT includes: EUV irradiance $>40 \text{ W/cm}^2$, angle of incidence on sample $<5^\circ$, spot diameter $>1.8 \text{ mm}$ and pulse repetition rate up to 2.5 kHz. The design of the system allows multiplexing to reach 10 kHz and a higher power on sample. An updated design and new results based on optical and gas-flow simulations will be presented.