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Requirements and prospects of next generation Extreme Ultraviolet Sources for Lithography Applications

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Change of paradigm in the approach to EUV generation and a shift from Xe as an EUV production medium to alternative fuels allowed for new high output efficiency and high thermal load schemes to enter the market of EUV sources for lithography application. Based on the occurred shift multiple source vendors and research institutions dealing with EUV lithography demonstrated last years a strong rise in performance of EUV sources.

The fact that new approaches allow to meet the first Alpha Demo Tool (ADT) requirements around 10~20 Watt @ Intermediate Focus (for 5 mJ/cm^2) is already a fact of the day. It seems that the scalability of the sources to a 100 W level is also feasible.

However it also becomes clear that with Extreme Ultraviolet Lithography (EUVL) being scaled down further to the smaller CD's the resist sensitivity might also become less sensitive (180 @ IF for 10 mJ/cm^2 target for production tools has already been set by ASML). Furthermore EUVL has to be competitive with respect to the established technologies, which are steadily improving their productivity.
These facts call for the continuous increase in the EUV source performance for high volume manufacturing tools. New approaches to already existing technology are being investigated.

Furthermore the key issues, associated with the EUV source development and integration of it into the system such as, lifetime of components and lifetime of the adjacent optical system need close attention and constant monitoring.

Latest insights in requirements for process development tools and production tools will be given and the related source requirements and specifications will be revisited.

Results of an experimental and theoretical study on the source and debris mitigation scaling possibilities will be discussed and potential pathway to meet the increasing requirements will be identified.