Towards a contamination-tolerant EUV power sensor

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A reproducible measurement of in-band EUV power over time is essential in EUV lithography, e.g. for dose control, monitoring the transmission of (parts of) the optical path and detecting changes in EUV source performance. However, all currently available sensors suffer from sensitivity degradation over time due to photon-induced contamination and/or structural degradation. For instance, a carbon layer on a sensor surface, as may be deposited during exposure to EUV, inhibits detection of a significant fraction of the EUV power.

To avoid a change of sensor response over time, TNO is developing a carbon-contamination-insensitive EUV power sensor that can operate under typical EUV scanner vacuum conditions. The sensor uses the photo-electric effect to distinguish between in- and out-of-band EUV. The sensor has been tested in the EUV beam line at TNO using a Xe EUV source. Here, we present the latest experimental results, showing the time-resolved response of the sensor to the EUV pulse.