Measurements of EUV Radiation at the Intermediate Focus

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Introduction
Our goal is to provide a comprehensive set of intermediate focus (IF) measurements for the characterization of EUV sources. Here, we review the conditions and candidate arrangements for measurements at the IF and give estimates of the achievable measurement accuracy. In addition, we provide a description of the methodology combined with the use of IF measurement chamber on an LPP source with a 4.1 cm collector mirror.

Parameters, Methods and Accuracy of IF Measurements

- EUV monitors to be carried out in a chamber behind the IF
- EUV monitors and mirrors have to be inserted into the beam path
- A gas barrier can be used to provide contamination isolation
- Source chamber design with gas barrier capabilities
- Tool and measurement parameters are discussed

Use of Thermal Power Meter at High Rep. Rates
- A residual gas analyzer (RGA) with differential pumping connected to the IF chamber via an orifice used to monitor contaminants.
- ML/UV witness plates can be mounted behind the IF aperture to record particle debris. After exposure for a given number of pulses the witness plates will be examined by a surface analysis technique.

Filter-based Measurements for Out-of-Band Regions
- Two rotating filter wheels in sequence, each with 8 positions for filters, allowing measurements with a photodiode detector also for combinations of two filters.

IF Measurement Chamber Allows Rotation for Angular Distribution Measurements
- A set of IF measurements is proposed
- Chambers and contamination reduction techniques were installed

Conclusions
- IF measurement techniques are developed and presented for EUV light collected from an LPP source
- A set of IF measurements is proposed

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