

# Characterization of grazing incidence collectors under near production conditions

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## Introduction

- test of collector cooling capability at real EUV source
- test of optical performance in the EUV under heat load
- check of simulation and pretest for extrapolation to HVM conditions

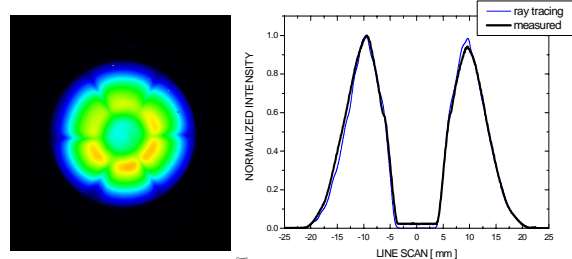
## Test stand



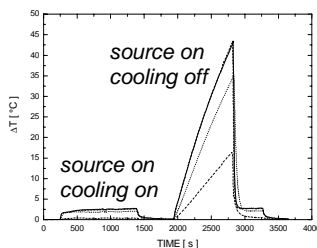
## Experimental Set-up

- Xenon pinch plasma source as first step to later Tin source
- Operation at different input powers up to 5 kW
- Double shell grazing incidence collector with thermocouples at entrance and exit
- Inband Screen for recording of far field images
- Operation with different water flows
- Thermocouples for cooling water inlet and outlet

## Far Field Images

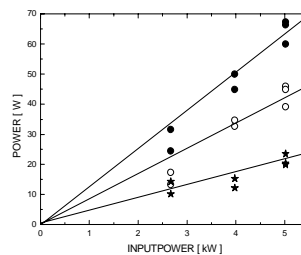


## Typical Test Run



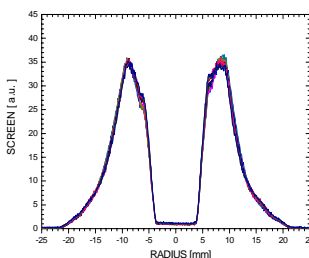
- temperature difference to cooling water inlet
- operation at 5 kW input power
- operation in steady state and without collector cooling

## Power Distribution



- cooling power for 2 shell collector (total and distribution to each shell)
- power distribution in agreement with solid angles of shells

## Stability of Far Field Images



- scans across far field images for test run with temperature increase of 40°C
- standard deviation less than 2% independent on collector temperature

## Conclusions

- maximum temperature increase of 5°C for input power of 5 kW with real plasma source
- no significant change of IF distribution for higher temperatures up to 40°C expected as HVM conditions

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**PHILIPS**



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