

# Grazing Incidence EUV Reflectometer using a Xenon Pinch Plasma Source

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## Goals

- availability of compact, in-house diagnostics
- study of source-collector interaction
- fast access to reflectivity data
- additional diagnostics to SEM, AFM, XRF
- availability of at-wavelength diagnostics
- diagnostics for flat and bent samples

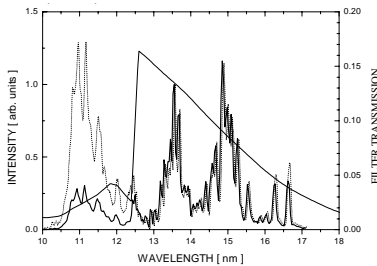
## Experimental Set-up



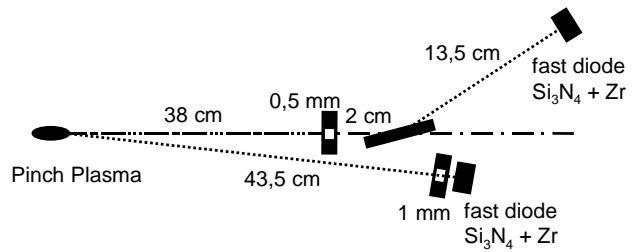
Hollow Cathode Triggered  
Pinch Plasma Source

Working Gas : Xenon  
 Pulse Energy : 2,5 J  
 Rep. Rate : 15 Hz  
 number of pulses  
 for data point : 96

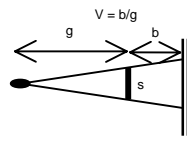
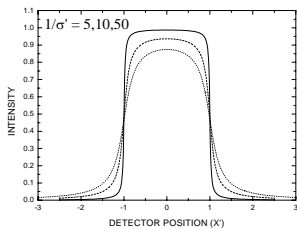
## Emission Spectrum



## Optical Path



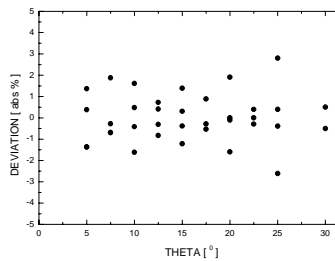
## Design Criteria



$$x' = x / \frac{s}{2} (1 + V)$$

$$\sigma' = \frac{2\sigma}{s} \frac{V}{1 + V}$$

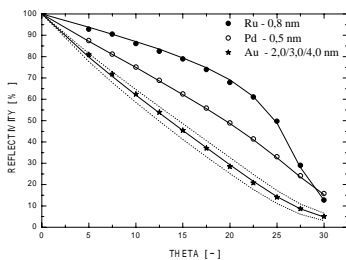
## Reproducibility



repeated measurement  
of the same sample  
(deviation from average)

Diode aperture/sample have to be fully illuminated !

## Different Elements



- Fit of reflectivity using CXRO atomic data
- Fresnel Formular for unpolarised light
- influence of roughness,  $\sigma$ , considered by Nevot Croce approach

## Summary

- standard deviation of single diode signals : 0,8 %
- standard deviation for ratio of diode signals : 0,4 %
- accuracy of 1-2 % for absolute reflectivity (proven by comparison to PTB measurement)

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