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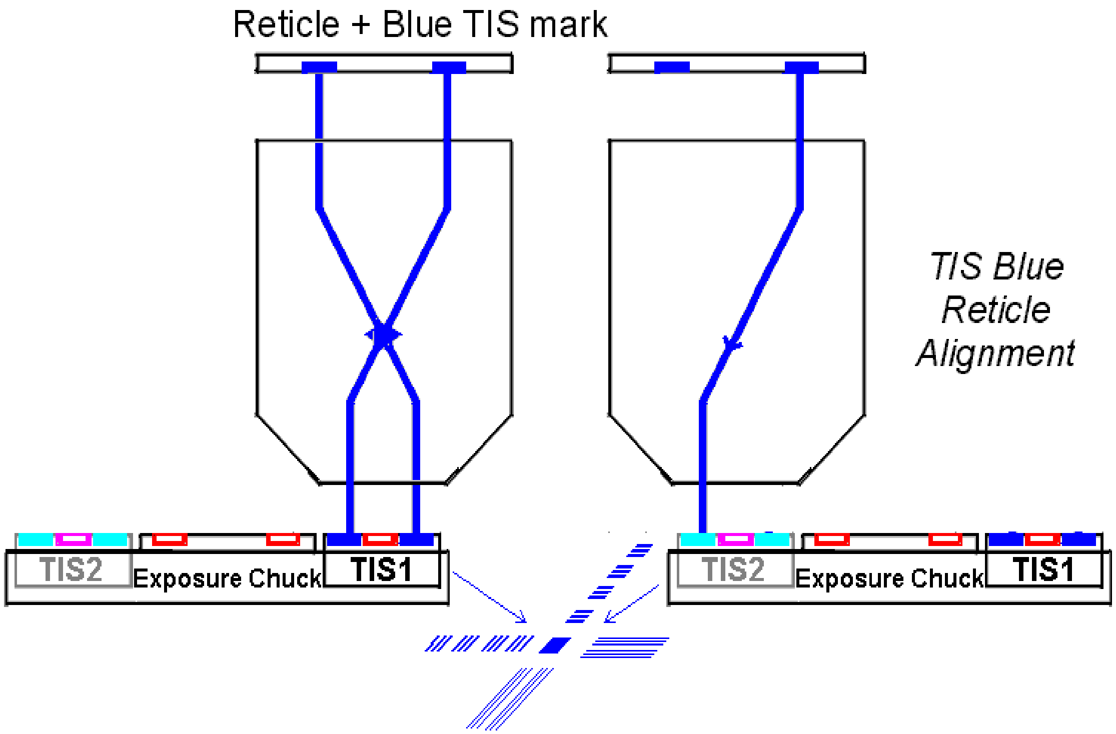
Goal

- Show the ASML basic mark types
- Explain their usage
- Show the ASML segmented marks

Contents

- Review alignment TIS, AA and TTL
- Basic mark types
  - TIS
  - PM
  - XPA
  - SPM
  - XPA-scribelane marks
- Segmentations
- Special marks
- Summary and Glossary of terms

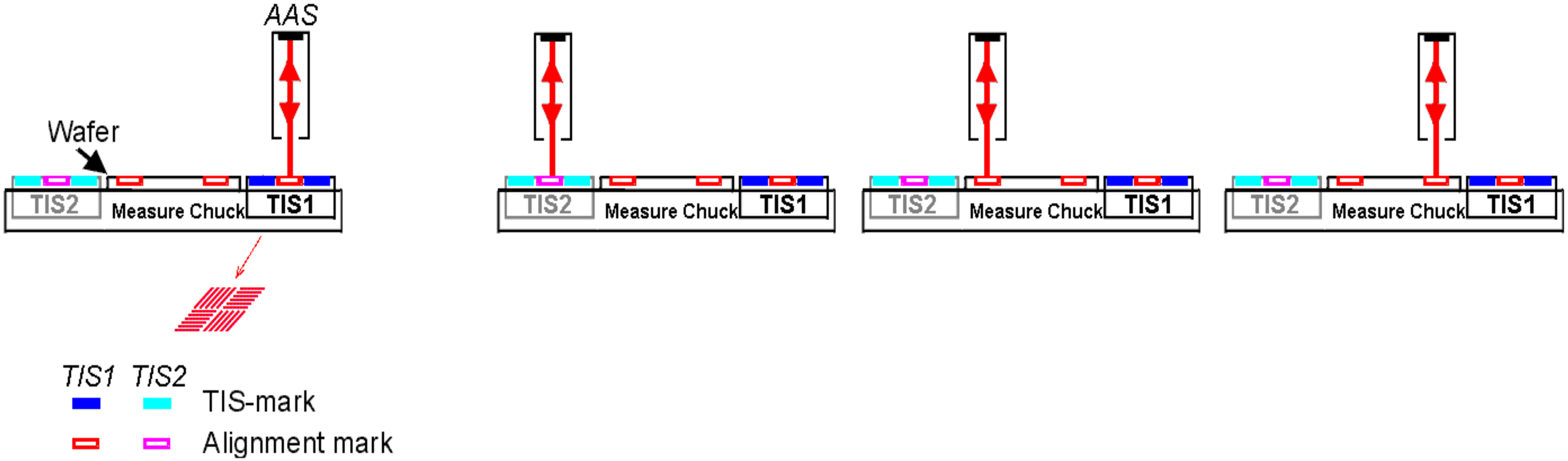
Reticle Alignment on AT systems



TIS Blue Reticle Alignment

Wafer Alignment on AT systems

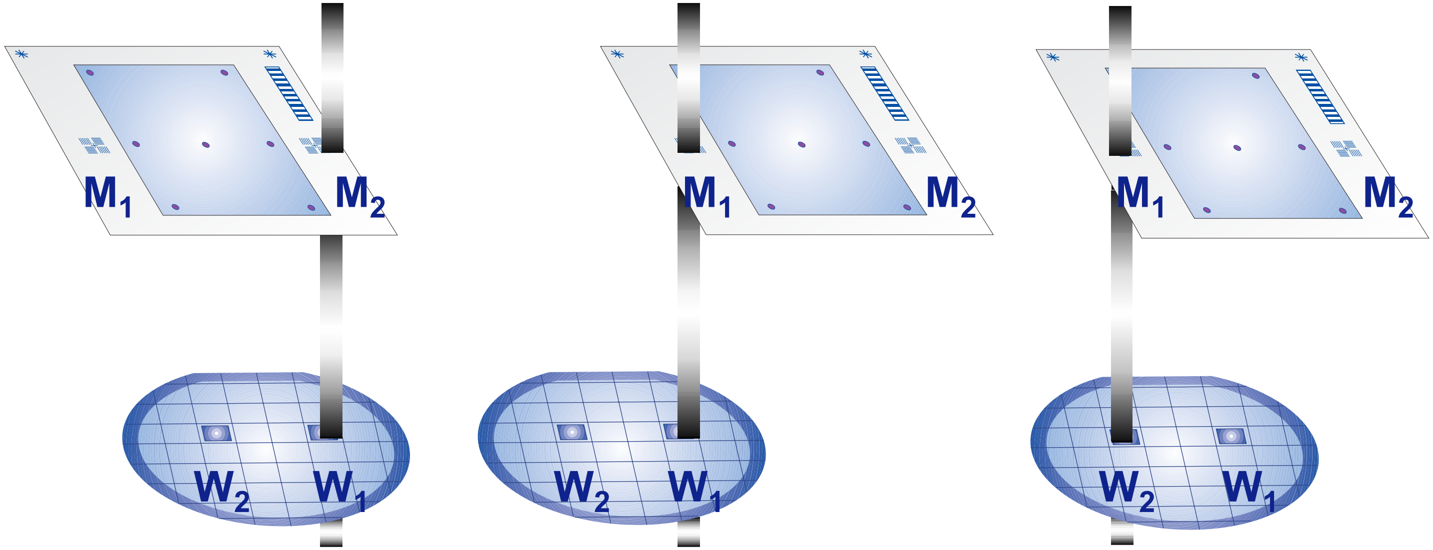
AT-T:



Alignment on TTL systems

Reticle alignment

Wafer alignment with TTL,
OA also possible.



$W_1 \rightarrow M_2$

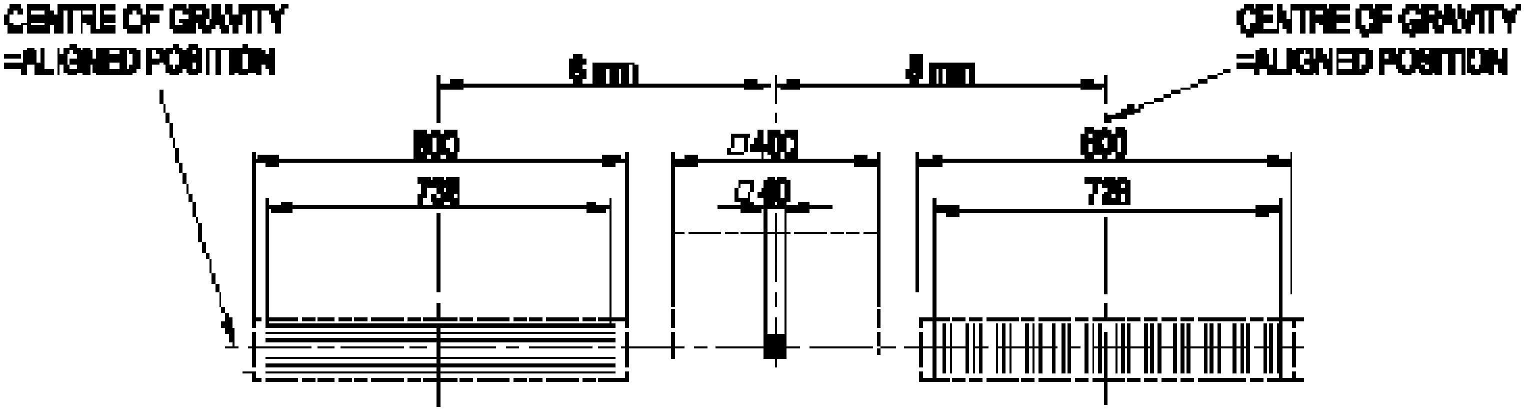
$W_1 \rightarrow M_1$

$W_2 \rightarrow M_1$

Basic mark types

- There are several ASML basic types:
  - Transmission Image Sensor mark (TIS)
  - Primary Mark (PM)
  - eXtended Pattern Area mark (XPA)
  - Scribelane Primary Mark (SPM)
  - XPA scribelane marks
  - Segmented versions
  - Small SPM (SSPM)
  - Versatile SPM (VSPM)

Transmission Image Sensor mark



- Used for reticle alignment
- X and Y gratings
- Also gives Z-position

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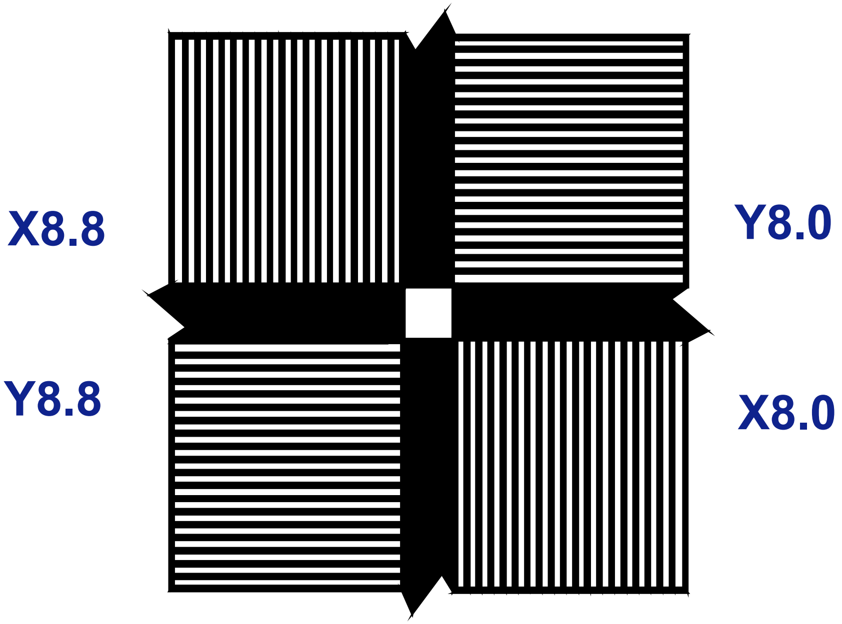
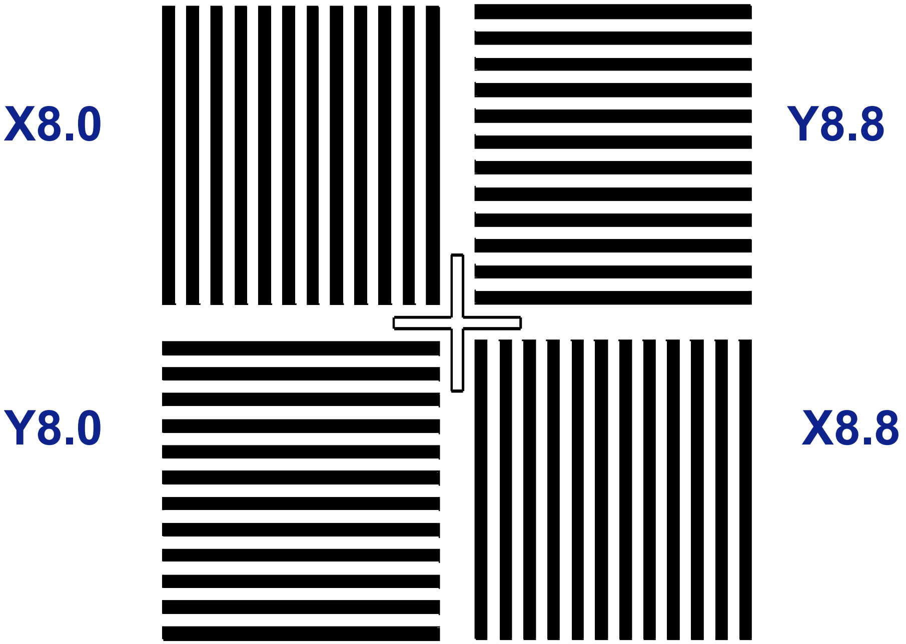
Reticle mark (RM)



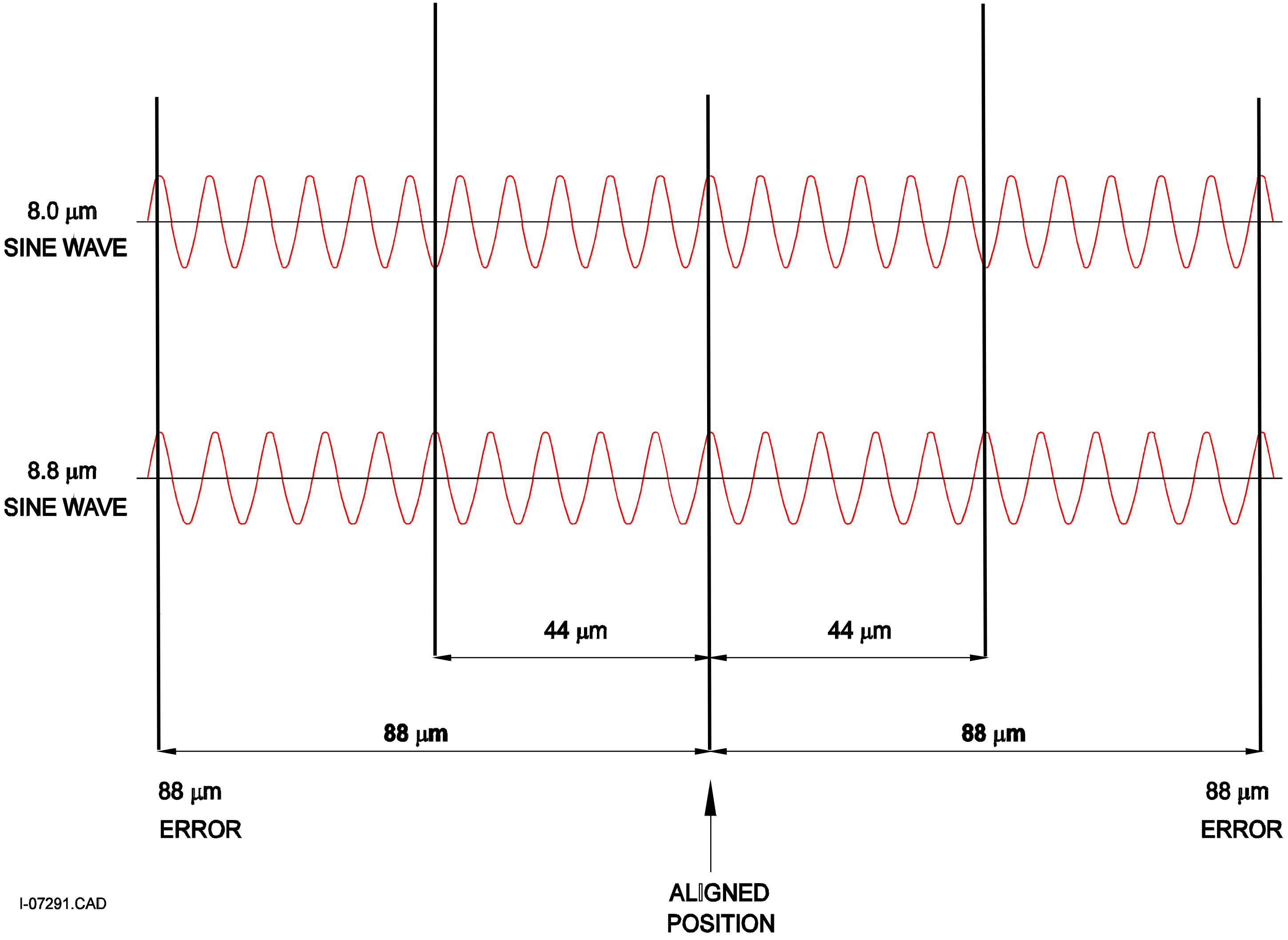
Reticle Alignment Mark (K1, K2) for TTL systems

Primary Mark



- •Primary Mark, PM
- •Capture range 88 micrometer
- •X and Y gratings
- •Suitable for optical pre-alignment

Capture range 88 micrometer



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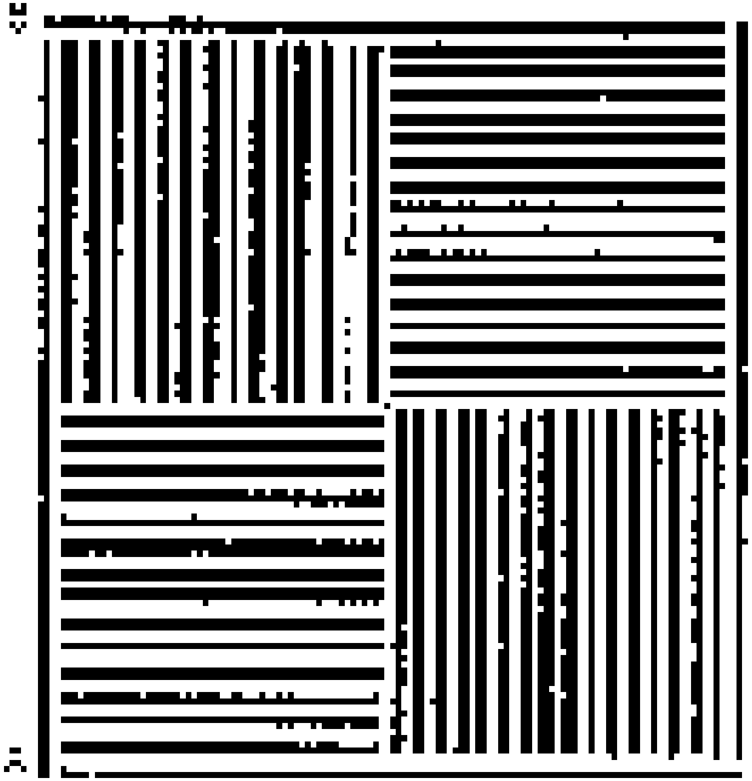
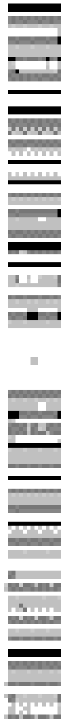
eXtended Pattern Area mark



- eXtended Pattern Area (XPA)
- Capture range 88 micrometer
- X and Y gratings
- Suitable for optical pre-alignment

Sribelane Primary Mark

SPM-X



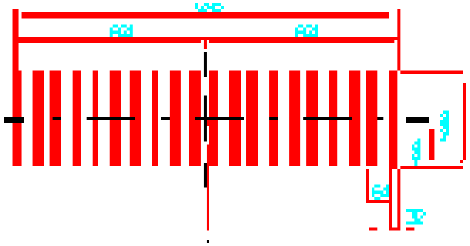
SPM-Y

- •Scribelane Primary Mark, SPM
- •Capture range 88 micrometer (Small scan possible)

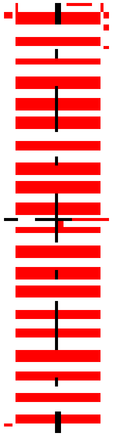
- •SPM-X: X-grating only
- •SPM-Y: Y grating only

XPA scribelane marks

XPA-X



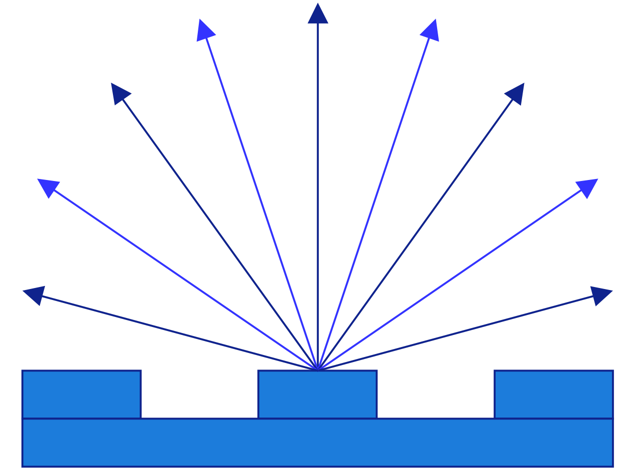
XPA-Y



- •Scribelane XPA mark
- •Capture range 8 micrometer

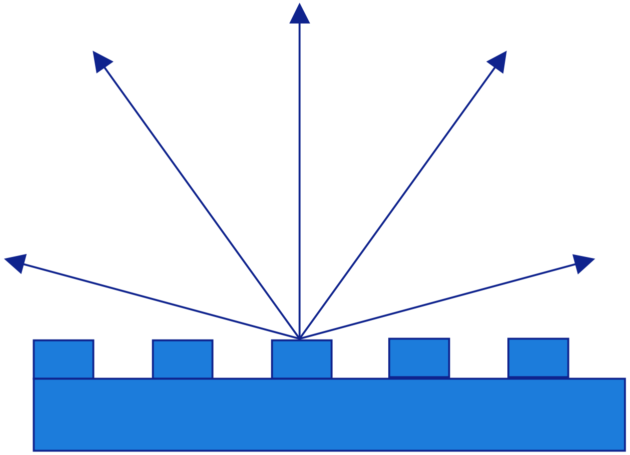
- •XPA-X: X-grating only
- •XPA-Y: Y grating only

Segmented marks



Doubling the frequency
=>
doubling the diffraction angle

(sin α = nλ / d)



This way we can enhance
the intensity for certain angles
= for certain orders.

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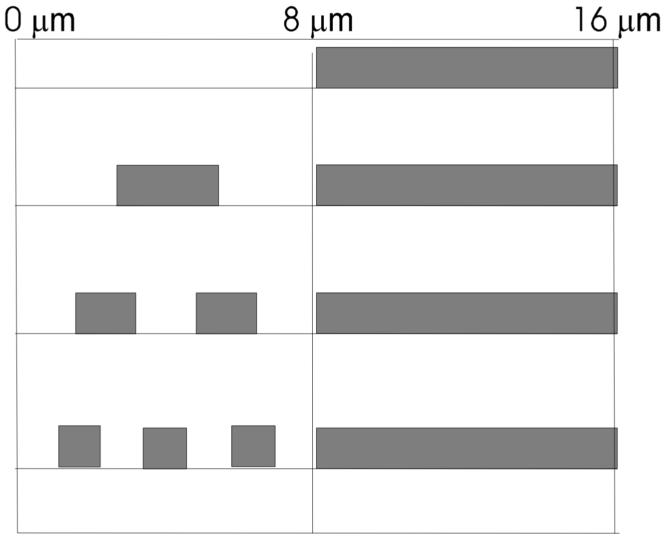
Standard ASML segmented marks



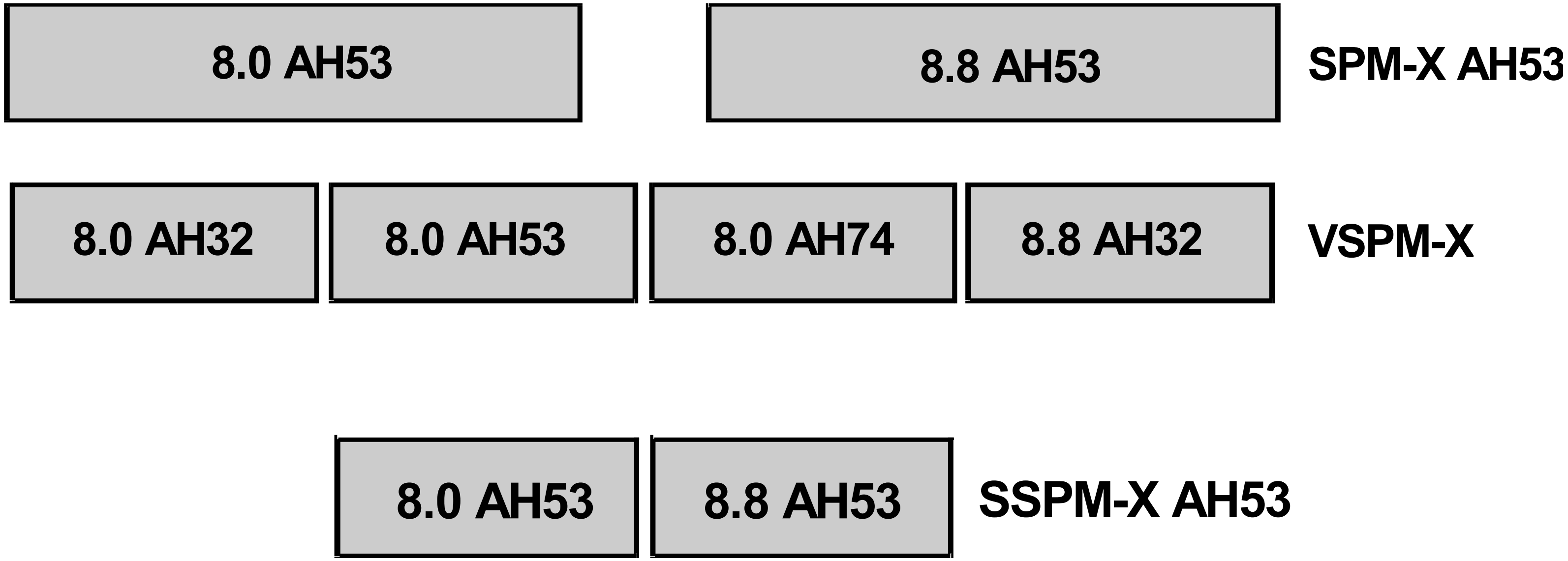
Standard

AH32

AH53

AH74

Short SPM and Versatile SPM



8.0 AH53

8.8 AH53

SPM-X AH53

8.0 AH32

8.0 AH53

8.0 AH74

8.8 AH32

VSPM-X

8.0 AH53

8.8 AH53

SSPM-X AH53