A 70-year history of innovation and collaboration

From glass wholesaler to high-tech, high-precision company

1952

Foundation of Berliner Glas as glass wholesaler

BERLINER GLAS
BERLINER GLAS GROUP

1970

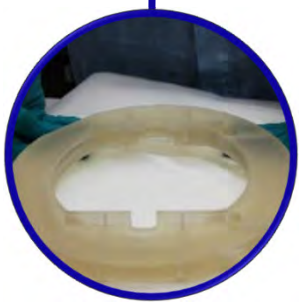
Transition to precision optics

2002

Beginning of development of EUV components

1960s

Industrial manufacturing of technical glass



1991

First projects for semiconductor industry: Start of collaboration with ASML

2020

Joined the ASML family as major R&D and manufacturing site with expertise in optics and wafer chuck technology

ASML in Berlin's contribution to the DUV systems

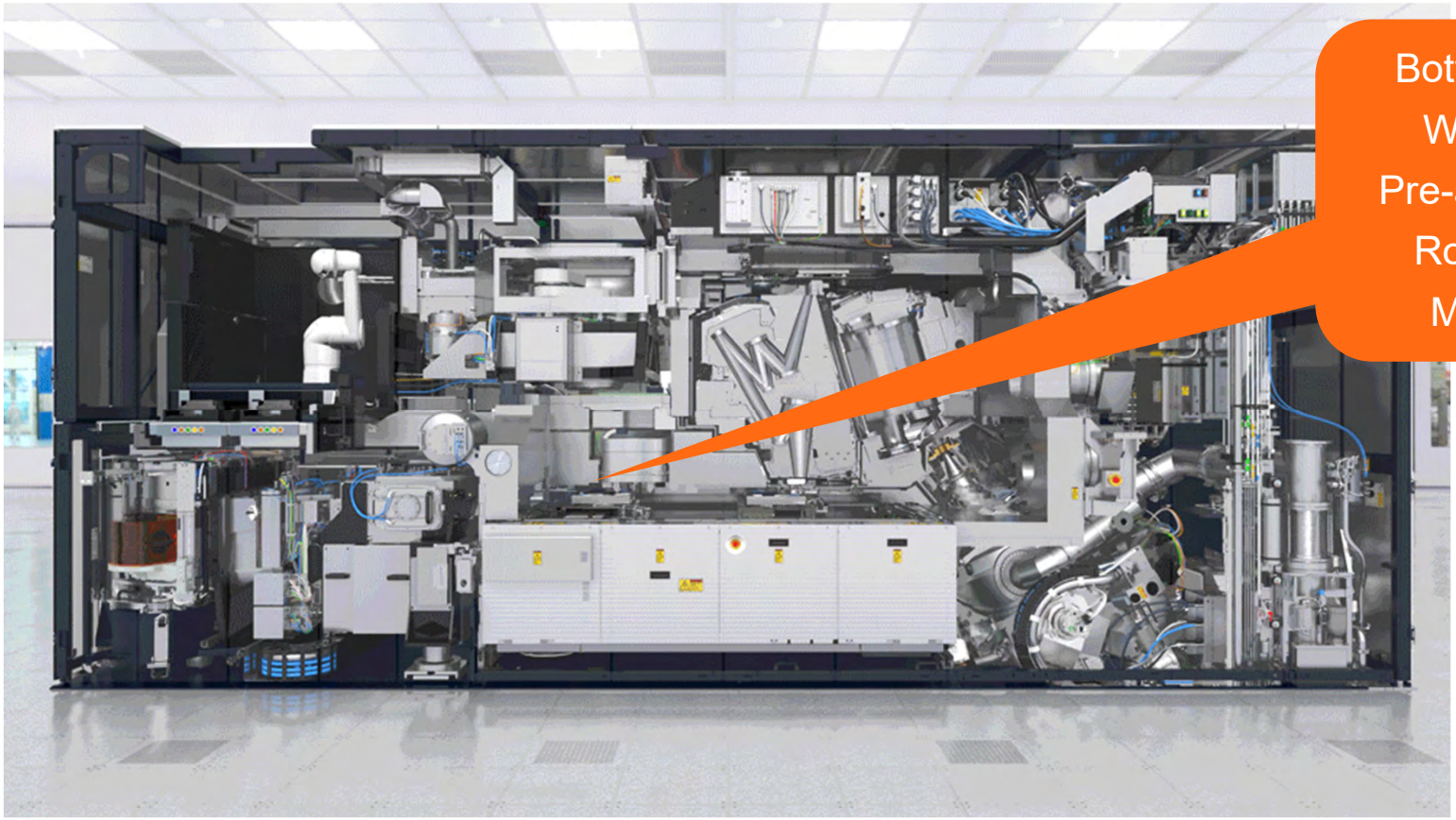
High value components and modules designed and manufactured in Berlin

Top Module:
Reticle chuck

Bottom Module:
Wafer table
Mirror block
Z-mirror
Reference frame
Smash ARA (Alignment Reference Axis)

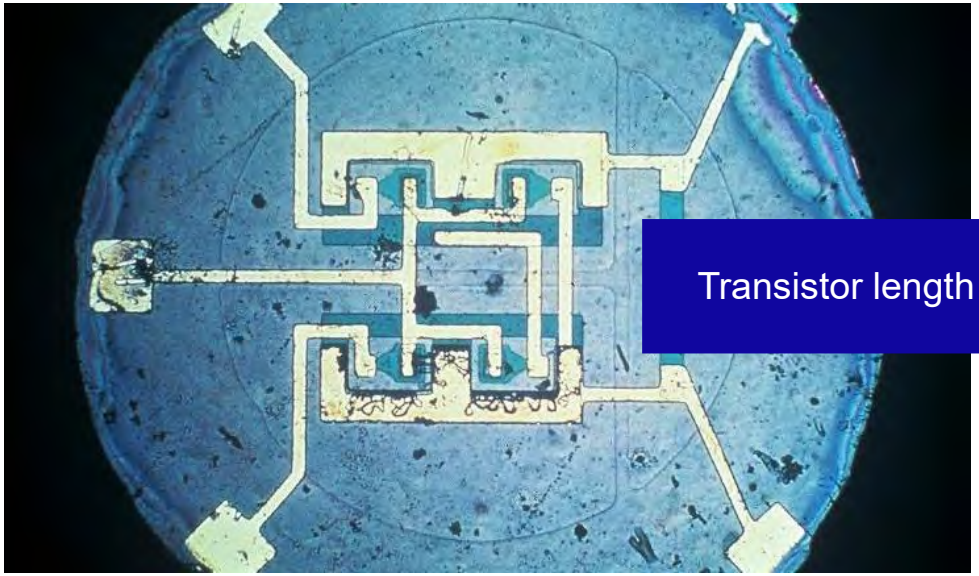
ASML in Berlin's contribution to the EUV systems

High value components and modules designed and manufactured in Berlin

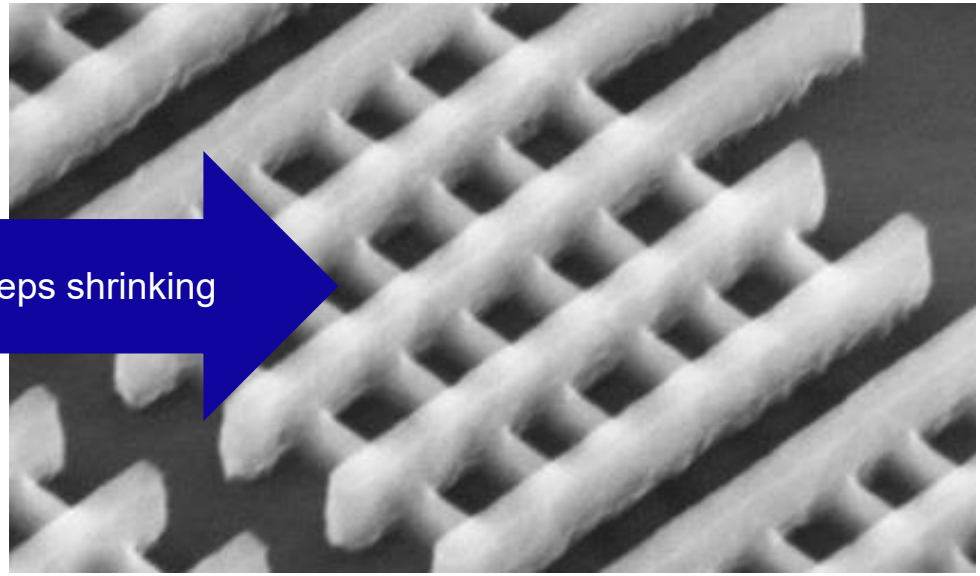


Technology

Key to Moore's Law: Making smaller transistors



Transistor length keeps shrinking

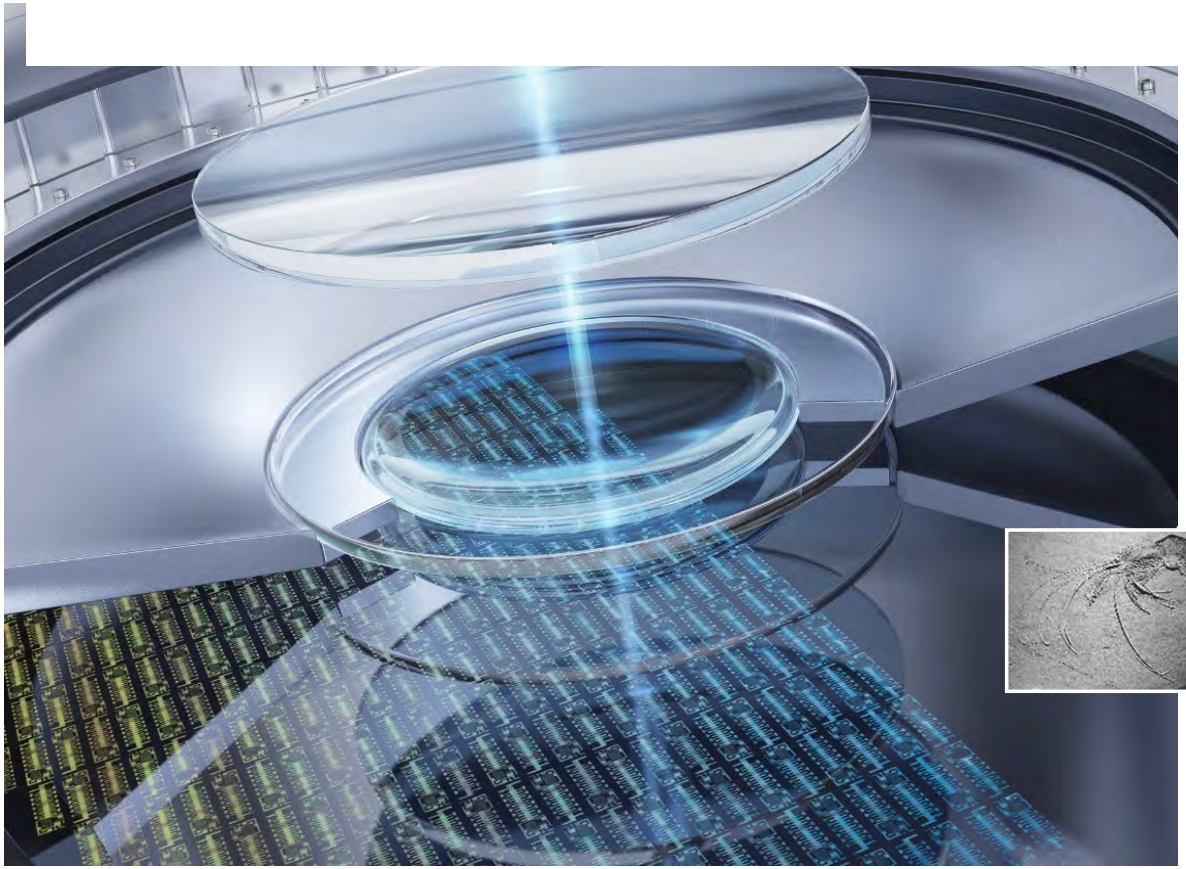


The first integrated circuit on silicon, on a wafer the size of a fingernail

(Fairchild Semiconductor, 1959)

Today: Billions of transistors on the same area

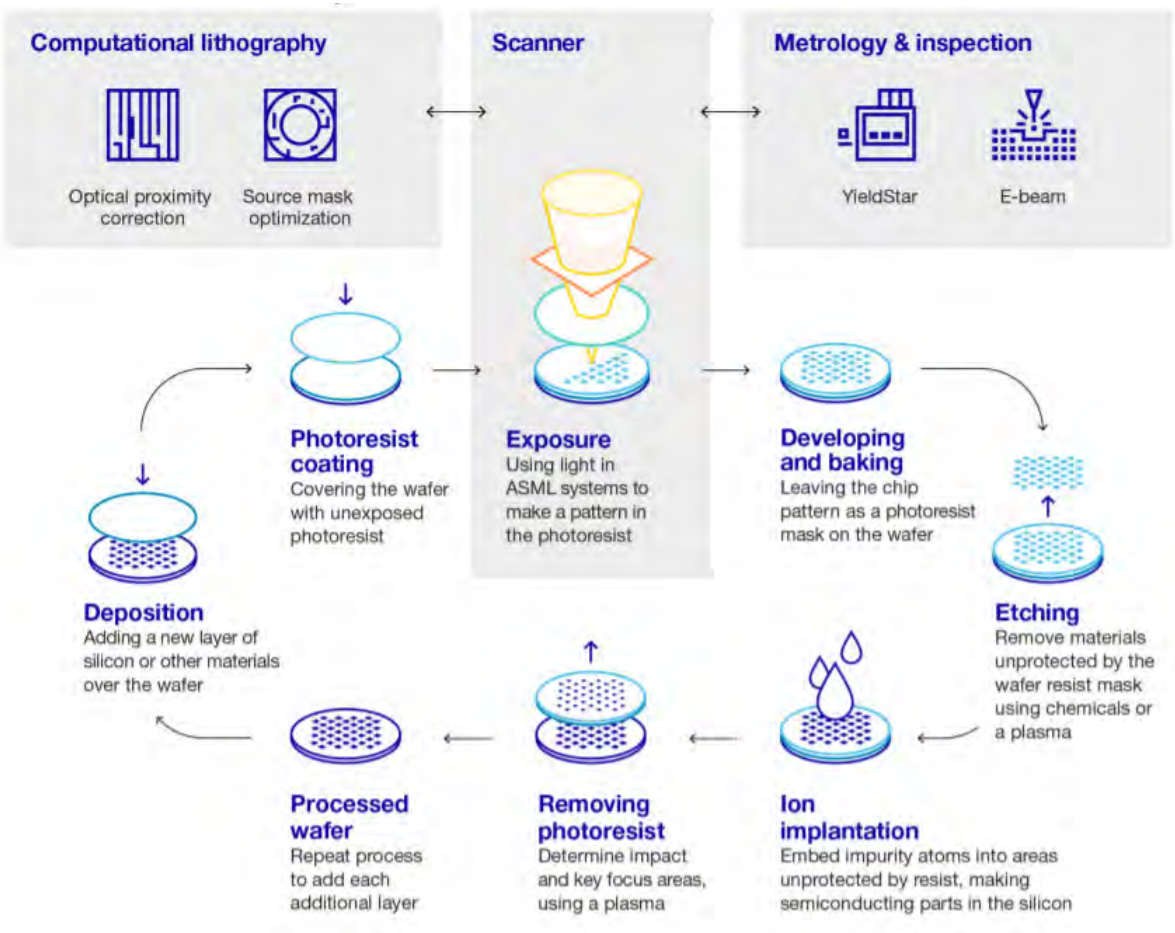
Lithography is critical for shrinking transistors



Lithography is the only semiconductor production step to process the wafer die per die, in contrast with all other production steps. This makes ASML's technology so pivotal in getting the highest yield and best performance in chip manufacturing

Lithography: Ancient Greek λίθος, lithos, meaning 'stone', and γράφειν, graphein, meaning 'to write')

The semiconductor manufacturing loop



Lithography innovation keeps chip manufacturing affordable

80s

436 nm → 365 nm light
100 mm → 150 mm wafers

90s

248 nm → 193 nm light
150 mm → 200 mm wafers
'step & repeat' → 'step & scan'

00s

200 mm → 300 mm wafers
Dry → immersion lithography
Single stage → dual stage

10s/20s

Litho → Holistic litho
Immersion → EUV
Letho 0.33 → EUV 0.55

Relative cost per pixel

Technology-wise, we had to move mountains

Sometimes it seemed impossible– until we did it

80s

436 nm → 365 nm light
100 mm → 150 mm wafers

PAS 2500/10
Res: 900nm
W: 150mm
Wph: 66

90s

248 nm → 193 nm light
150 mm → 200 mm wafers
'step & repeat' → 'step & scan'

PAS 5500/60
Res: 450nm
W: 200mm
Wph: 48

TWINSCAN XT:1400
Res: 65nm
W: 300mm
Wph: 145

00s

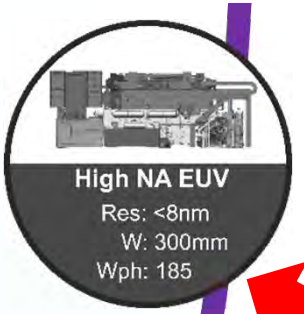
200 mm → 300 mm wafers
Dry → immersion lithography
Single stage → dual stage

TWINSCAN NXT:1950i
Res: 38nm
W: 300mm
Wph: 190

10s/20s

Litho → Holistic litho
Immersion → EUV
Letho 0.33 → EUV 0.55

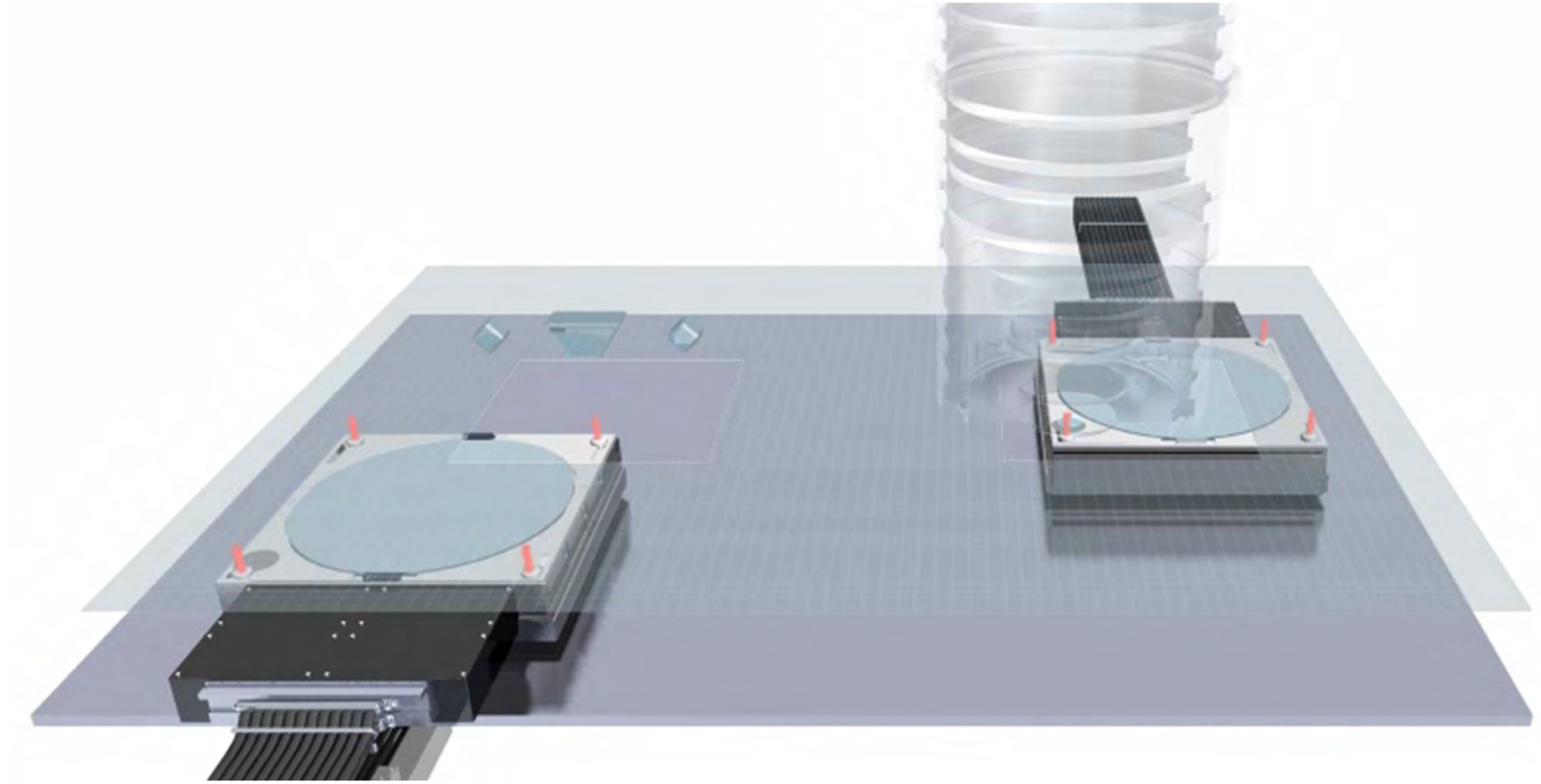
TWINSCAN NXE:3400B
Res: 13nm
W: 300mm
Wph: 125



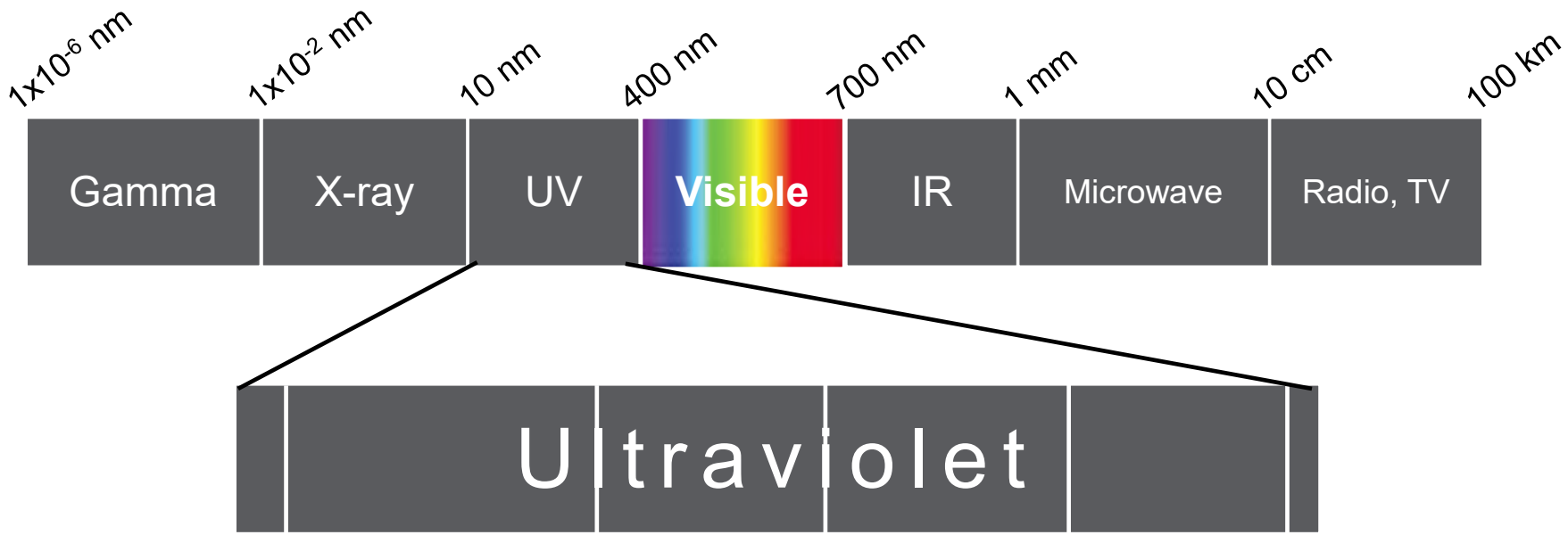
High NA EUV
Res: <8nm
W: 300mm
Wph: 185

System complexity

Key innovation: TWINSCAN

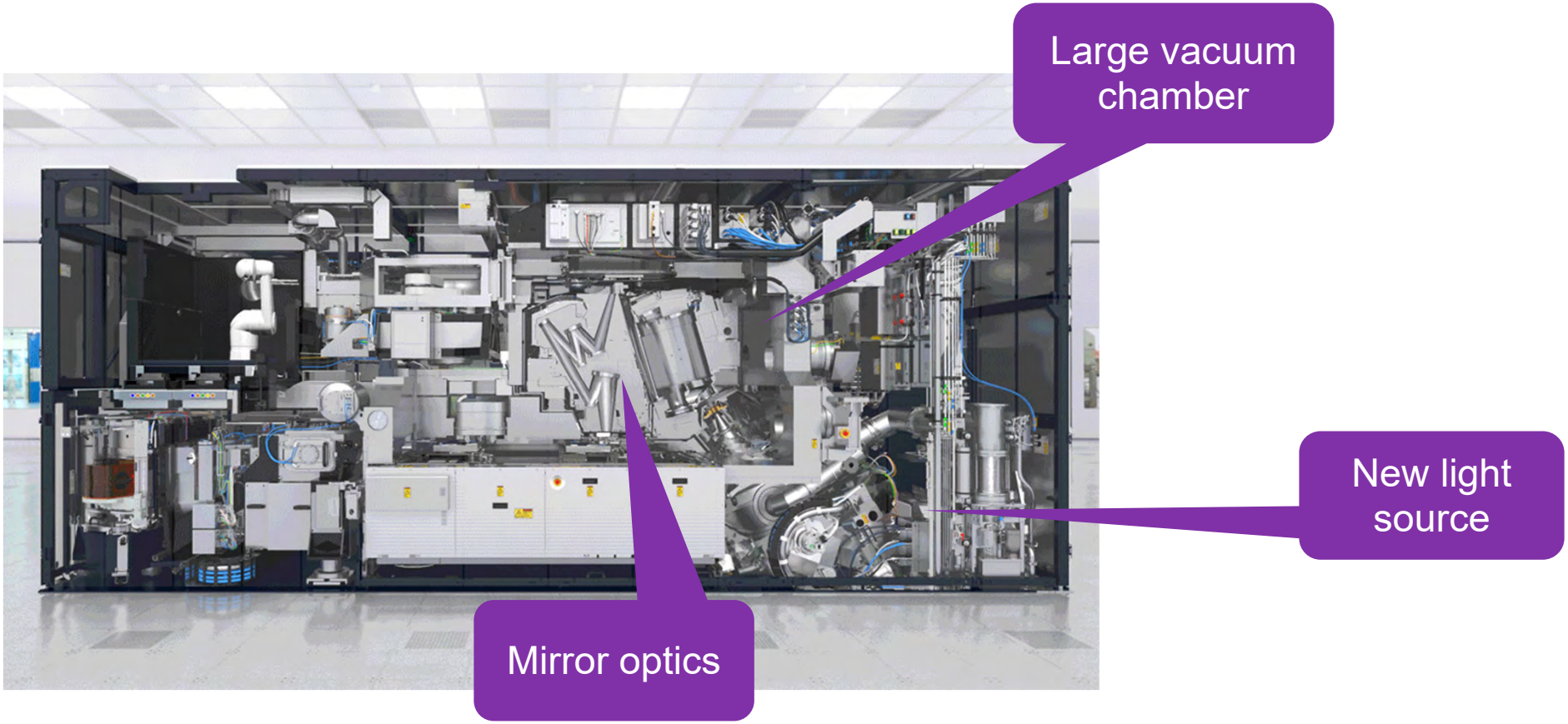


Key innovation: Wavelength changes

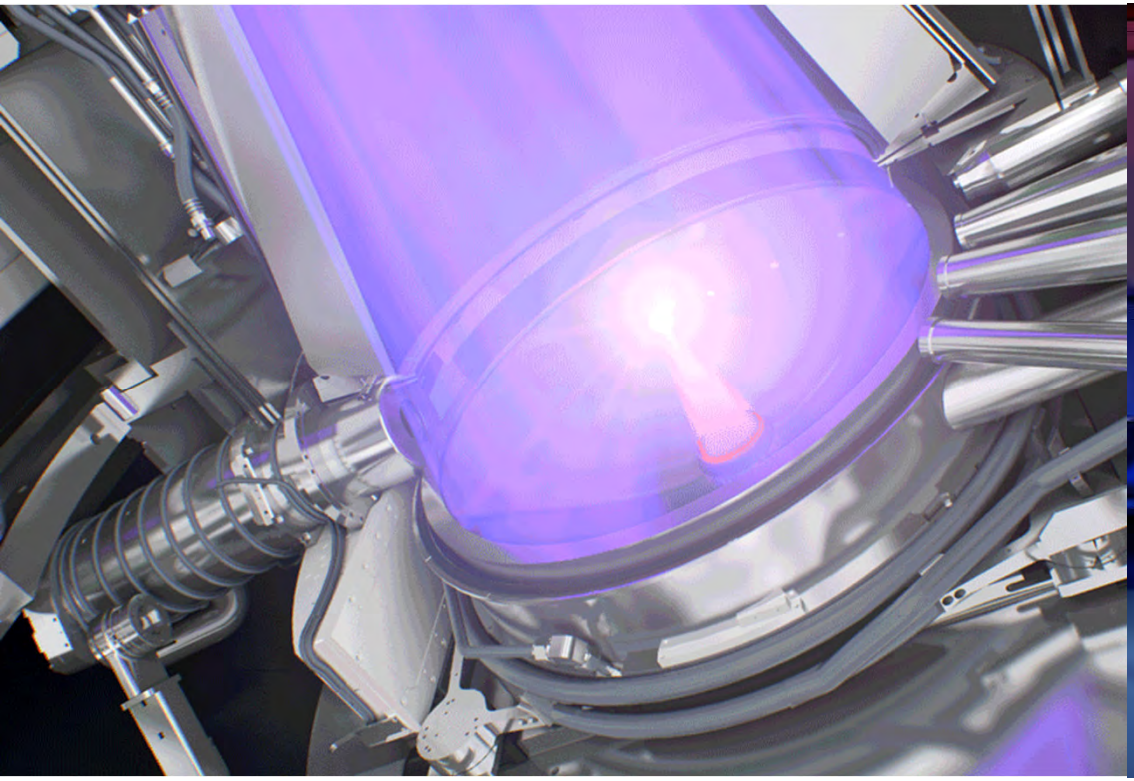


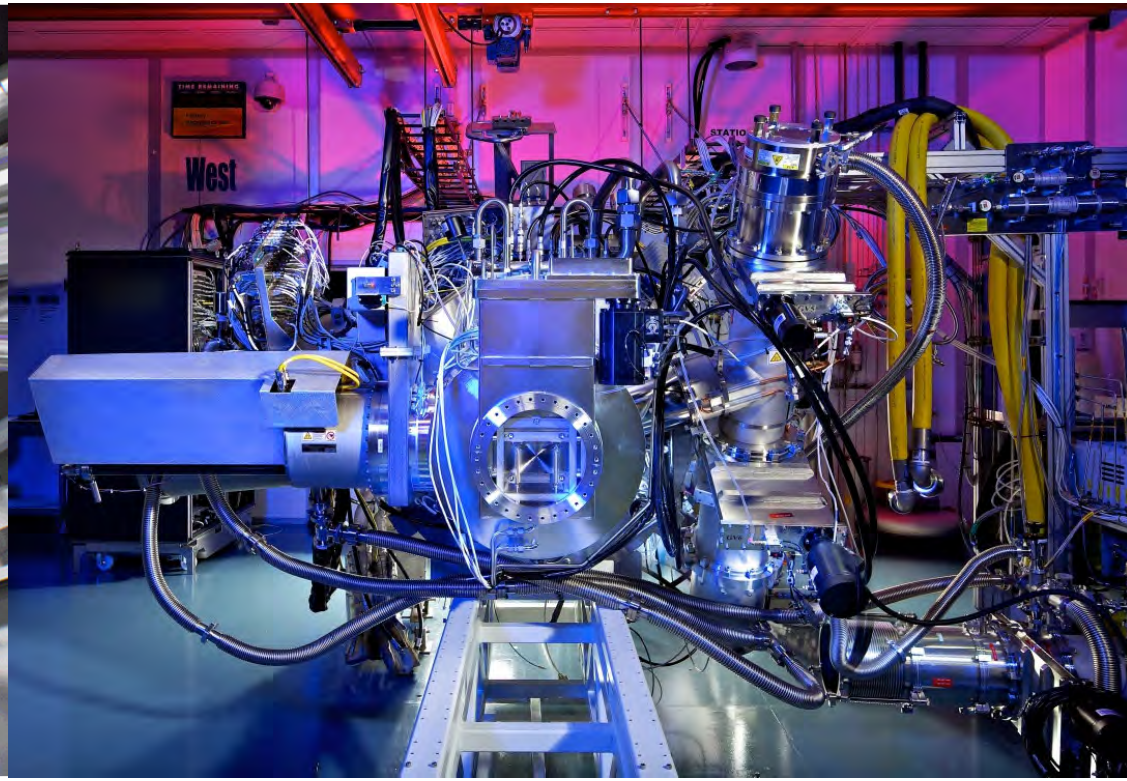
Wavelength	**13.5 nm**	**193 nm**	**248 nm**	**365 nm**	**436 nm**
Year	2011	2003	1992	1986	1984
Platform	EUV	DUV Immersion	PAS 5500	PAS 5000	PAS 2000

Key changes from DUV to EUV lithography



Firing a laser on a tin droplet 50,000 times a second





R&D is our life blood: this is how we push technology further

Our R&D investments amount to >€3 billion per year

1980s:

PAS 2000/5000

1990s:

PAS 5500

2000s:

TWINSCAN

2010s:

EUV

2020s:

High-NA EUV

In the world of EUV, everything is bigger

Transportation takes 40 containers, 20 trucks and 3 fully loaded 747s

NXE has over 100,000 individual parts, 3,000 cables, 40,000 bolts and 2 km of hosing…

20 years of sustained R&D

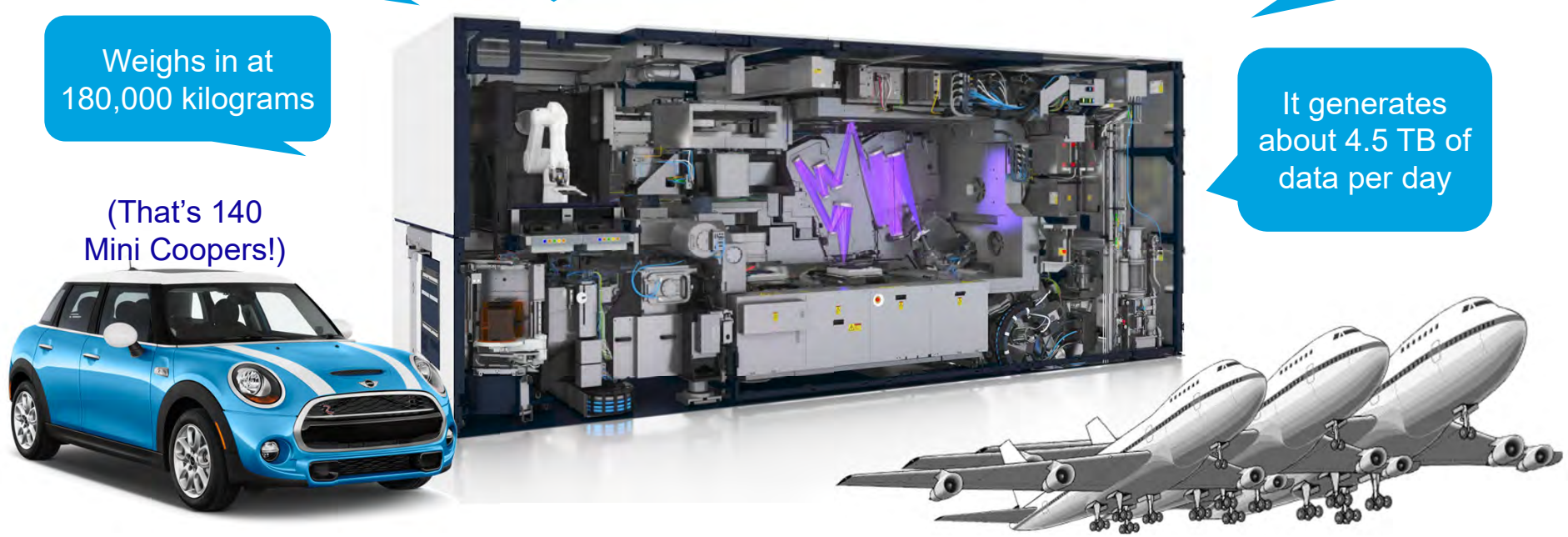
Transportation takes 40 containers, 20 trucks and 3 fully loaded 747s

It has about 1,500 sensors to capture imaging data

Weighs in at 180,000 kilograms

It generates about 4.5 TB of data per day

(That's 140 Mini Coopers!)

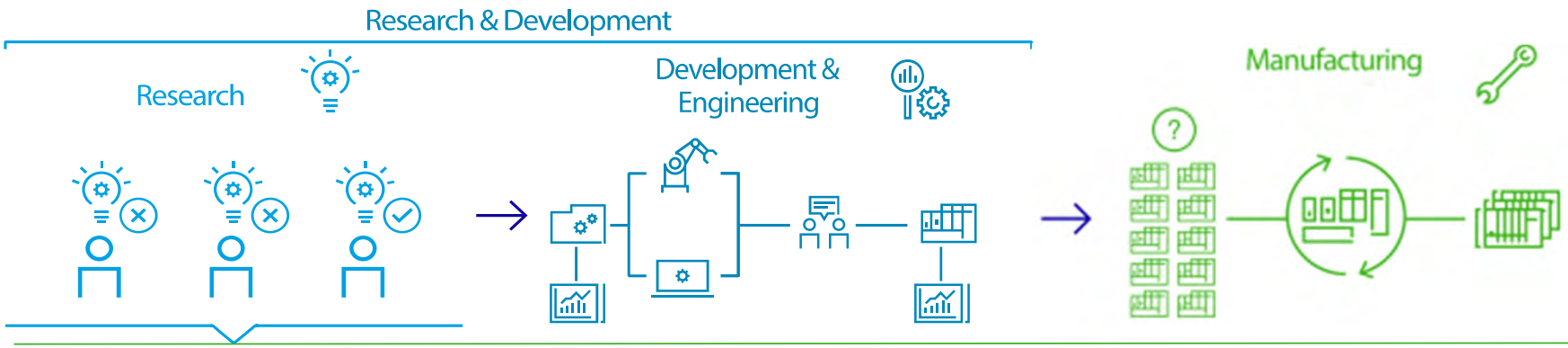


Your career at ASML Berlin

Post-graduation career

Your opportunities after graduation

Join our team



Subjects of study

- STEM-Studies
- Natural science
- Mechanical engineering
- Electrical engineering
- Physics

- Material Science
- Photonics/ Optical engineering
- Chemical engineering
- Mathematics
- Computer Science
- Nanotechnology

Required degrees

- Bachelor
- Master
- PhD

ASML

Student opportunities

Join ASML as a student

Internship (compulsory or voluntary)
- Perquisition: enrolled at a university
- Duration: usually 3 till 6 months
- Working hours: 38.5-40 hours per week
- Subjects of study: STEM studies, natural science

Working student
- Perquisition: enrolled at a university
- Working hours: max. 20 hours per week

Writing a thesis
- Bachelor, Master, PhD
- Perquisition: enrolled at a university
- Working hours: max. 30 hours per week

ASML

Empowering pupils

Start your journey with ASML after school

Apprenticeships
Mechatronics Engineer
Warehouse logistics specialist
Industrial clerk
Fine optician
Cutting machine operator

Dual studies
Mechanical engineering
Business information systems
Business administration

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Thank you