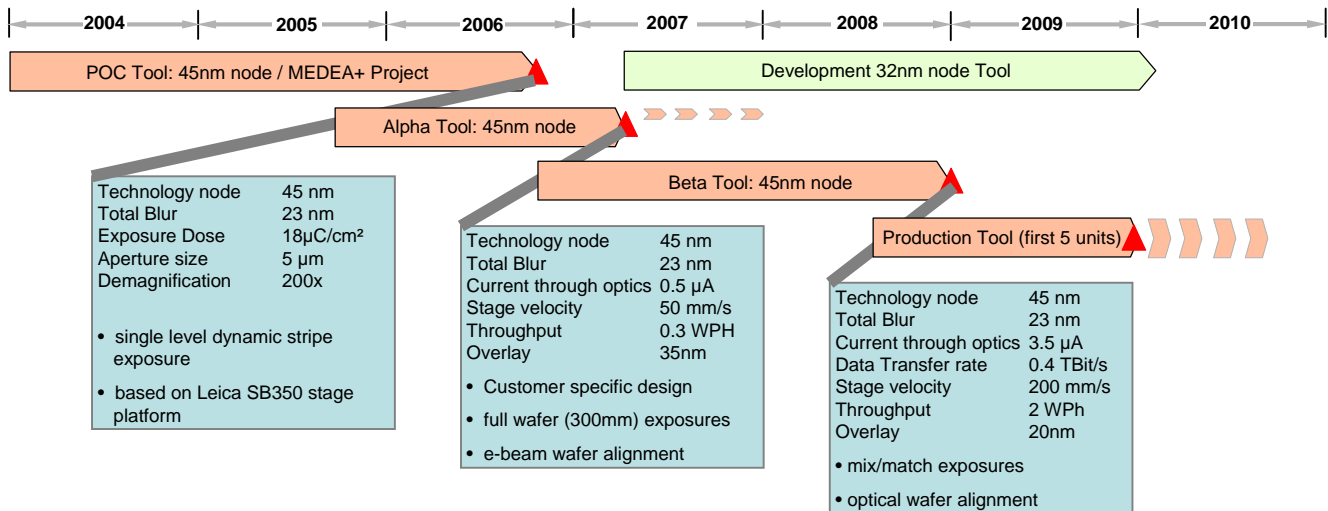


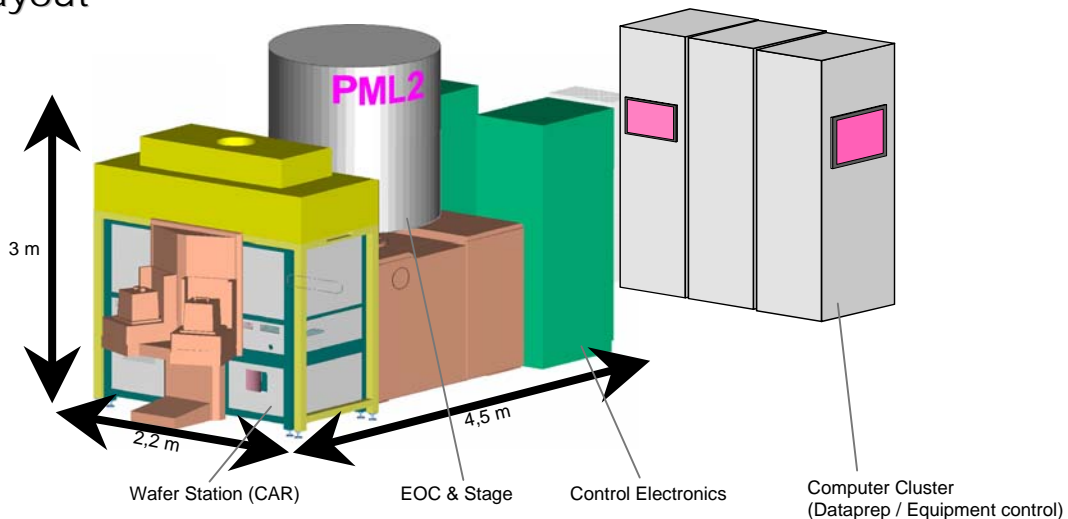
Why PML2 ?

- High process yield due to redundant exposure process
- Compatible with single layer e-beam resist process (proven in 65nm device fabrication)
- Stripe exposure allows precise in die corrections for excellent overlay
- Superior system uptime enabled by long life multi beam modulator - low contamination due to large working distance
- Multi generational solution based on MEMS technology fabricated Aperture Plate System (APS) and 200x reduction electron optics
- Highly experienced consortium / strong technology base
 - IMS experience with large field projection optics: key to reduction of Coulomb interaction and image blur
 - Leica expertise in high performance commercial e-beam systems: key to reliability of system design
 - expertise of Fraunhofer Institutes in advanced Micro Systems Technology (ISIT) and high bandwidth optical data transmission (HHI): key to outstanding beam modulator solution

Multi generation industrial roadmap



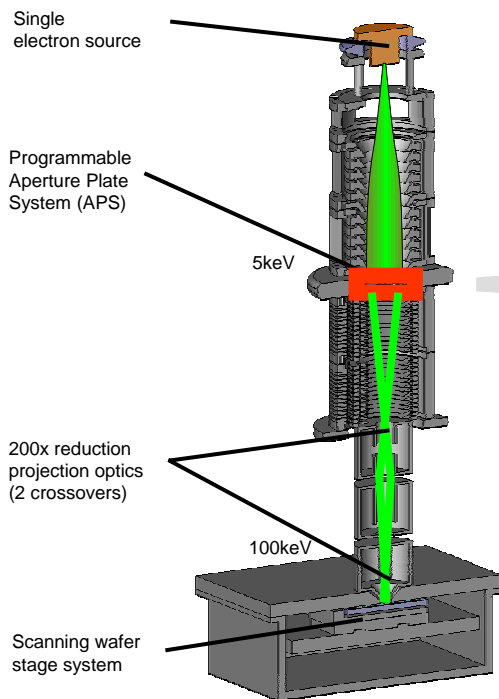
System Layout



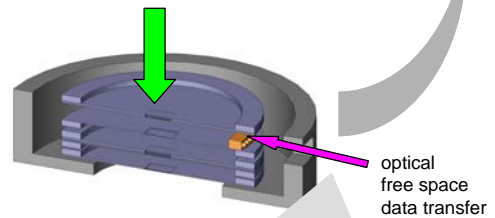
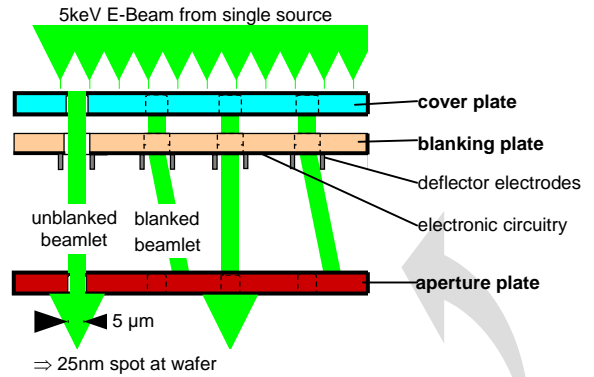
PML2 Technology

Beta Tool Targets

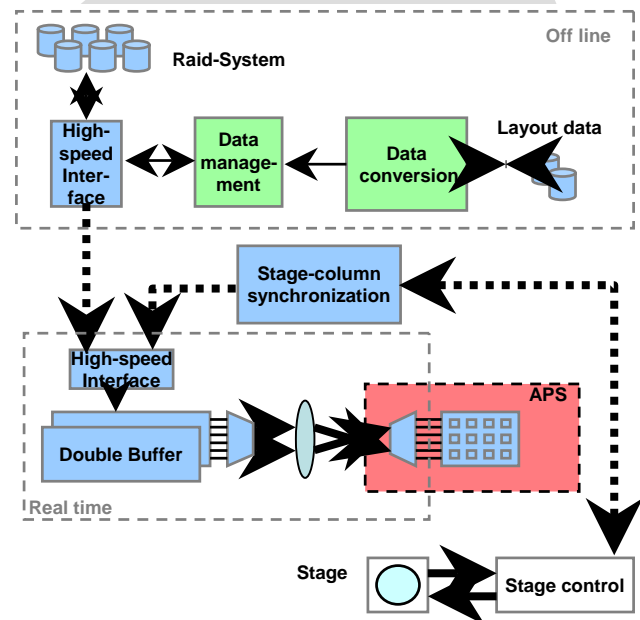
- Aperture Field 40x40mm
- Aperture Size 5 μm
- Scan stripe width at wafer 200 μm
- No of Greylevels 64
- Data volume per stripe 43 Gbit
- Data Transfer Rate 0.4 Tbit/s



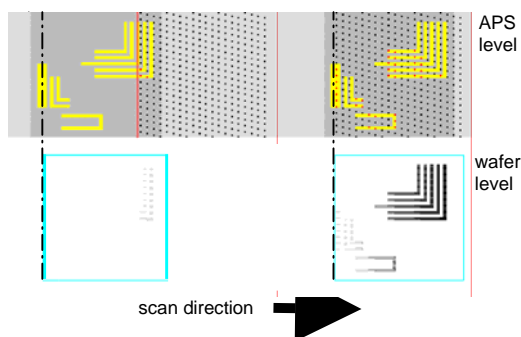
Programmable Aperture Plate System (APS)



Data Path & Data Preparation



Exposure Principle & Spot Generation



PML2 Consortium

Lead Partners

LEICA	Germany
IMS-Jena	Germany
IMS Nanofabrication	Austria

Expertise / Experience

EBDW system and process know how, Wafer Stage, System Control
 System integration, PML2 Commercialization
 Large field particle optics, PML2 system concept, Electron optical column design

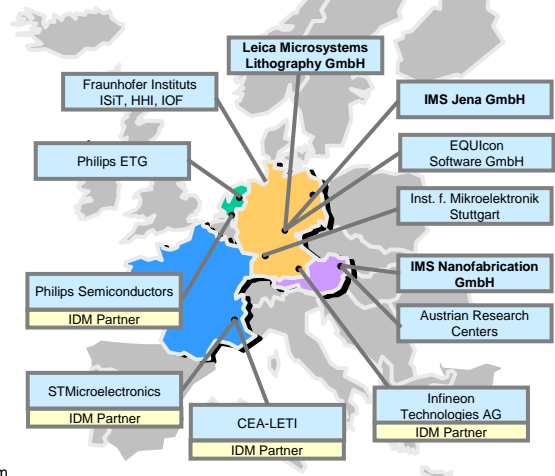


Integrated Device Manufacturer (IDM) Partners

STMicroelectronics	France
Philips Semiconductor	Netherlands
Infineon Technologies	Germany
CEA-LETI	France

Development Partners

FhG ISIT	Germany	Advanced MEMS and IC design, MEMS fabrication and system integration, ISO certified APS supplier
FhG HHI	Germany	High bit rate and high volume optical data transfer system, photonic networks, ISO certified
FhG IOF	Germany	Precision alignment and measurement systems, micro mechanics
Inst. für Mikroelektronik Stuttgart	Germany	stencil mask fabrication - high rate silicon etching
Equicon	Germany	Software for exposure data processing and EBDW system control
Philips ETG	Netherlands	Equipment Foundry: OEM mechatronic module and system development and supplier
Austrian Research Centers	Austria	Material / coating development

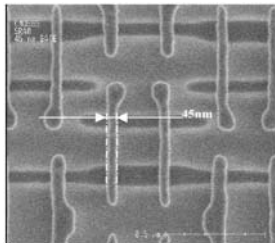


Cost of Ownership

Beta Tool	Costs / Year [k\$]	Costs / GWLE [\$]
Tool depreciation (45nm, 2wph, 20Mio, 90% yield, 85% availab., 13400 GWLE / year)	4 000	300
Service Full Service contract	1 100	82
Facility costs		
white area (cl 10, 22m²) :	62	4,6
grey area (cl 100+, 14m²) :	11	0,8
utilities + supplies :	43	3,2
manpower :	200	15
Total	5 416	405

E-Beam Direct write technology demonstration: STM & Leica

Medea+ Project Results T201

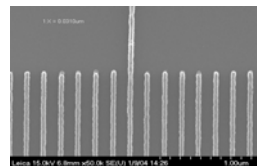


Advanced architecture validations

- 65nm node structures
- Gate on Active, after etch
- both layers printed by SB320-50DW / Leica

Source: STM
(SPIE Microlithography Conf. 2003)

Medea+ Project Results T207



Leica test pattern exposed by SB350 DW

- 150nm NEB on Si, resist image
- basic dose = 11.7 µC/cm², proximity corrected
- target linewidth: 30nm, result: 32nm

Source: Leica

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