



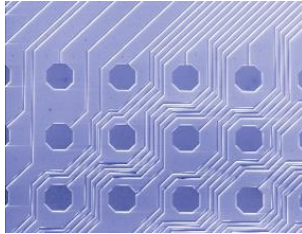
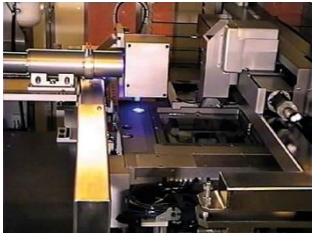
CAPITAL MARKETS DAY - STERNENFELS

- PHOTONIC SYSTEMS -

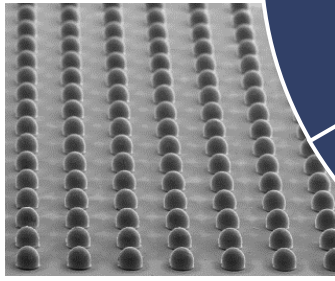
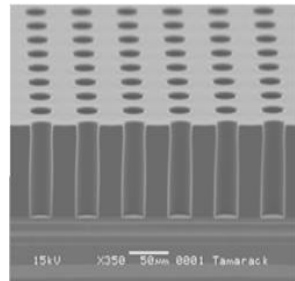
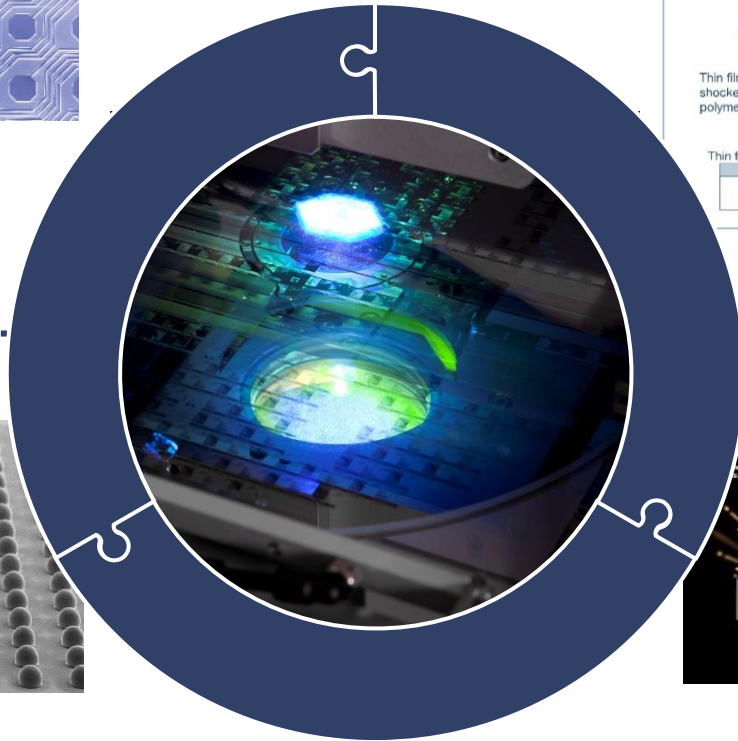
DR. MARKUS ARENDT, GM PHOTONIC SYSTEMS

September 13, 2018

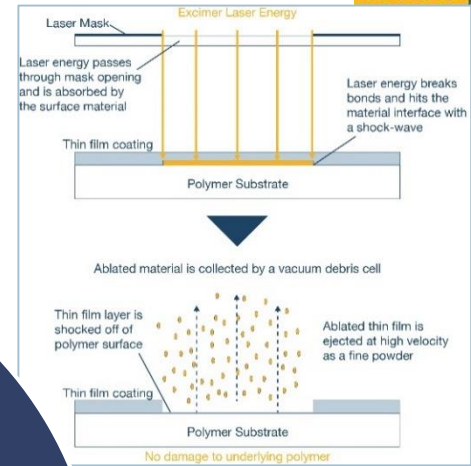
PHOTONIC SYSTEMS CORE TECHNOLOGIES



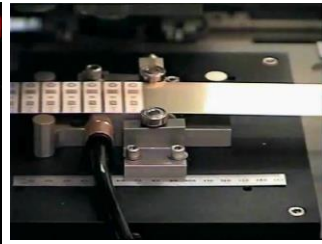
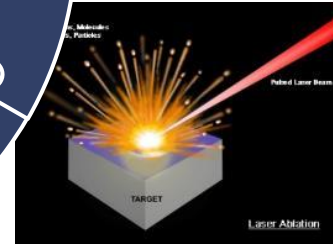
Projection Scanner:
Fan-out wafer-level packaging
Redistribution layers and Vias



Projection Scanner:
Cu pillar
Bumping

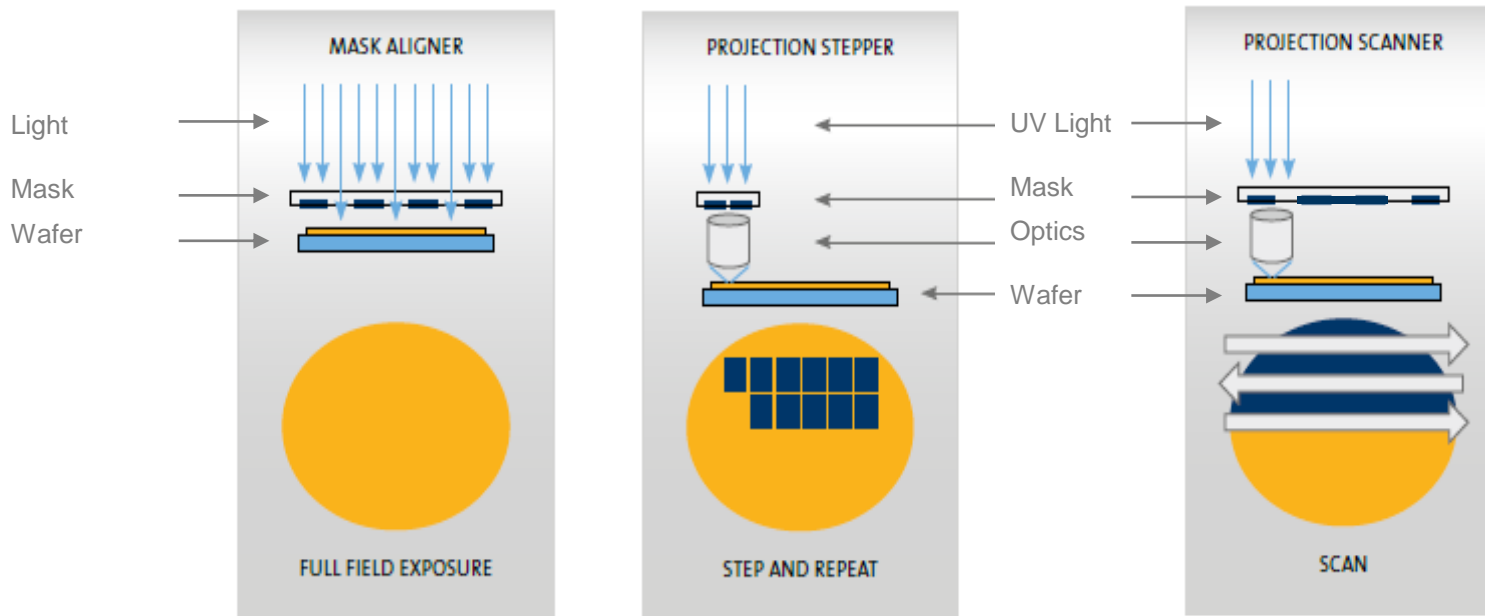


Excimer Laser Ablation:
Mask based direct material removal



Excimer Laser Ablation:
Patterning of thin metal layers
Annealing
Debonding

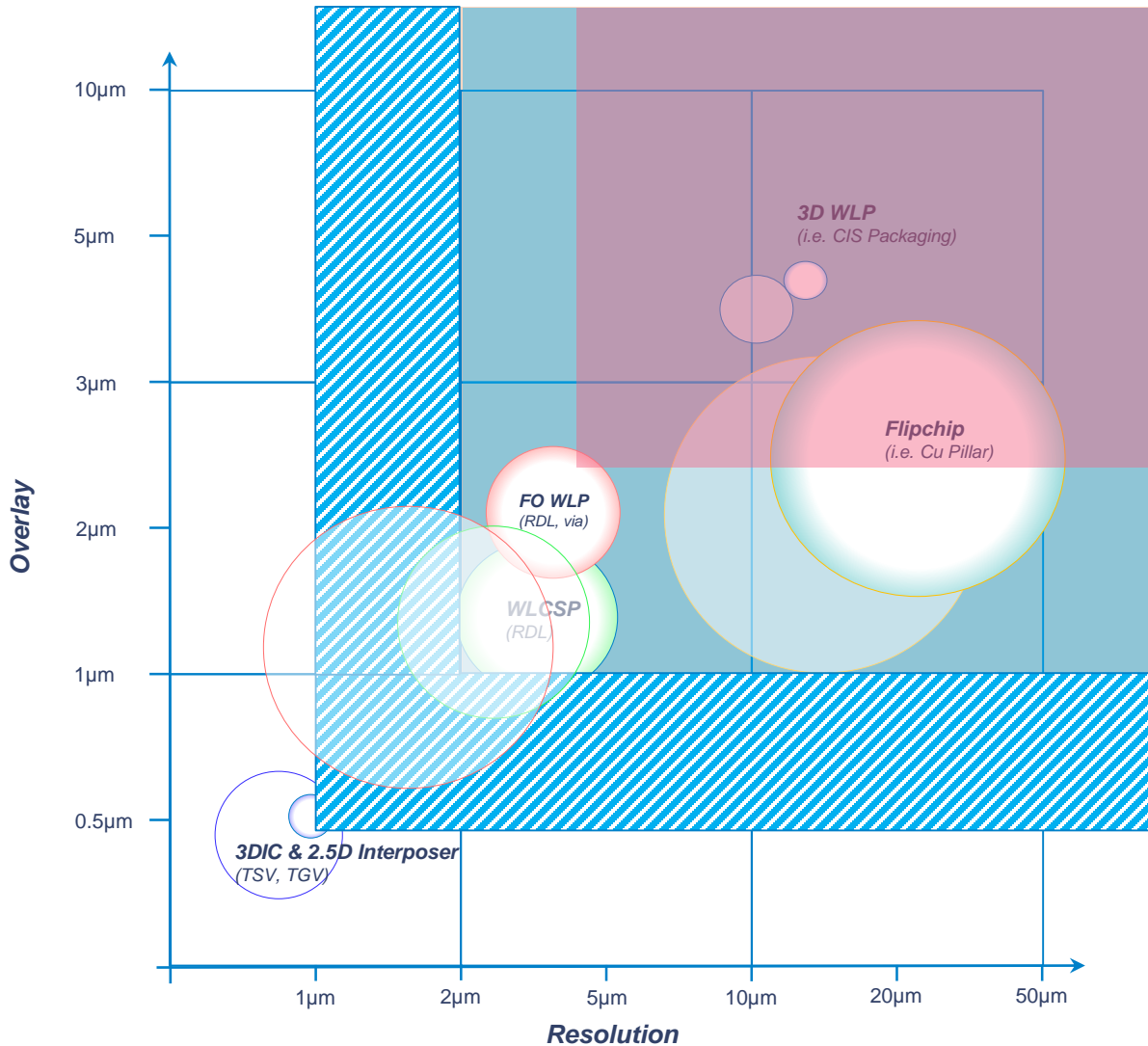
MID- AND BACKEND EXPOSURE TECHNOLOGY



UV-Projection scanner is a 1x full field exposure system with the same resolution and overlay as a stepper, but at much higher throughput

ADVANCED PACKAGING: MARKET AND APPLICATION REQUIREMENTS

Bubble size represents equipment market size (solid: market size 2018; contour: market size 2022)



Exposure Technology: Main capabilities:

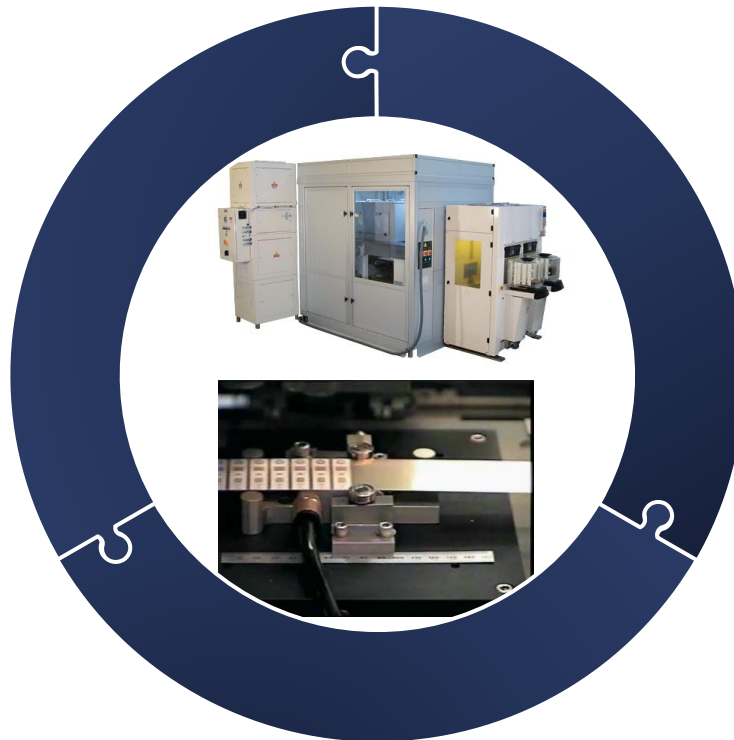
- Mask Aligner: Overlay 2.5µm, Resolution 4.0µm
- Projection Scanner: Overlay 1.0µm, Resolution 2.0µm
- Excimer Ablation Stepper: Overlay 0.7µm, Resolution 2µm

Future Requirement for Next Gen Packaging:
 - Overlay -> 0.5µm
 - Resolution -> 1µm

EXCIMER LASER TECHNOLOGY

**Unique Selling Proposition:
No comparable product in the market**
Disruptive approach
Less process steps for Packaging
More material choices
High-speed patterning for adjacent markets

**Product is ready:
91x shipped and used in production**
ELP300 is a true stepper! Qualified at major
player in Advanced Packaging
Future product development together with
key customers



Market penetration strategy
Win big players in Packaging Market
Enabler for different packaging approach:
save cost, overcome technical barriers

**Tactical approach:
Create confidence and awareness**
Cooperation (research partners)
Target marketing: conference contributions,
magazine articles, demos
Market research in adjacent markets

We have a unique selling proposition!

READY FOR INDUSTRY INFLICTION POINTS

Industry Trend

Heterogeneous Integration

Larger packages
Integration of chips with different sizes
Variation in Z height inside package

5G Standard

Integration of antennas in packages
More sensors (AR, autonomous driving)
Further evolution of Fan-Out Packaging

Increasing I/O counts

Shrinking to 2/2um L/S, to 1/1um L/S
Smaller vias
Reduce number of RDL layers

Industry Challenge

Stitching free exposure
Large Depth-of-Focus

Cost effective ways for packaging with increased area

Remove Seed Layer
Electromigration
Gap filling

SUSS Photonic System Solution

DSC Scanner Technology

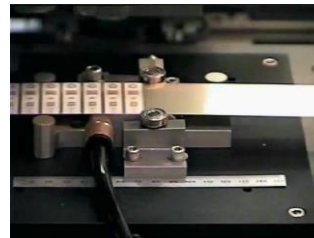
Full-field exposure without stitching
Exposure of Non-repeated patterns
Variable NA

Panel Format

Scanner and ablation panel size exposure systems for high throughput / low CoO
Magnification correction for Fan-Out

Excimer Laser Ablation

Embedded RDL (no seed layer removal)
Use of non-photo dielectrics with better material properties
Cost reduction through less process steps



DISCLAIMER

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Thank you!

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