

EPIC Online Technology Meeting on Structured Light and Computer Vision, 12th June 2020

Wafer Level Manufacturing for Advanced Optical Modules

Dr. Martin Eibelhuber, Deputy Business Development

Leading supplier of wafer processing equipment for the MEMS, nanotechnology and semiconductor markets

Founded in 1980 by DI Erich and Aya Maria Thallner. More than 1000 employees worldwide

Headquarters in Austria, with fully owned subsidiaries in the USA, Japan, South Korea, China and Taiwan

Recent Developments



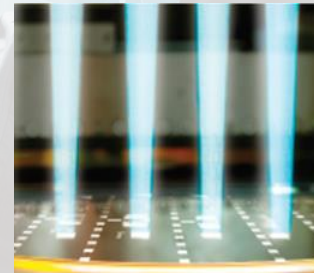
GEMINI® FB
Hybrid Bonding



EVG®850 DB
Laser Debonding



BONDSCALE™
Fusion Bonding



EVG® MLE™
Maskless Exposure
Technology



EVG® HERCULES® NIL
SmartNIL® UV-NIL
Up to 300 mm

Wafer Level Optics | 3D and Depth Sensing

Structured Light



Dot Projector

Infrared camera

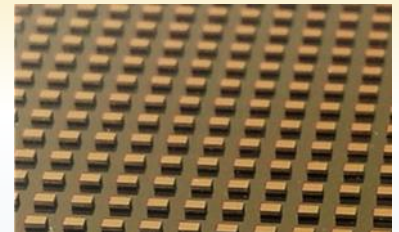
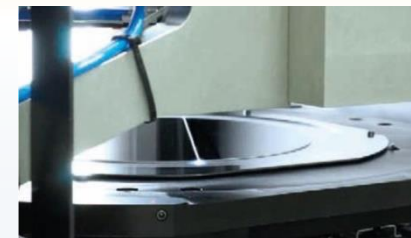
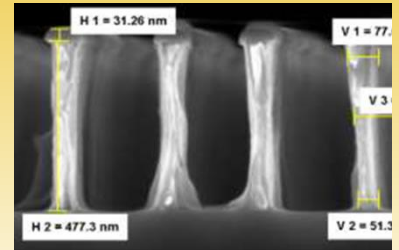
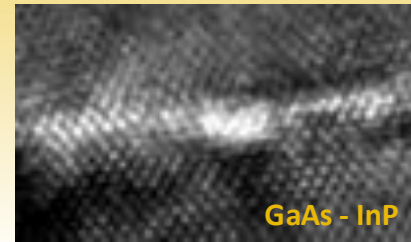
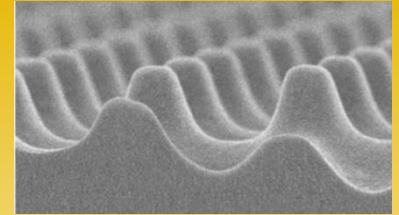
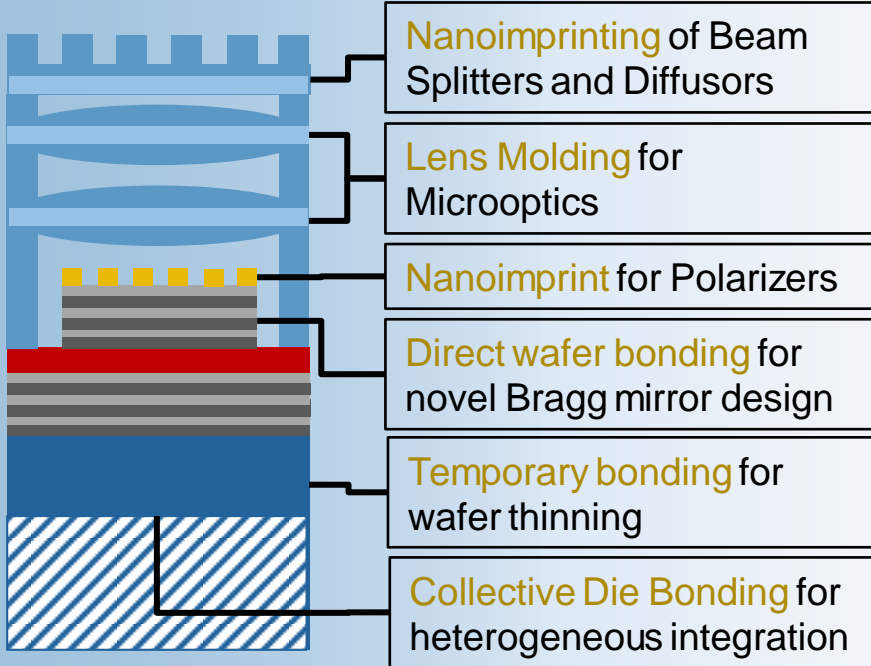
Time-of-Flight



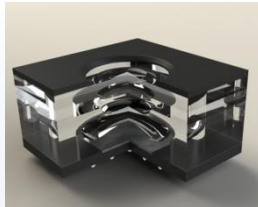
Time-of-Flight camera

Time-of-Flight camera

Wafer Level Manufacturing | VCSEL Modules



Wafer Level Optics | Lens Molding



Lens Molding Process Flow

Puddle dispense

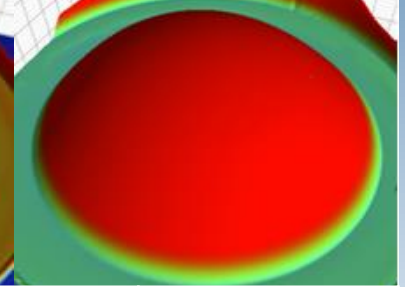
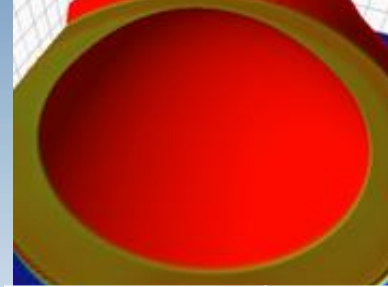
Alignment

UV Curing

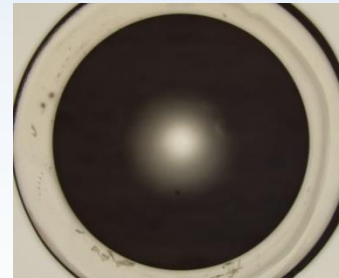
Demolding

Lens Master

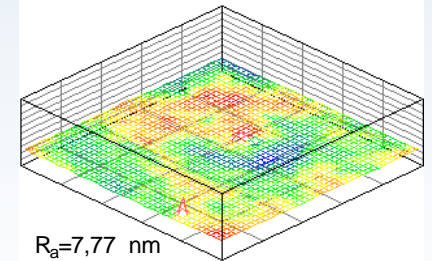
Lens Imprint



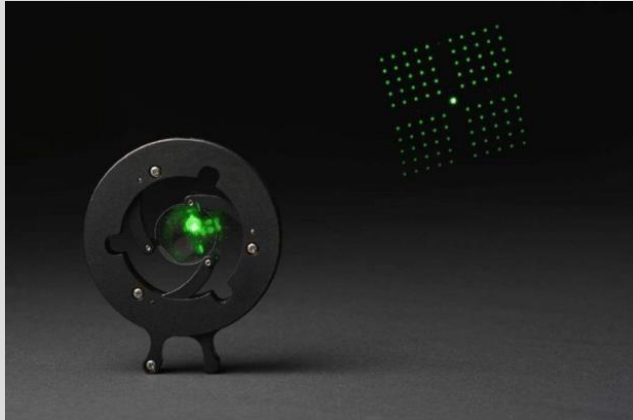
[μm]	Lens Master	Imprint
Lens height	238,6	232,3
Lens width	3121	3111



Convex Lens
(**DELO KATIOBOND**)

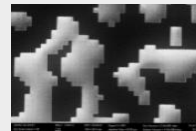
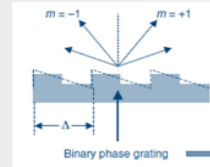


$R_a=7,77$ nm
Lens roughness – Convex



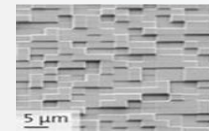
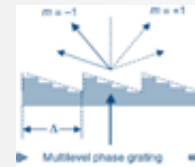
Source: EPFL

2D Structures



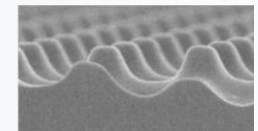
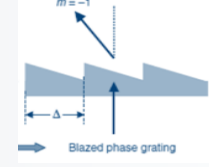
Mihai KUSKO et al.,
U.P.B. Sci. Bull., Series
C, Vol. 71, Iss.4, 2009

Multi-level Structures



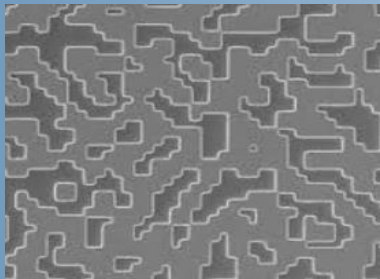
Source: Nanoscribe

2.5D Structures

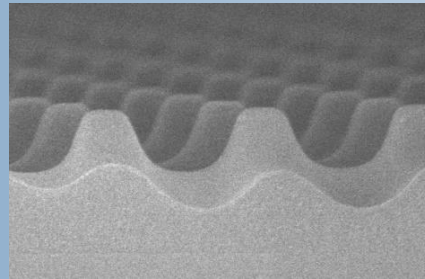


EVG & IMS Chips

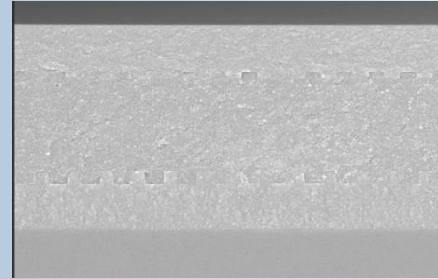
SmartNIL® Reference Structures



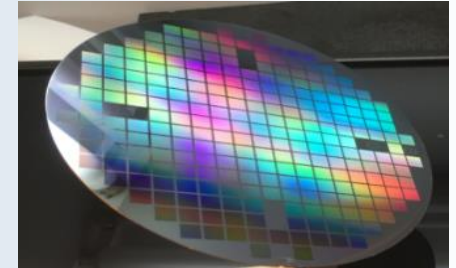
Source: Temicon



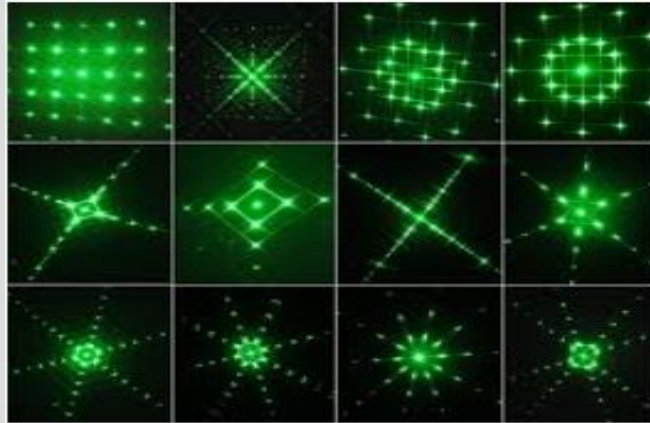
Source: EVG & IMS Chips



Source: EVG

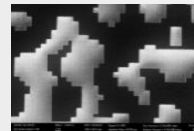
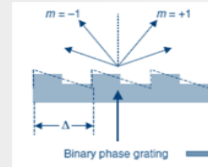


Source: EVG



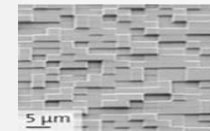
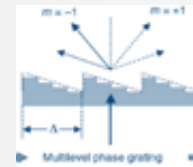
Source: htgdslaser

2D Structures



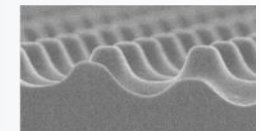
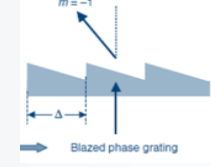
Mihai KUSKO et al.,
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Multi-level Structures



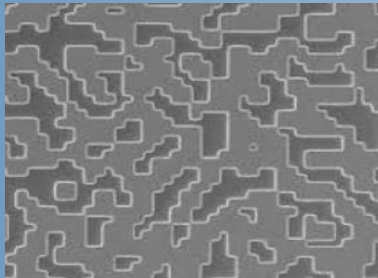
Source: Nanoscribe

2.5D Structures

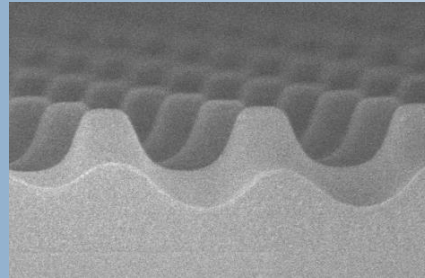


EVG & IMS Chips

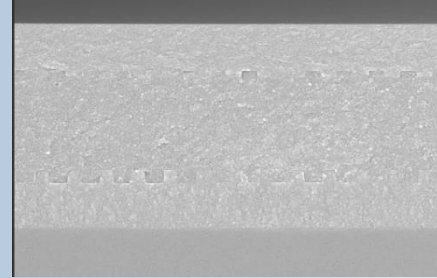
SmartNIL® Reference Structures



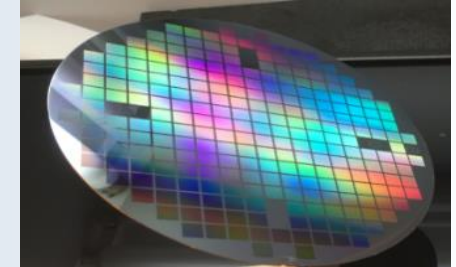
Source: Temicon



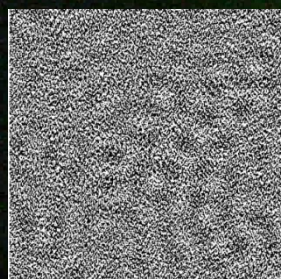
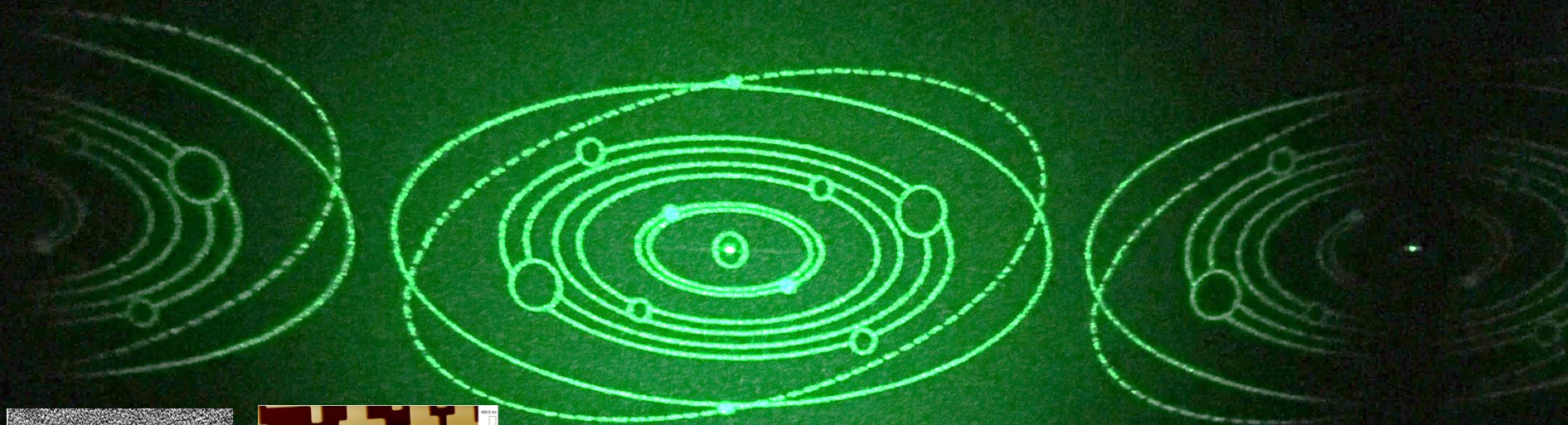
Source: EVG & IMS Chips



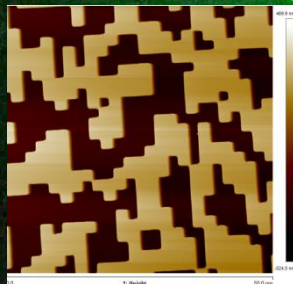
Source: EVGroup



Source: EVGroup



Master: CGH
(Calculation CNRC)

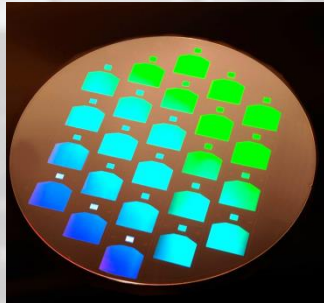


Master: etched silicon – AFM
(Fabrication IMS Chips)

NILPhotonics® Competence Center – A smart way to collaborate for success

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Bridging the gap between photonics R&D and volume manufacturing



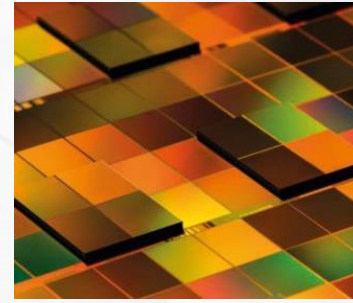
Nanoimprint & S&R Mastering



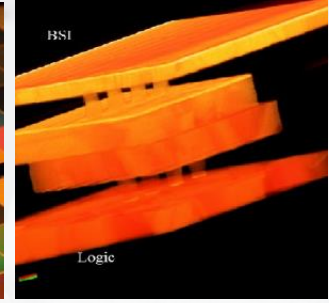
Wafer Level Optics & Photonics Packaging



Advanced Resist Processing



Heterogeneous Integration



3D Integration & Hybrid Bonding

Thank you for your attention.



Dr. Martin Eibelhuber
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