

SRON - Veldlaser

- Jobshop; disciplines, trends opmaat naar lensarray
- 2008 introductie micromachining
- Array 1,4,16,128.....5000+ lenzen
- Ar-coating
- Zakelijke ontwikkeling ruimtevaart
- Conclusie

De verbeelding

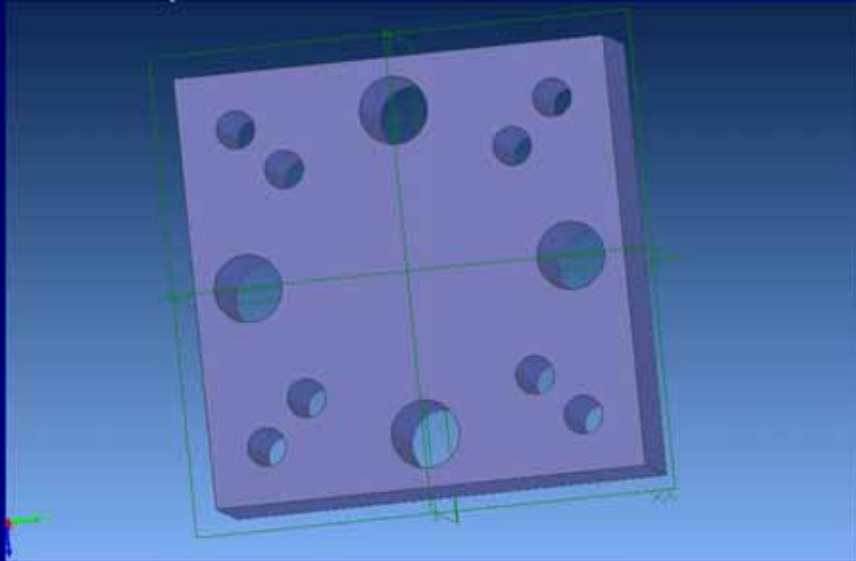
- Apollo 11



Onbereikbaar?



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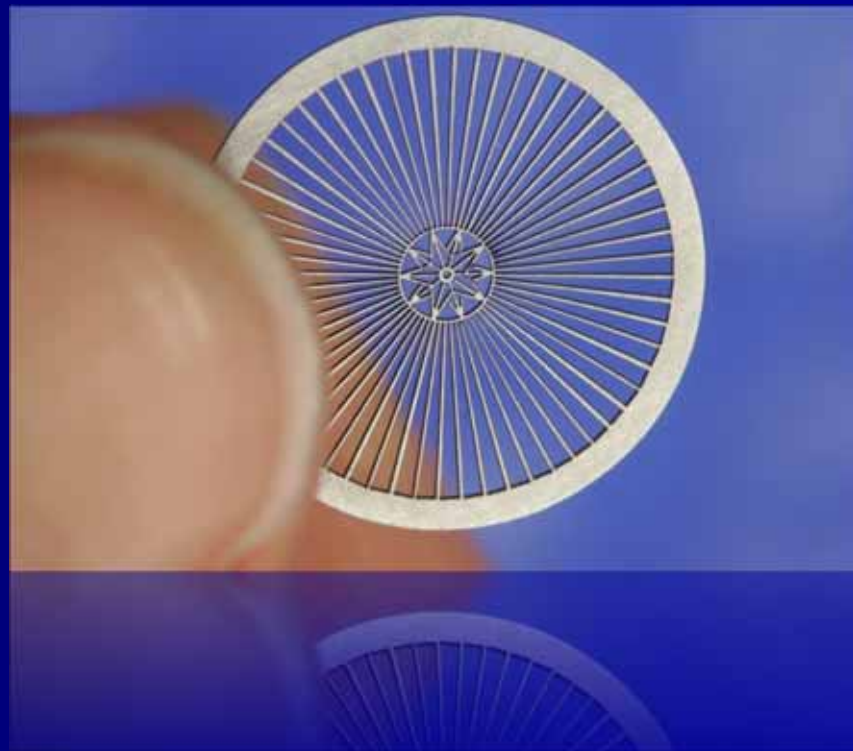


- 30 years experience
- 10 years Ultra Short Puls laser
- turnover 2016 € 1 M, 2017 € 1,3 M
- 10 employees
- ISO 9001: 2015 ISO13485: 2012



materials we process

- all stainless steels
- high melting metals
- plastics
- ceramics
- glass
- sapphire
- diamond
- silicon



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Werkgebieten

medical



analytical



space

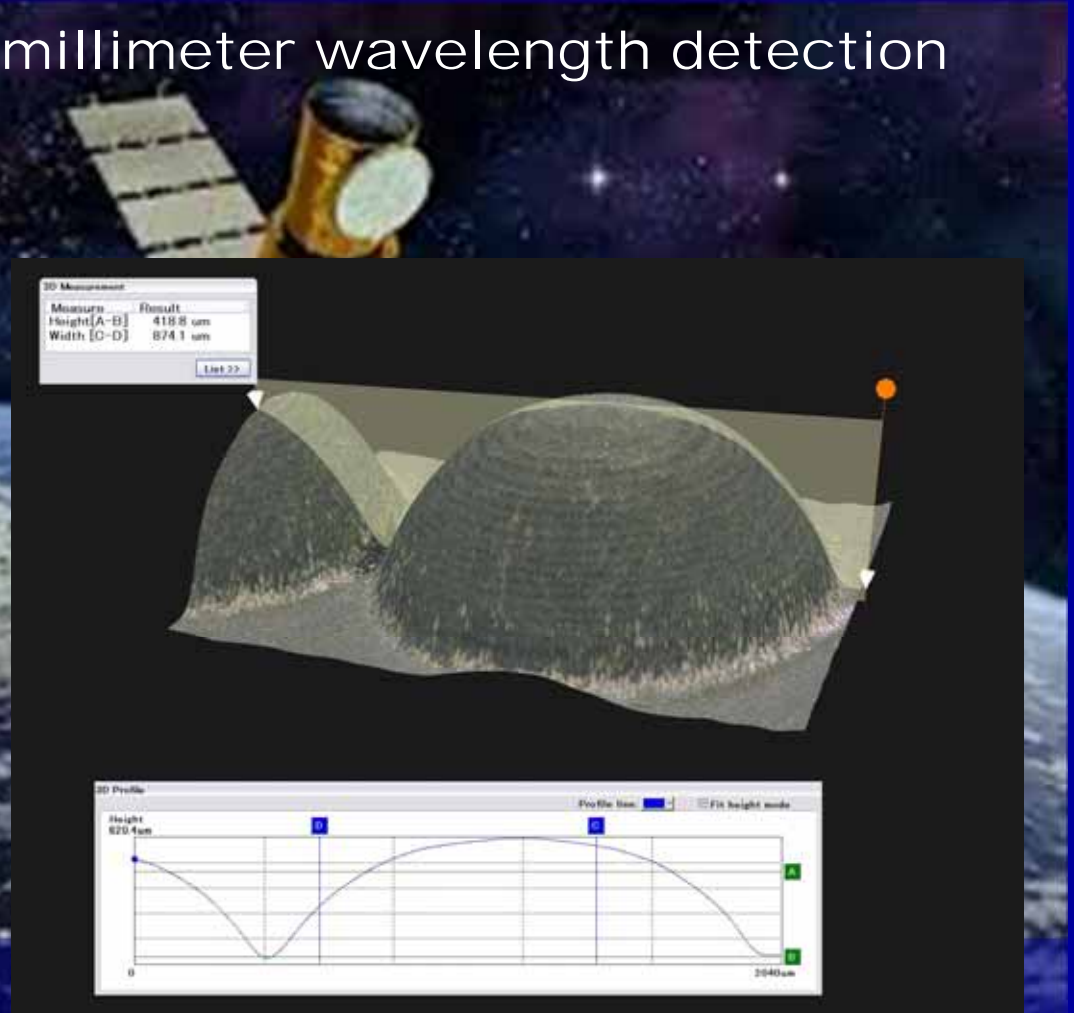


industry



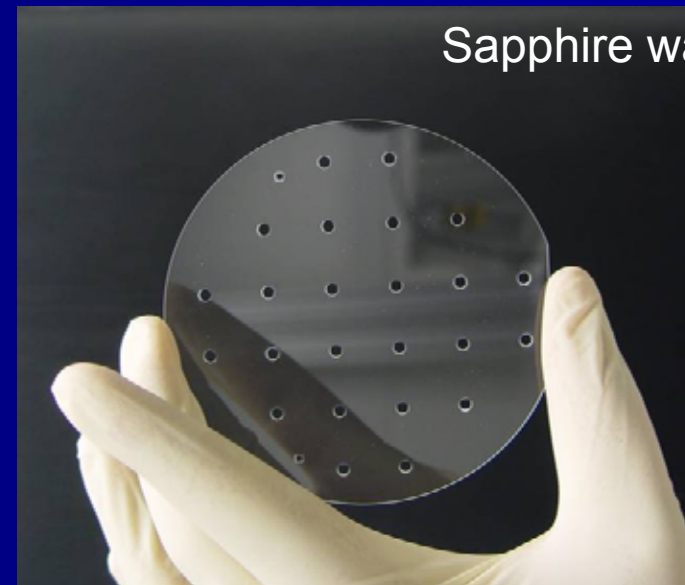
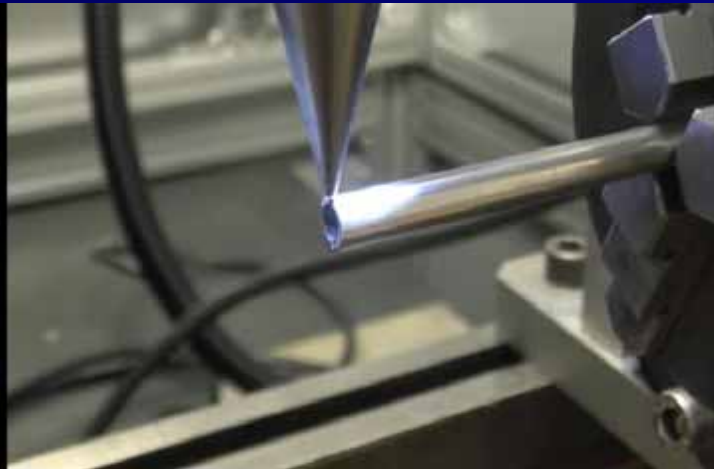
space

Lens arrays for submillimeter wavelength detection



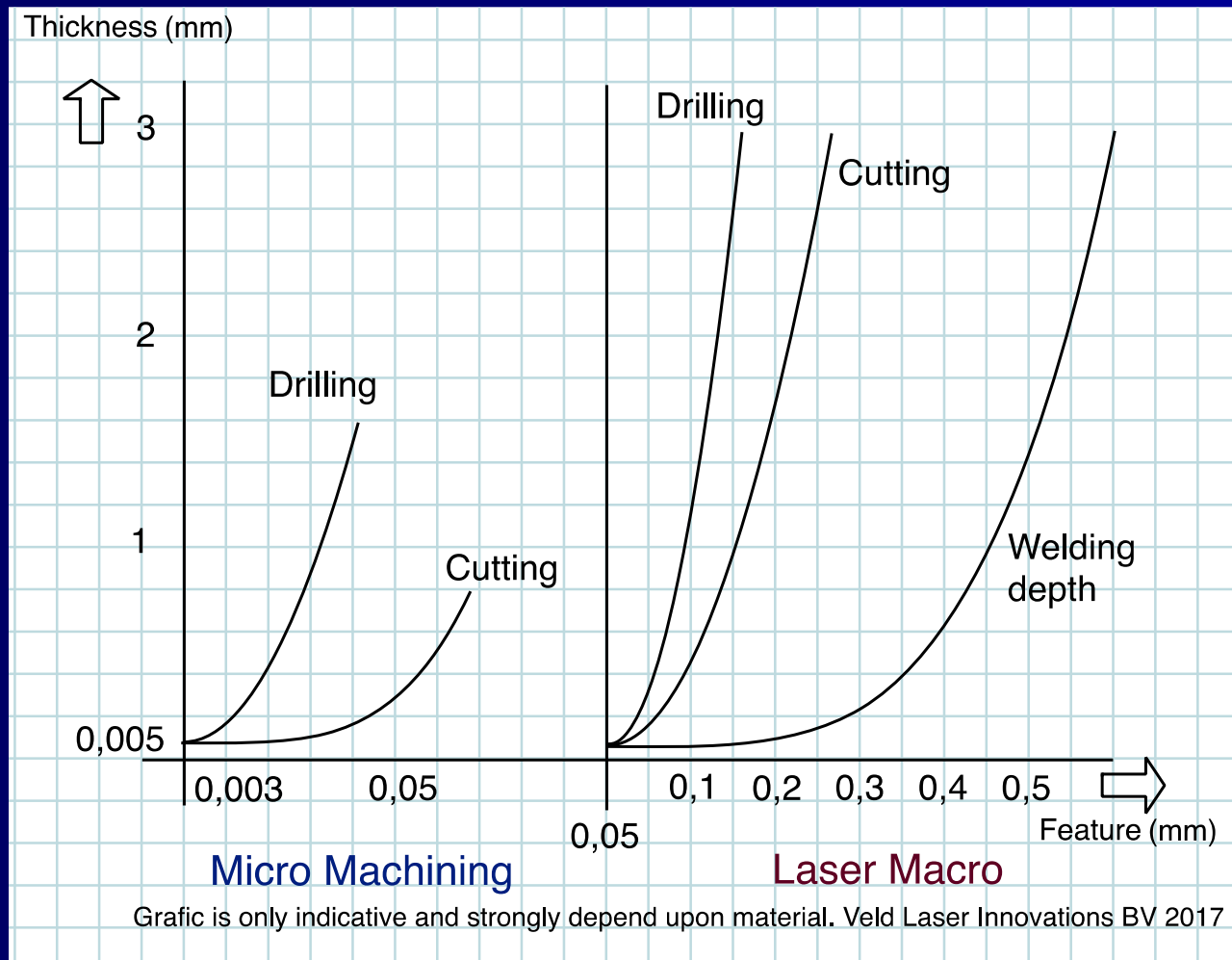
veldlaser

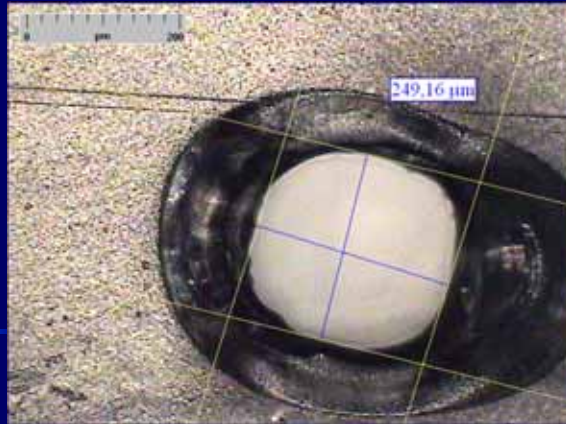
Jobshop disciplines



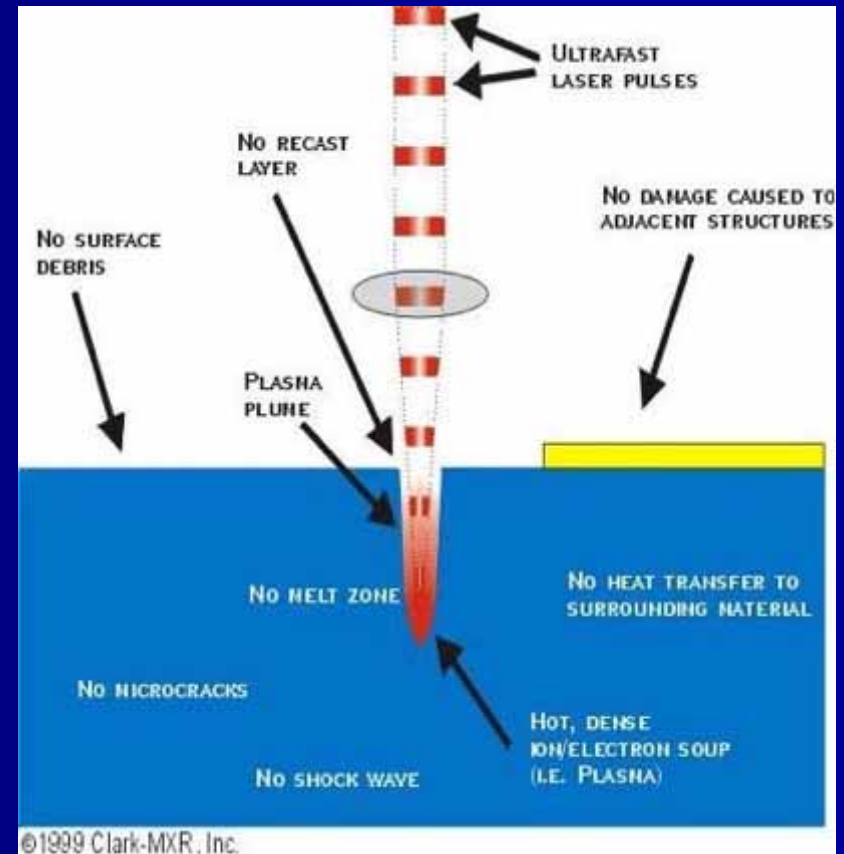
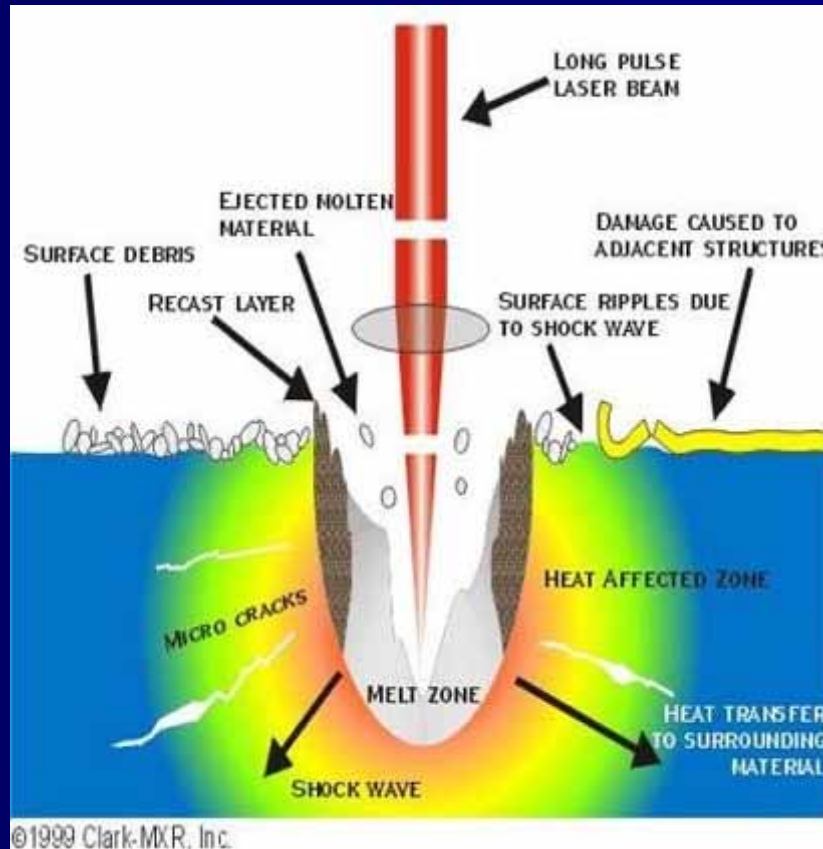
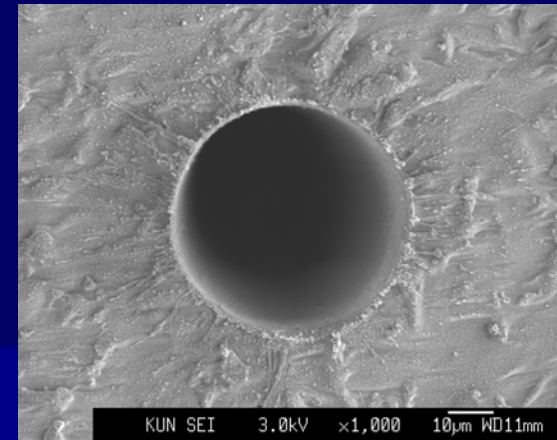
Sapphire wafer

indeling laserbewerken micro - macro





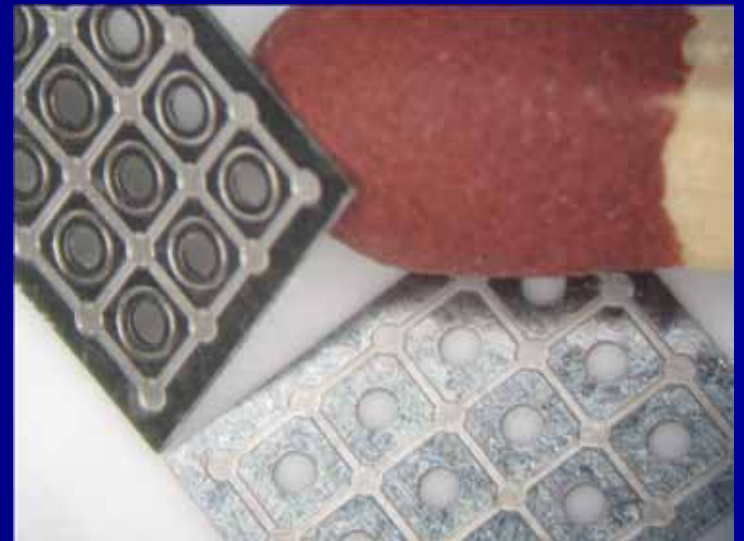
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Micromachining voorbeelden

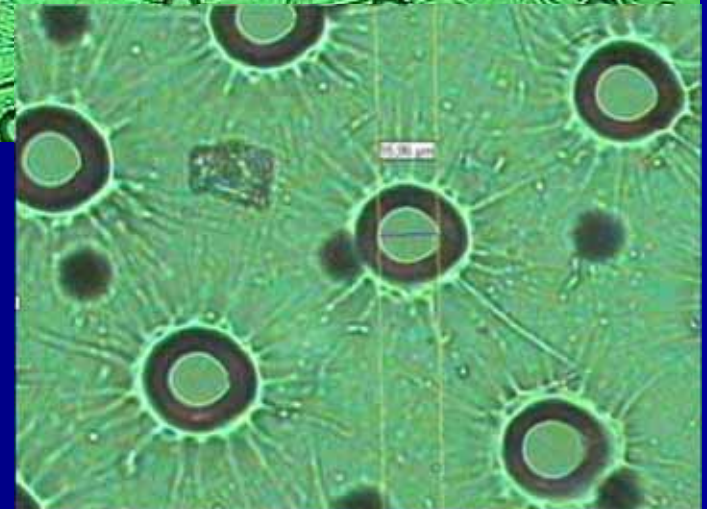
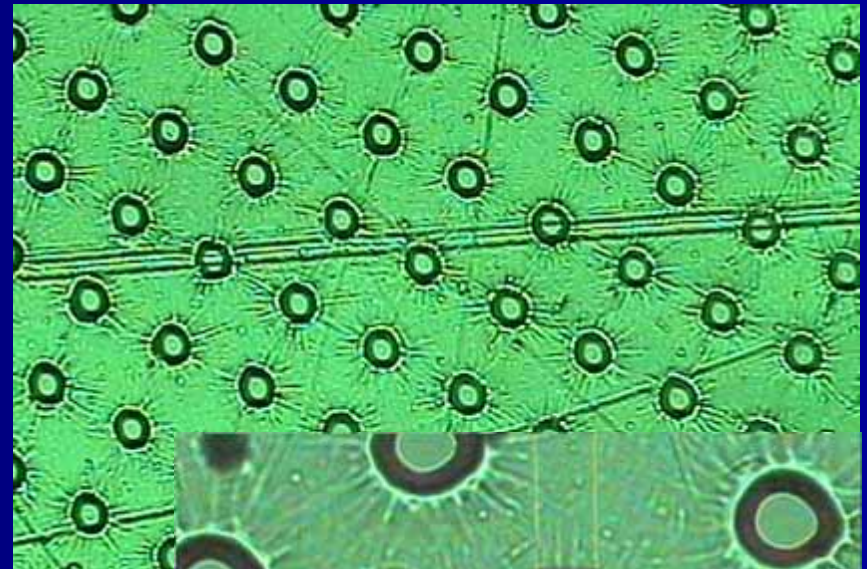


1,5D
De-coating of catheter



2D milling

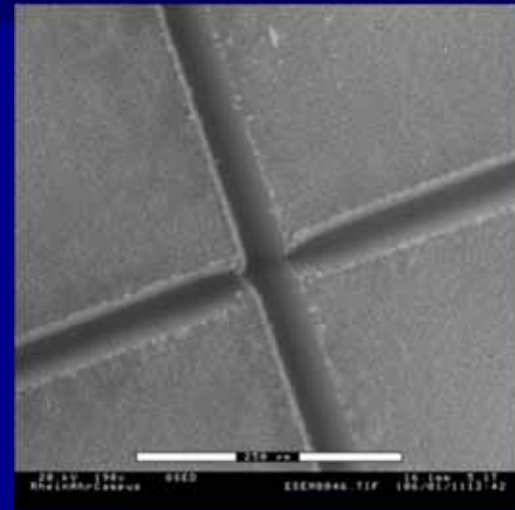
bio-polymer foil machining



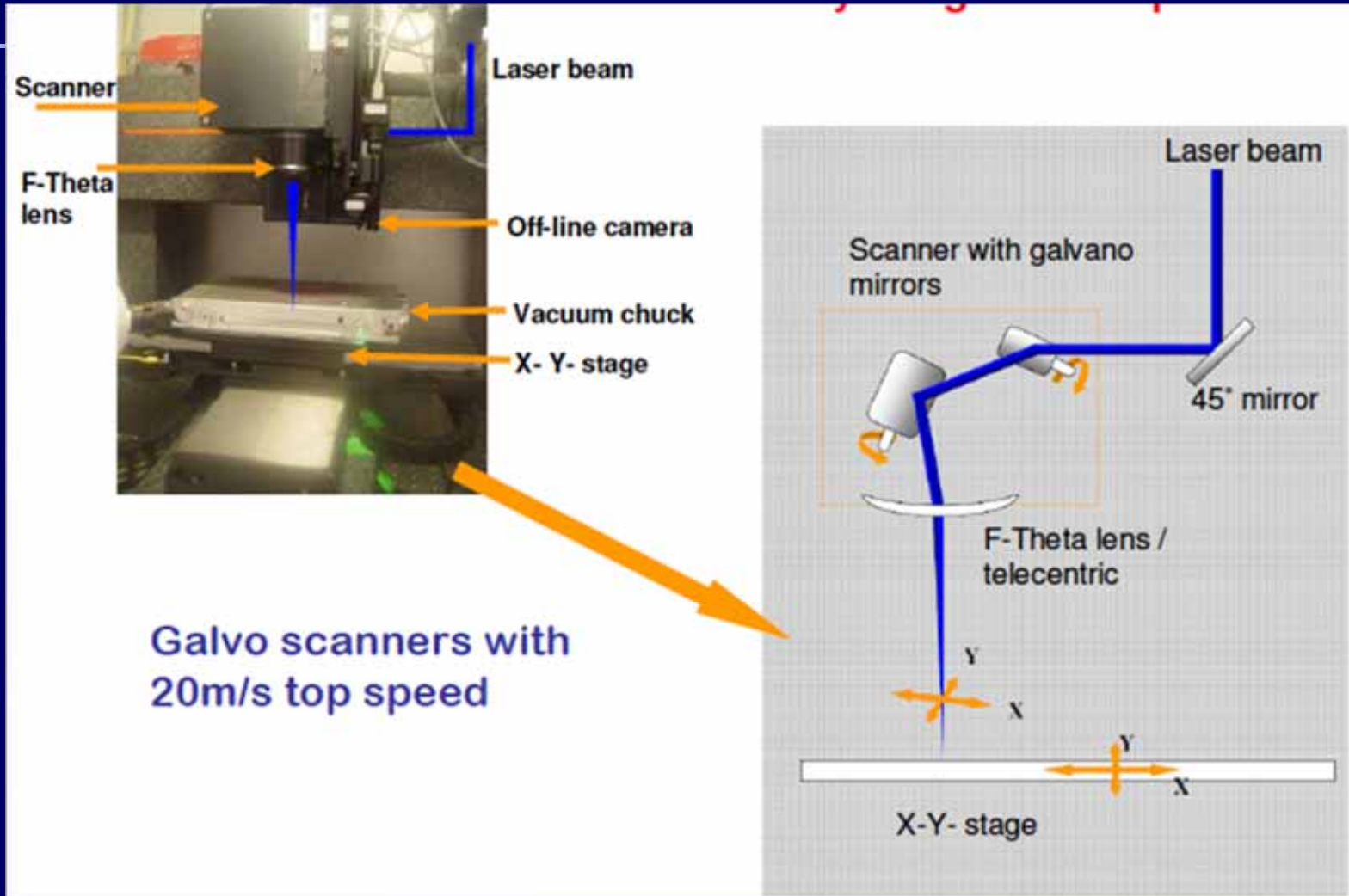
Micromachining



2D bewerking

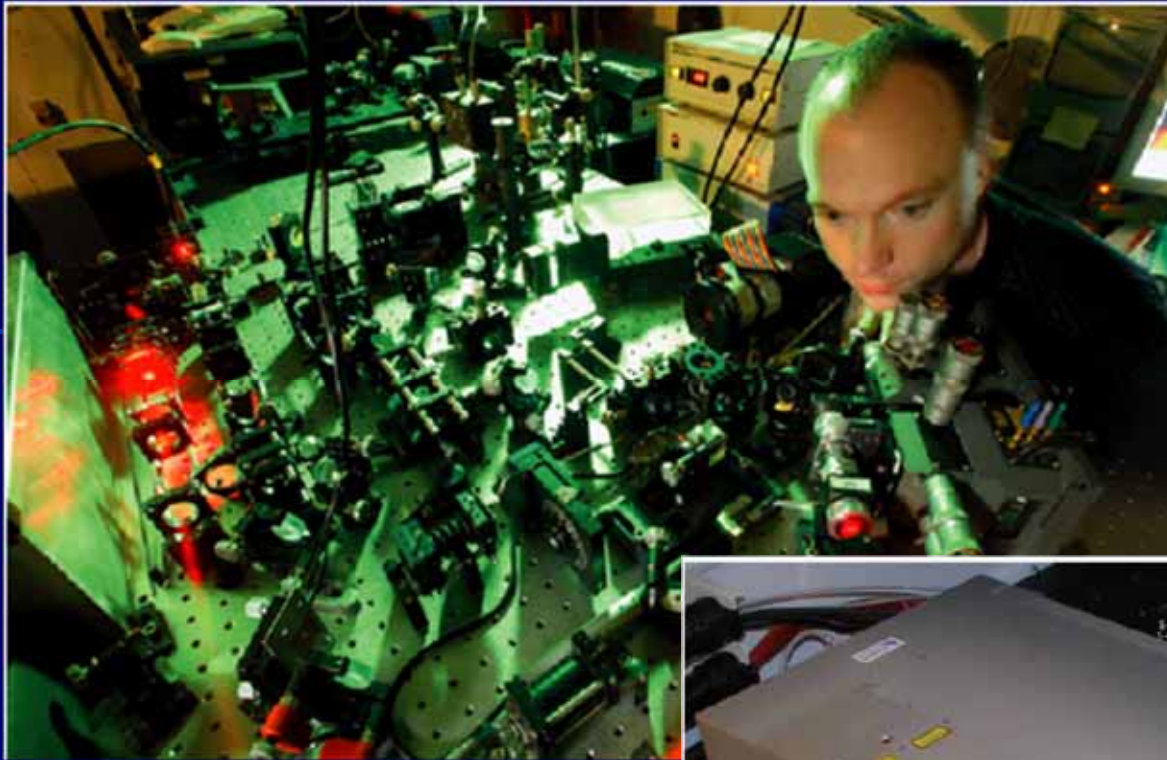


opbouw machine



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15 jaar geleden



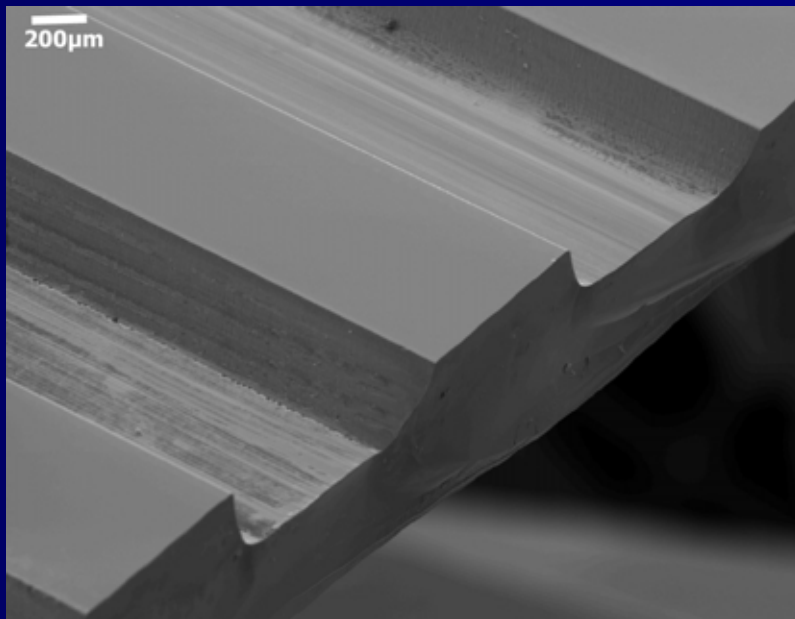
vandaag.....



Bron: Coherent

De stap van 2D -> 2,5D -> 3D

2008



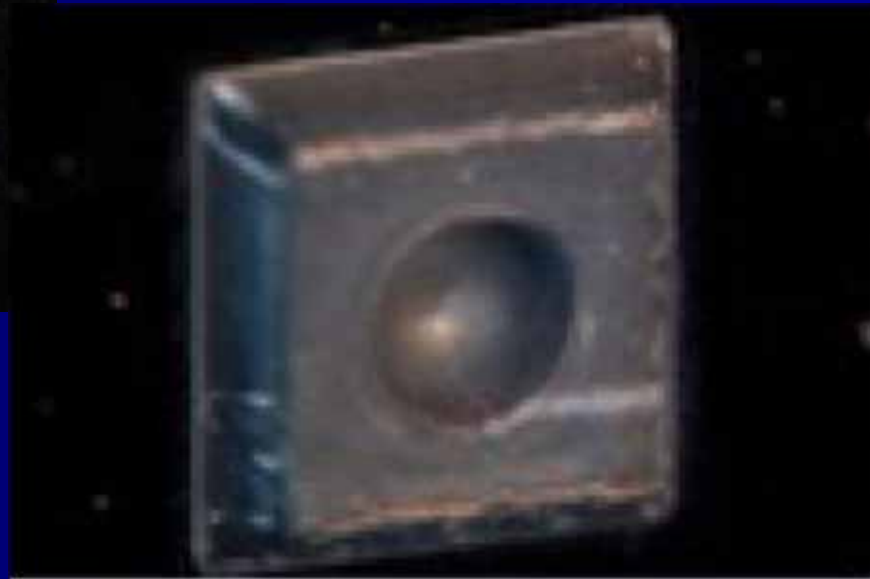
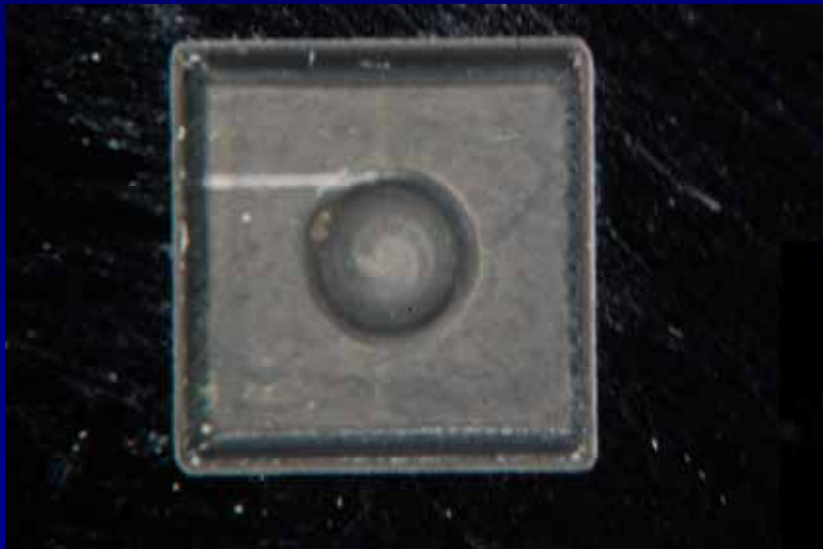
”state of art”



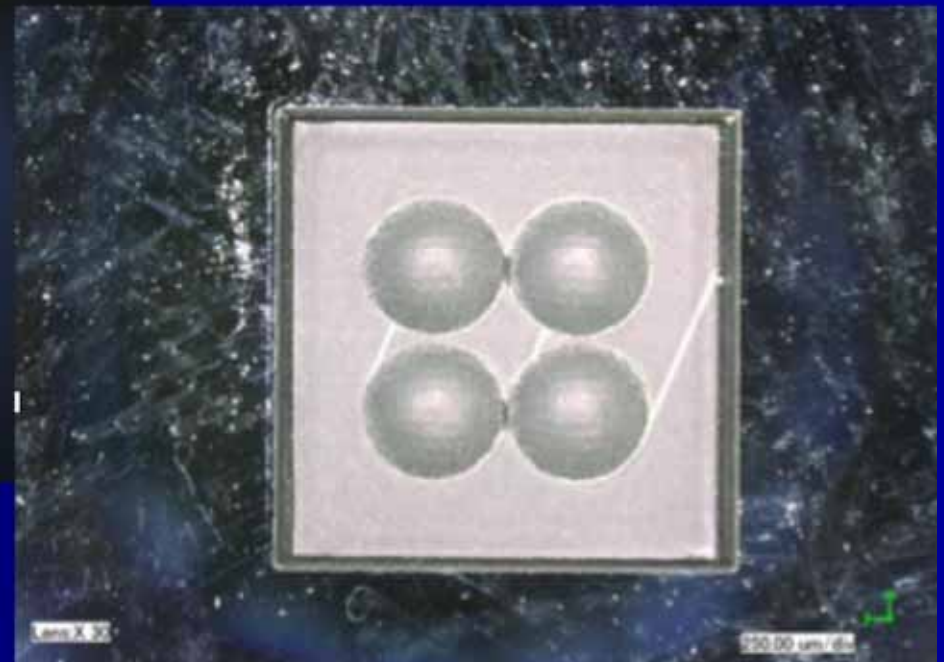
doel SRON

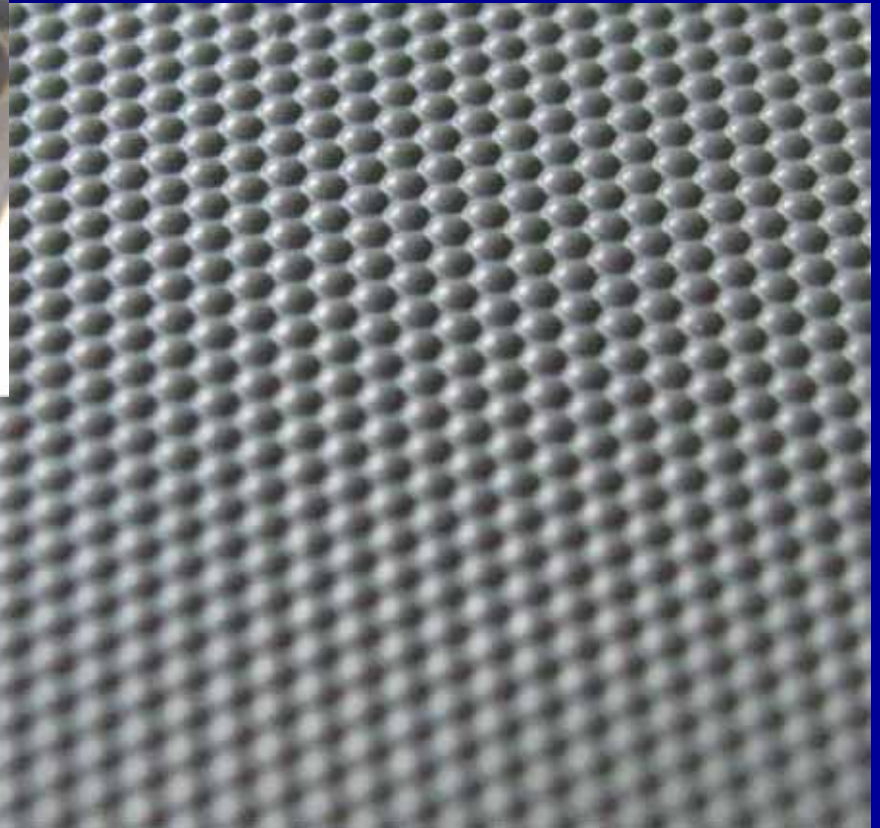
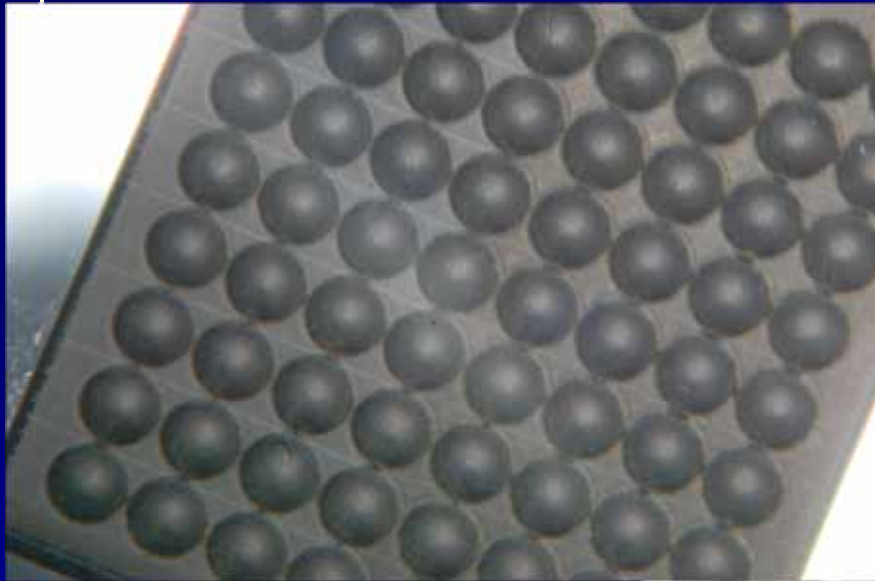
het begin 2D --> 2,5D

- 2009 Eerste lens – proof of principle



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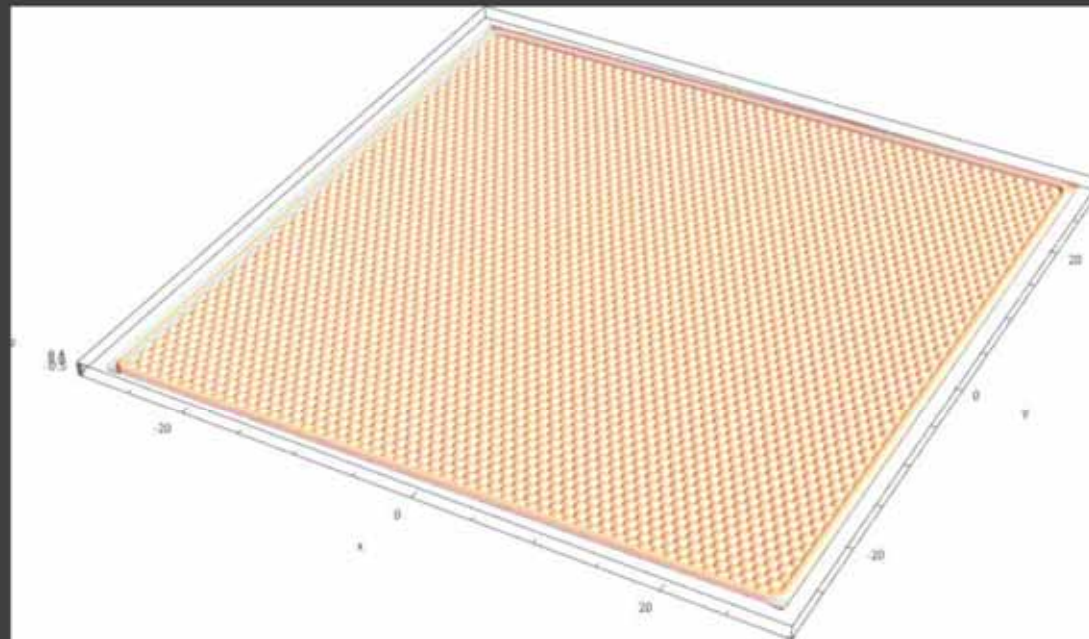
Precisie:

- afnamespecificatie xy-positie: 95% van de lensjes binnen 25 um van gewenste plek.
- afnamespecificatie lensvorm: 75% van de lensjes binnen 10 um van de gewenste vorm;



metingen

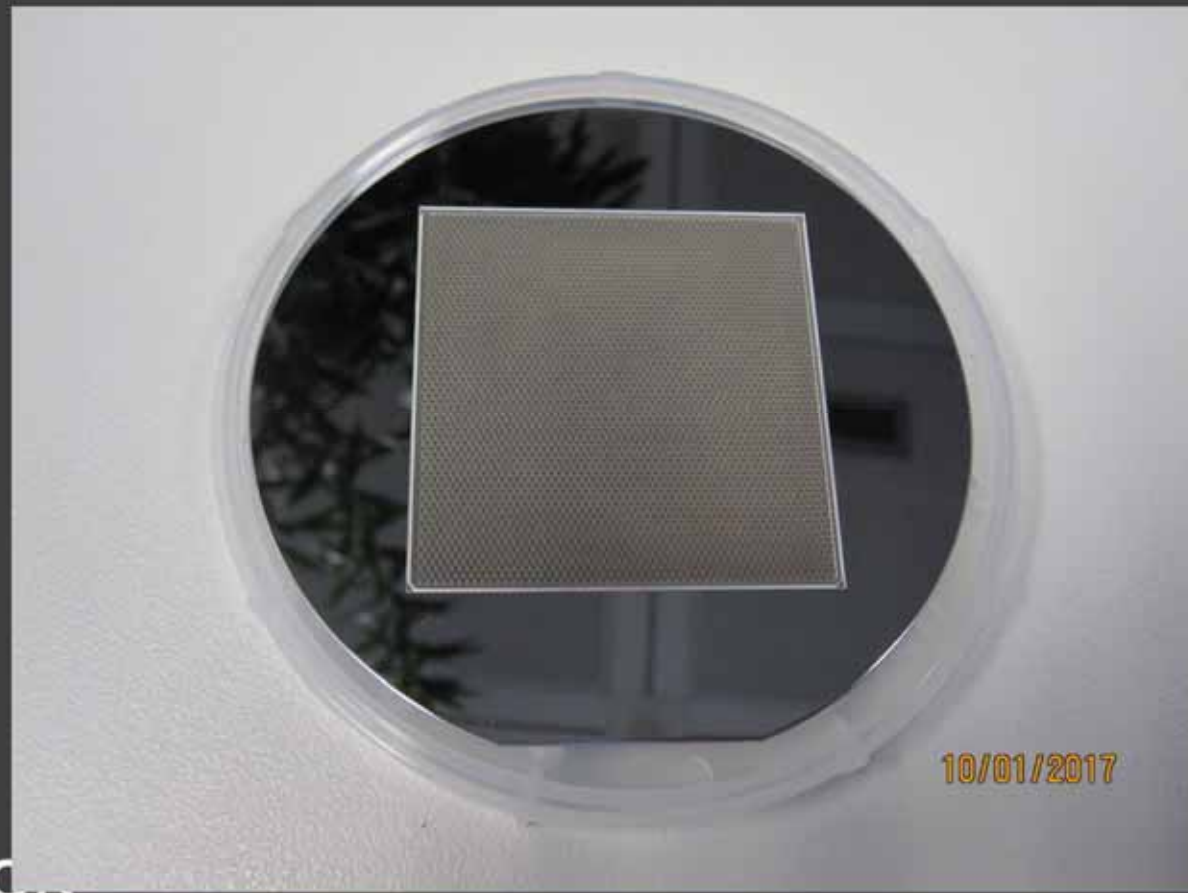
Initial data



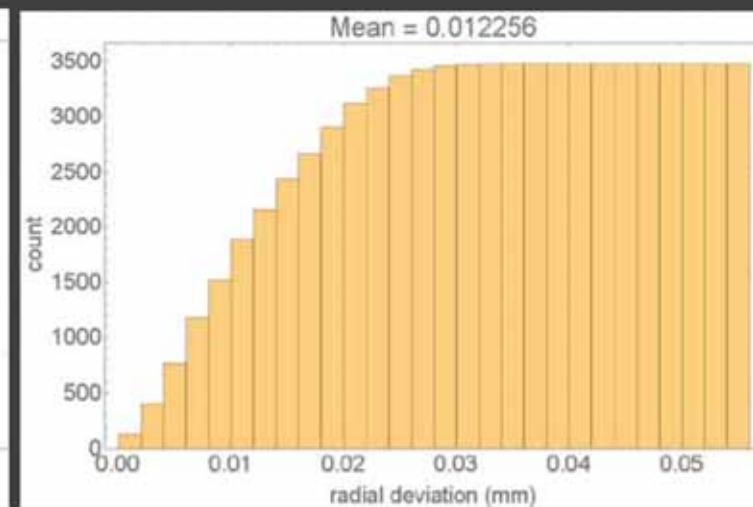
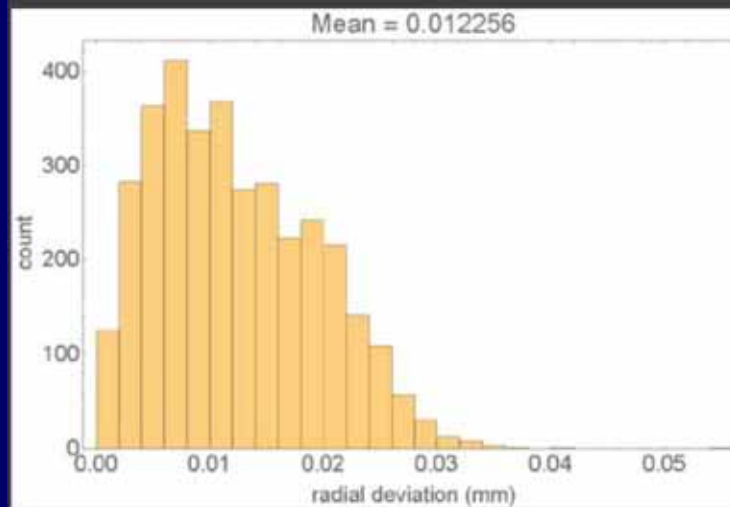
Veld Laser lens array, Measured optically
5335966 vertices,
3488 lenses array -> 1.6 % accuracy on all mean values over
~1000 vertices per lens surface

metingen

Initial data



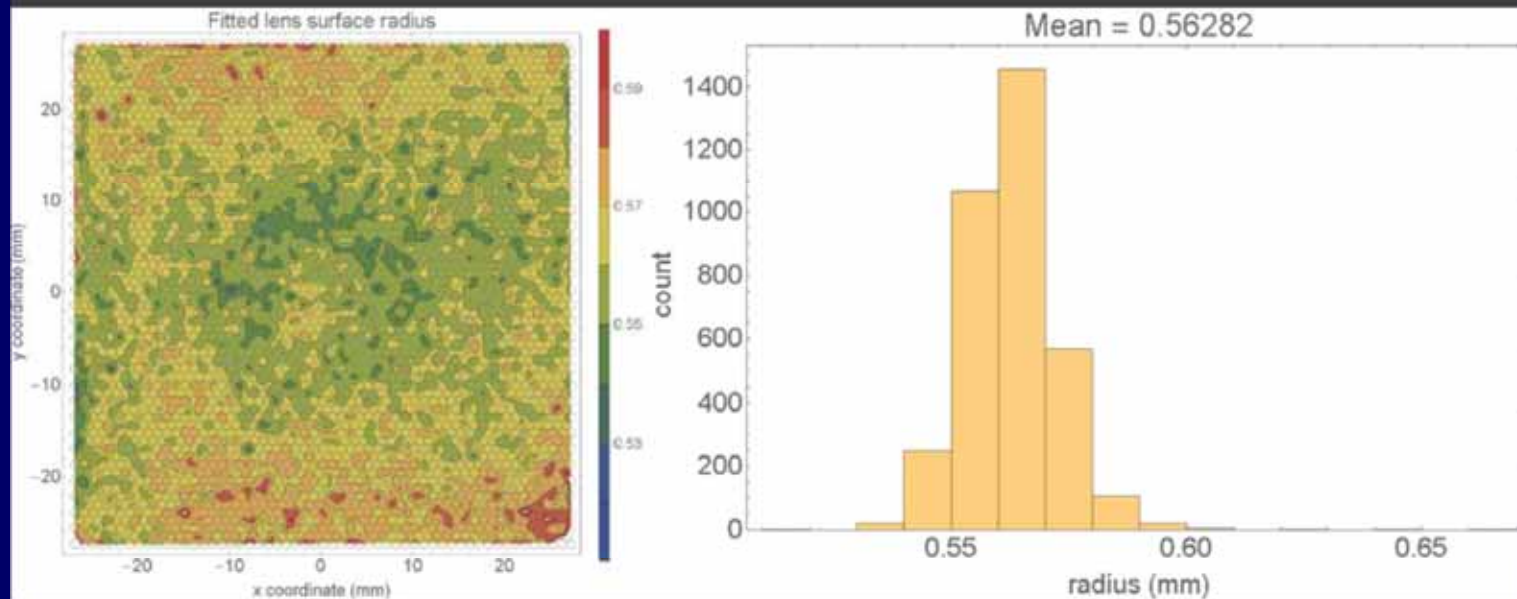
Histogram summary of lens center offsets



Specification in xy-position tolerance: 95% < 25 um

The data show that 96% is in spec: ok

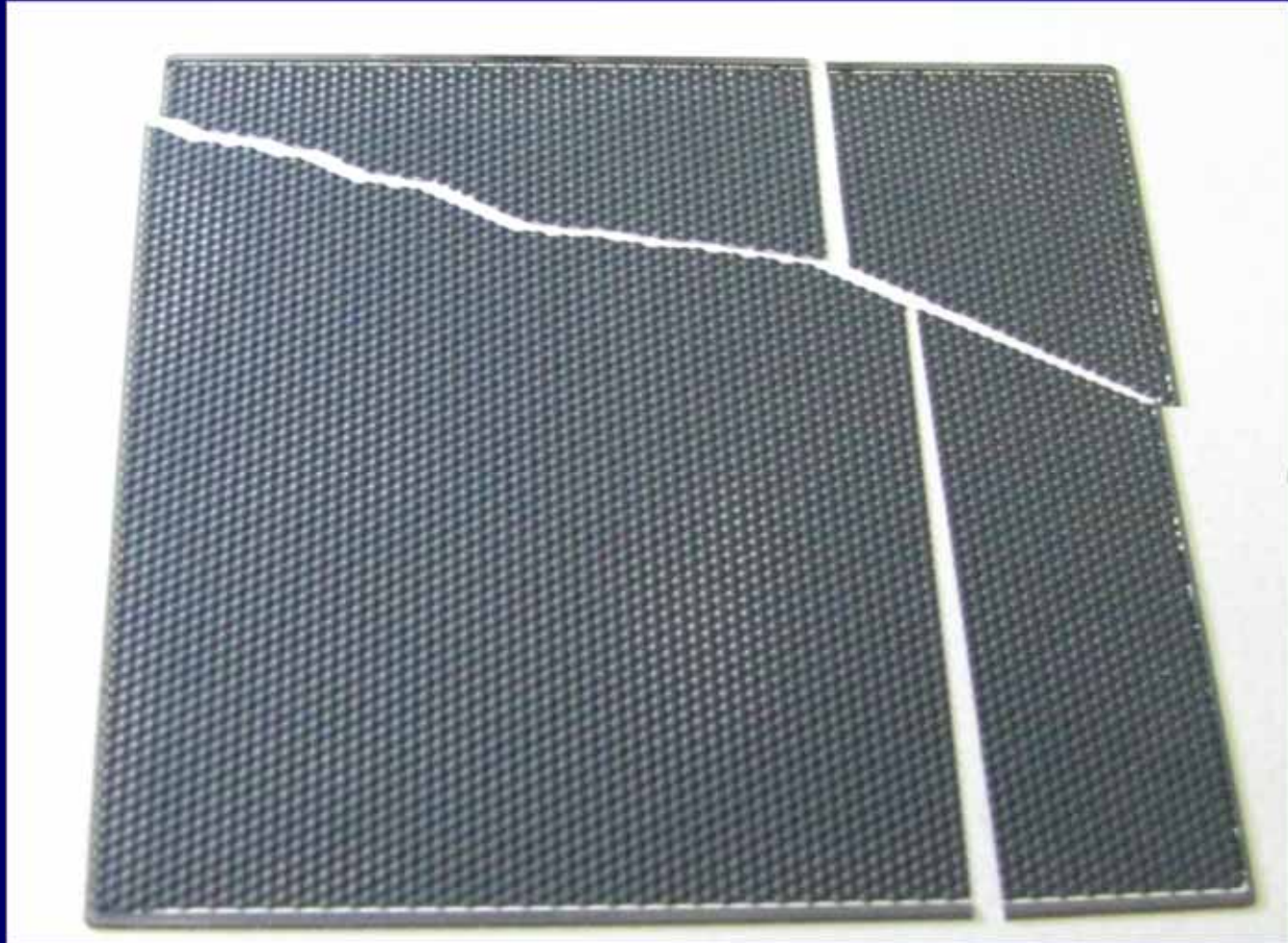
Sphere radius deviation



Specification on radius: 75% < 10 μm

The data show that 86% is in spec: ok

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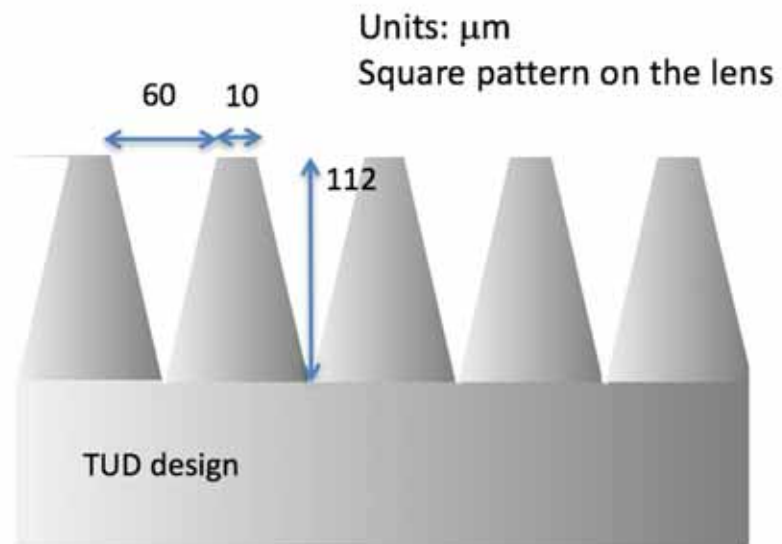
AR-coating

- Dynamische focusering = 3D

3D AR coating

TUD design

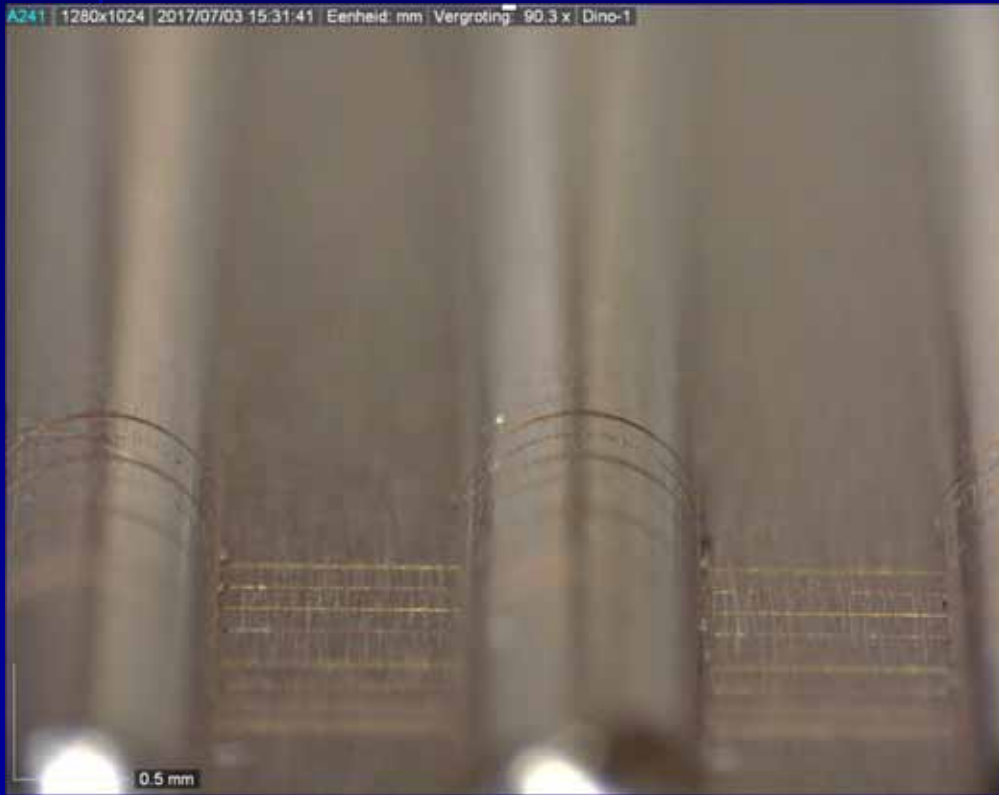
- Corrugations design by TUD assuming an angle of 15degrees
- Performance similar to a Paralyne coating



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3D AR coating

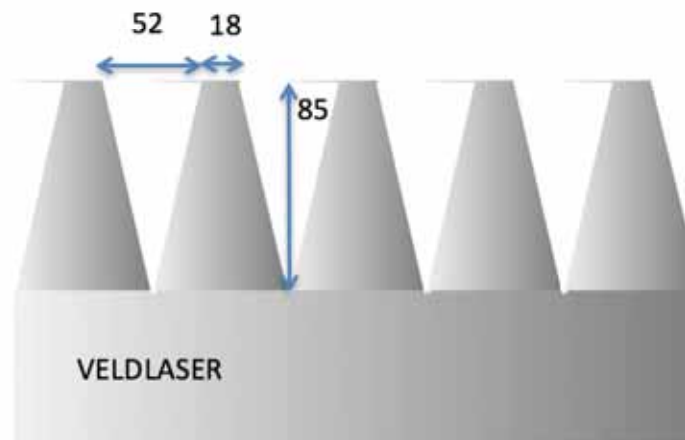
dynamische focussering



3D AR-coating

Veldlaser fabrication

- Veldlaser machined an angle of 17 degrees (instead of 15 degrees)
- The grooves are too shallow. However, on a flat surface, they are ~110um (email information)



conclusie

Samenwerking Sron - Veldlaser

- Uitbreiding van portfolio veldlaser
- Aanjager van nieuwe techniek.
- Goede samenwerking / aanvulling op gebied van bv meten, materiaalkennis.

veldlaser

- DANK U voor de aandacht