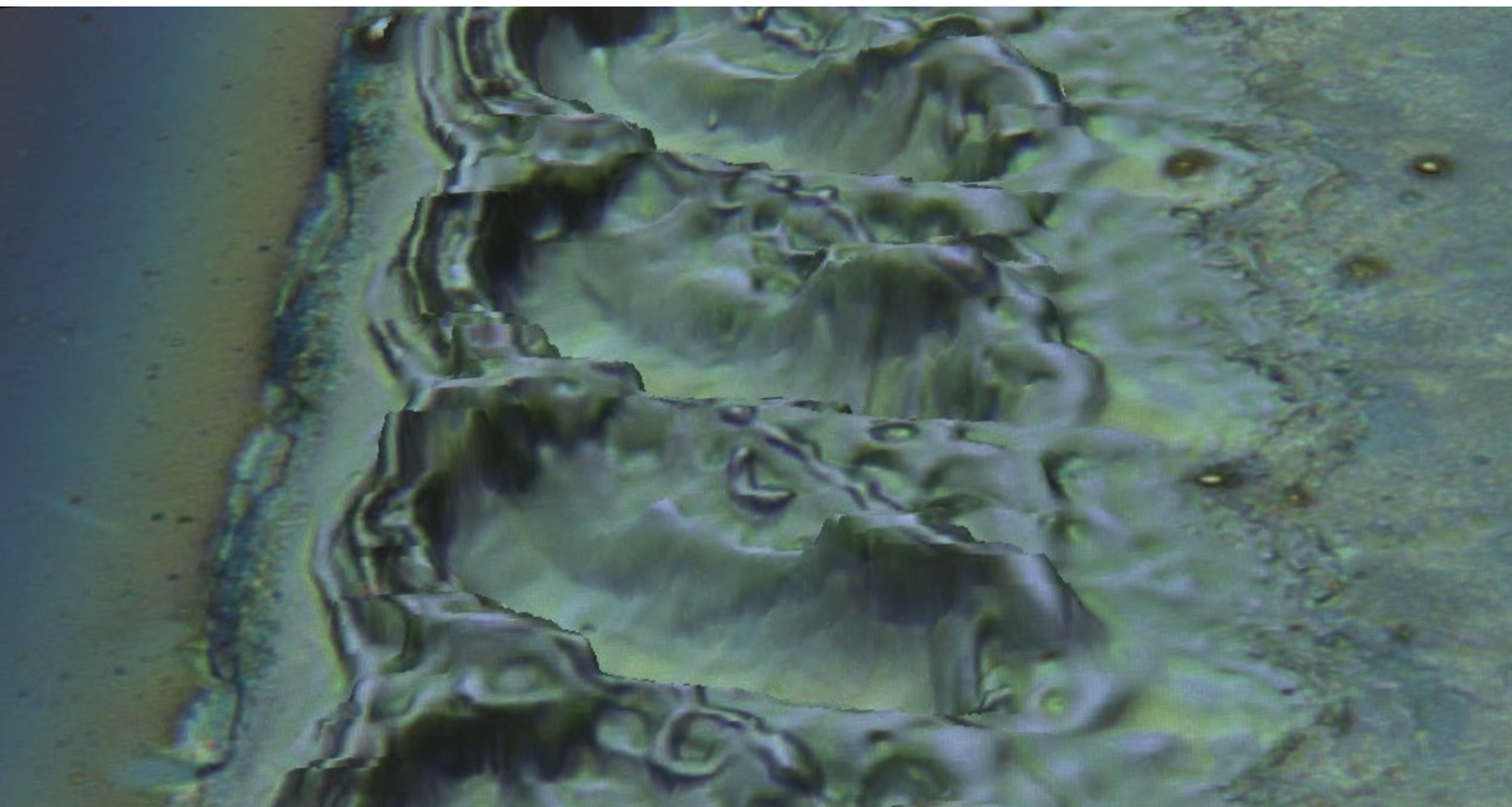


# Zeta-20

Optical Profiler



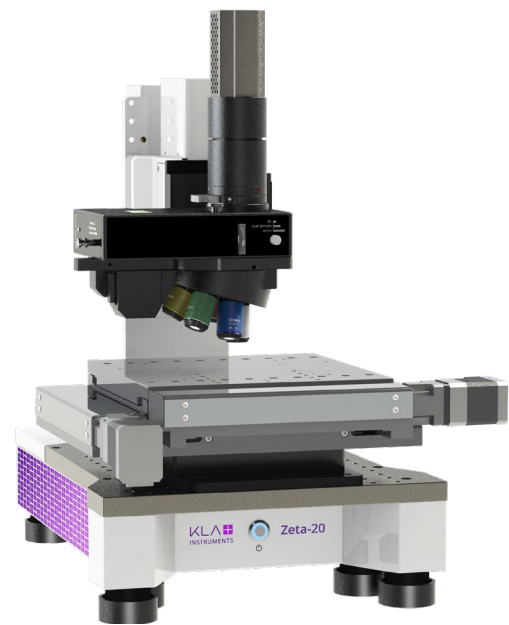
## Advantages

- Fast, non-contact, 3D optical profiler
- Multi-mode optics supporting 3D scanning, interference contrast, film thickness and automated defect inspection
- Fully automated measurements
- Simultaneous 3D scan and True Color infinite focus image capture
- Configurable for wafers with a diameter up to 150mm
- Manual or motorized XY stage and turret options
- Intuitive user interface

## Applications

- Step heights from nanometers to millimeters, including high aspect ratio
- Roughness of smooth (sub-nanometer) and rough (hundreds of microns) surfaces
- White light interferometry for wide area step height measurements with high z-resolution
- Thin film stress and sample bow
- Transparent film thickness from 30nm to 100µm with film thickness mapping
- Transparent, multi-layer surfaces, such as encapsulated microfluidic devices
- Automated defect inspection with sensitivity for defects > 1µm (lateral dimension)

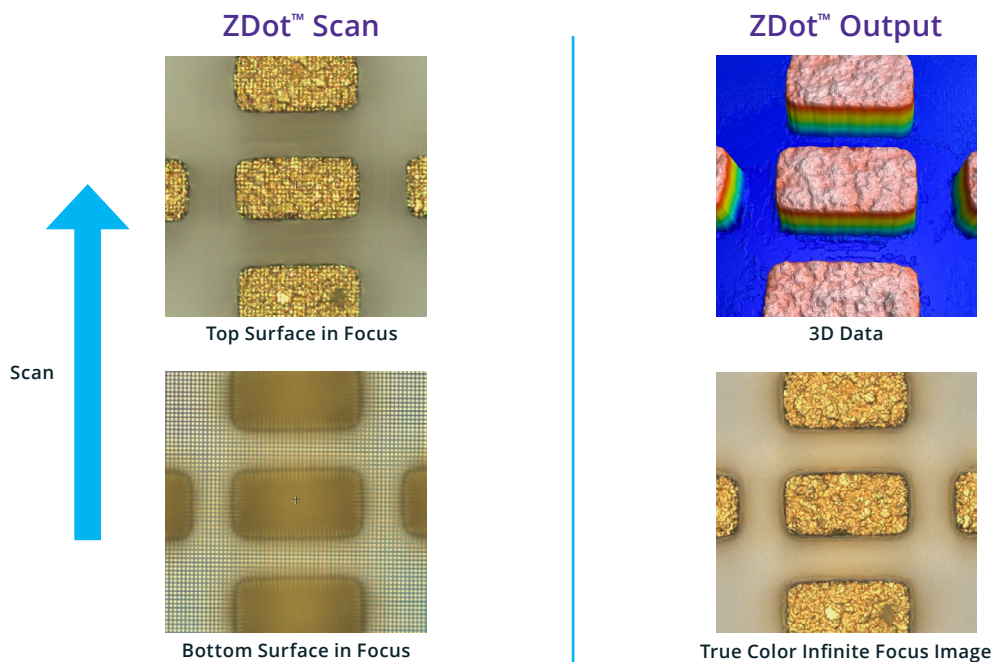
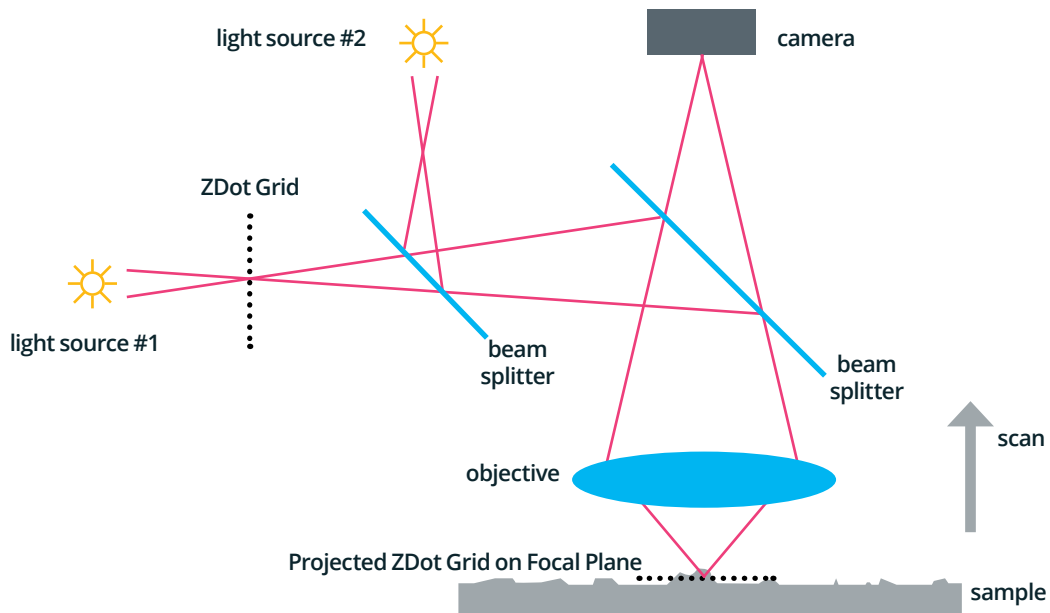
# Zeta-20 Optical Profiler



The Zeta-20 optical profiler is a non-contact, 3D surface topography benchtop measurement system in a compact, robust package. The system is powered by ZDot™ technology and multi-mode optics, enabling measurement of a variety of samples: transparent and opaque, low to high reflectance, smooth to rough texture, and step heights from sub-nanometer to millimeters. The Zeta-20 supports both R&D and production environments by providing comprehensive step height, roughness and film thickness measurements, plus defect inspection capability.

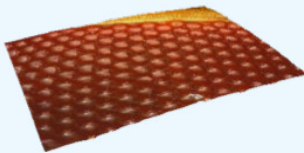
## Core Enabling Technology

ZDot™ confocal grid structured illumination technology is the patented 3D non-contact measurement technique inside the Zeta-20. A grid pattern is projected at the focal plane, providing high contrast when the surface is in focus. The maximum contrast for each pixel as a function of z position is used to map the surface topography. Simultaneously, a second LED is used to provide the surface's True Color at the point of highest contrast. The final output is a high-resolution 3D scan and a True Color infinite focus image of the surface.

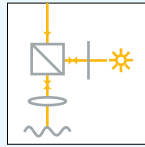


## Multi-Mode Optics

Flexibility and upgradability are enabled with multi-mode metrology, packing six powerful techniques into one compact optical package.

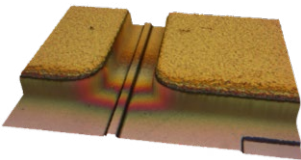


Eye of a Bee

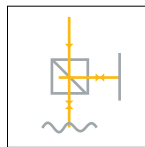


### ZDot™

Proprietary 3D measurement technology combines innovative optics with powerful algorithms to produce high resolution 3D data on a variety of surfaces.



Pump Laser

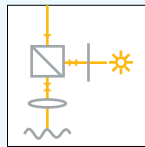


### ZI

Phase and vertical scanning interferometry enable wide area measurements with high z resolution.

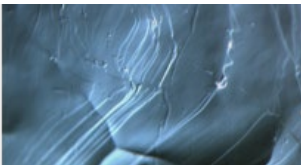


Residue on Glass

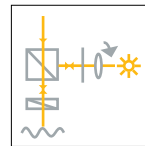


### ZIC

Interference contrast provides enhanced 3D imaging of surfaces having sub-nanometer roughness.

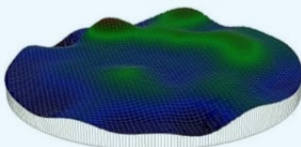


Atomic Steps

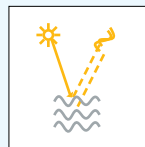


### ZSI

Shearing interferometry uses a standard objective and interference to provide 3D data with high z resolution.

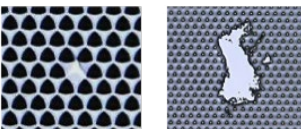


Film Thickness Map

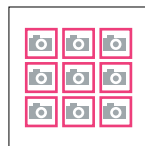


### ZFT

An integrated broadband reflectometer measures film thickness and reflectance.



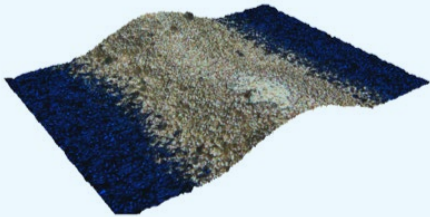
PSS Defects



### AOI

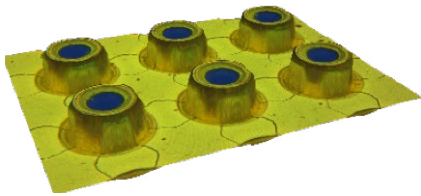
High quality camera and optics enable automated defect inspection by mapping defects across the sample.

## Broad Range of Applications



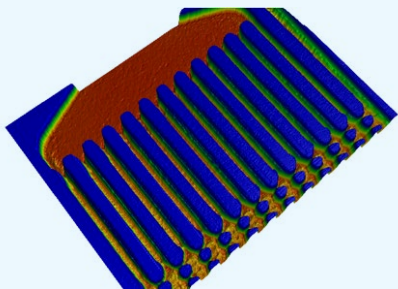
### Photovoltaic Solar Cells

Measure surfaces with both very low and very high reflectance materials in the same scan using ZDot™ technology and a high measurement dynamic range. This functionality enables simultaneous quantification of low reflectance nitride and line height, width and volume of the high reflectance silver paste that determines electrical line resistance.



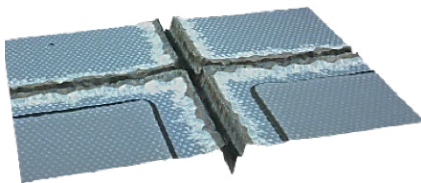
### VCSEL Device

Measure the height of the vertical cavity surface emitting laser (VCSEL). True Color imaging shows the actual color of the surface, enabling visualization of material property changes that cannot be observed in a 3D topography map.



### Microfluidic Device

Measure the height, width, edge profile, and texture of channels, wells, and control structures. This includes measurement after the channel is sealed with a transparent top cover plate – compensating for the change in refractive index and quantifying changes induced by applying the cover plate.



### Laser Dicing

Measure the depth of a laser cut on a LED device. Measure material buildup at the edge of the cavity to determine if it has flowed outside the scribe area and into the active area of the LED device.



### Biotechnology

Measure microneedle array structures for drug delivery, using the high numerical aperture objective lens and the ability to resolve a very low reflectance sample. Measure high aspect ratio steps, such as the depth of deep wells in biotech applications.



## Imaging

Image parameters such as field of view (FOV) and lateral resolution are determined by a combination of camera, coupler and objective.

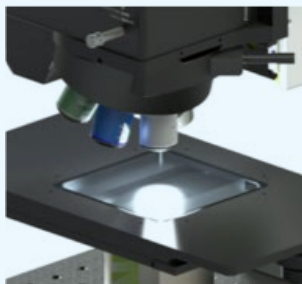
- 5MP color camera, programmable for different regions of interest
- Extensive suite of objectives and coupling lenses to measure an area as small as 45 x 35µm, up to 9.5 x 7.5mm without stitching
- Image in brightfield, darkfield, or differential image contrast (DIC) modes



## Objective Lenses

ZDot™ technology eliminates the need for expensive objectives by using standard objective lenses.

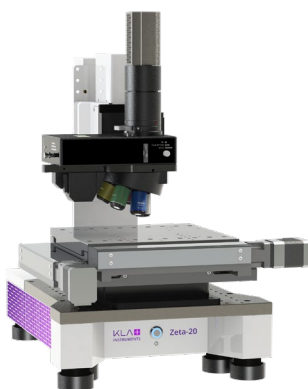
- ZDot™ uses standard, long and ultra-long working distance objectives
- Mirau objectives for interferometry
- Immersion, refractive index corrected
- Diamond-scribe objective with a precision diamond tip to mark features of interest for further analysis on AFM, SEM, FTIR, Raman or other review tools
- Manual or motorized turret with automatic objective identification



## Illumination

Multiple illumination options to optimize performance for each application.

- Broadband white light or 405nm monochromatic high brightness LED light sources
- Transmissive imaging using high brightness LEDs to illuminate transparent samples from the bottom
- Illuminate in darkfield or brightfield
- Side illumination for enhanced defect inspection



## Configurable Stages and Chucks

Compact, benchtop configuration for manual or fully automated measurements.

- XY stages: manual (100 x 100mm) or high precision motorized (150 x 150mm or 180 x 200mm)
- High precision 200µm z range piezo stage for enhanced z resolution
- Chuck options include manual rotary, coarse tip and tilt, fine tip and tilt, vacuum chucks, square chucks, glass chucks for transmitted illumination, and custom chucks for other applications in biotech
- Built-in vibration isolation for high resolution step height and roughness measurements

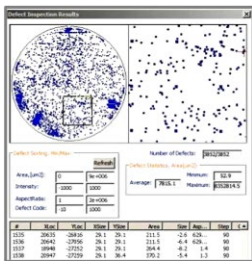


Simple scan setup

## Fast and Easy to Use

Preparing samples and equipment for data acquisition is easy with simple, intuitive software and automated measurement analysis features.

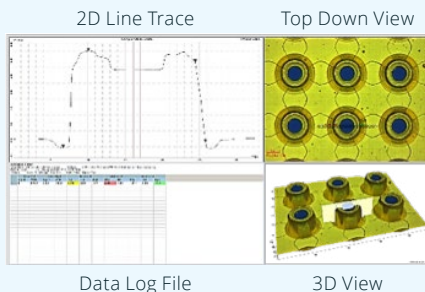
- ZDot™ focus assist for quick surface location
- Automatic illumination control
- Autofocus
- Auto-sequence for multiple sites
- Multiple transparent surface acquisition
- Wide area stitching
- Pattern recognition deskew for automatic sample alignment
- High dynamic range (HDR) for surfaces with high contrast range



Automatic Optical Inspection (AOI)

## Comprehensive Analysis Suite

- ISO 2D and 3D roughness
- 2D and 3D step height
- Automatic feature detection
- CD measurement of detected features
- Bow, shape, and stress measurement
- Automated defect inspection (AOI), plus defect review
- Film thickness spectrometry



Simple, effective analysis report

## Results

Advanced functionality plus easy reporting enable operators and engineers to communicate results:

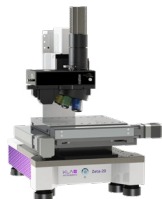
- True Color and height color maps
- 2D and 3D data viewing
- Offline analysis license
- Apex advanced analysis packages

## Optical and Stylus Profilers

Measure the topography of any surface with our range of benchtop and automated wafer handling optical and stylus profilers. Find out more at [kla.com/profilers](http://kla.com/profilers).



Profilm3D, MicroXAM-800



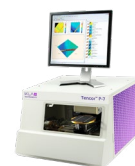
Zeta-20



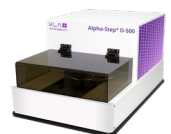
Zeta-300, Zeta-388



P-170, HRP-260



P-7, P-17, P-17 OF



Alpha-Step® D-500, D-600



#### KLA SUPPORT

Maintaining system productivity is an integral part of KLA's yield optimization solution. Efforts in this area include system maintenance, global supply chain management, cost reduction and obsolescence mitigation, system relocation, performance and productivity enhancements, and certified tool resale.

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