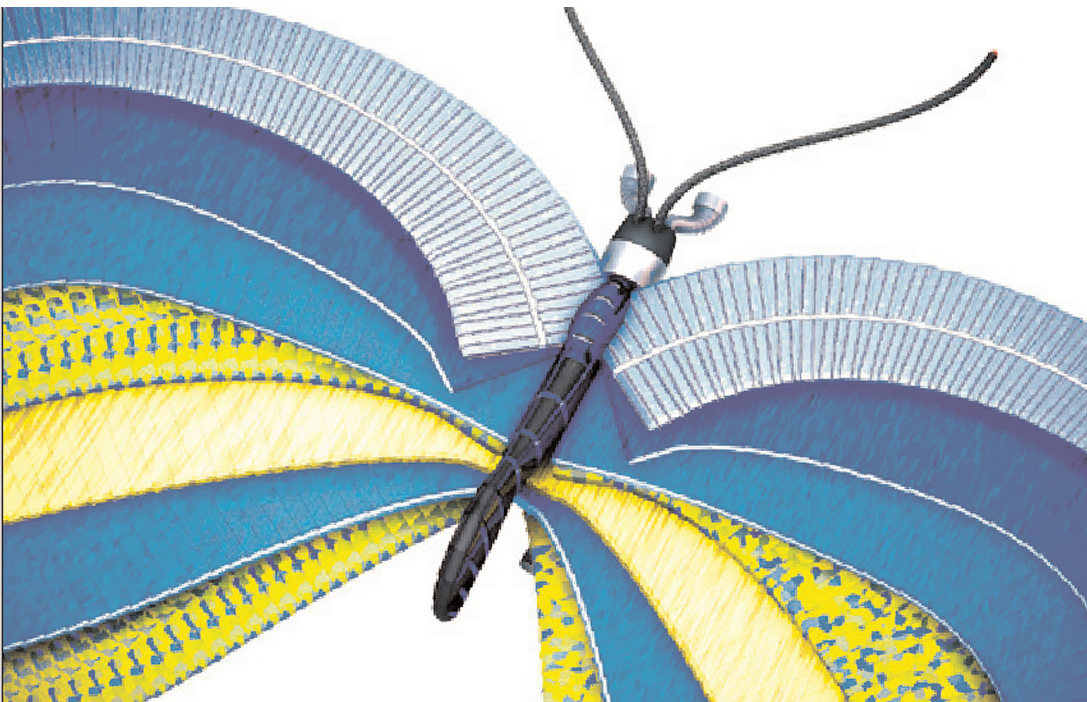


Materials MicroImaging Newsletter



Transcending Limits with the Stereomicroscope SteREO Discovery.V20

**Carl Zeiss' Latest Addition to the SteREO Family
Redefines Stereomicroscopy with a 20:1 Zoom Ratio**

The limits of stereomicroscopes have been redefined. Carl Zeiss' SteREO Discovery.V20 eliminates the need to change objectives or eyepieces when examining large specimens and their small details. It accomplishes this by offering the largest available field of view (23 mm at 10x), the highest available zoom range (20:1), and the industry's highest resolution, all combined into one stereomicroscope.

The innovative optical zoom concept makes all of this possible. The zoom decisively determines the magnification and resolution of the entire system. Thanks to the

motorized control of the zoom optics, the previous inherent tolerance (plus or minus five percent) of the mechanical zoom system has now been stabilized to ensure that the measure of inaccuracy in the reproducibility of the magnification is less than one percent.

The Discovery.V20's greater precision also enables a continuous increase in magnification with precise zoom levels to create a well-defined, high contrast image throughout the entire zoom range. This enhanced contrast results in sharper images with greater enhanced perception of depth.

[more on page 2](#)

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Particle Analyzer

Carl Zeiss has increased its array of particle analyzers with two new versions:

1. A manual system with the Stereomicroscope SteREO Discovery.V8
2. A completely motorized solution based on the upright light microscope Axio Imager.Z1m.

Both systems are supported by new software with automatic particle typing capability – an important new feature for differentiating between metal and nonmetal particles.

[>>>www.zeiss.com/particle](http://www.zeiss.com/particle)

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We make it visible.

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The Discovery.V20's System Control Panel (SyCoP) puts all major microscope functions at the user's fingertips, providing displays for total magnification, object field, resolution, depth of field, and Z position, and allowing for fast changeover between zoom, focus and illumination functions. Special care has been taken to ensure that the system meets the ergonomic demands of users who spend long hours working with this instrument.

The SteREO Discovery.V20 can be combined with the AxioCam digital camera and AxioVision image analysis and evaluation software for a powerful, complete image recording and analysis system; for the digital measuring and evaluating needs of your quality control applications.

[>>>www.zeiss.com/stemi-mat](http://www.zeiss.com/stemi-mat)



The NMI System: Taking Steel Analysis to a New Level

The NMI system from Carl Zeiss incorporates the Axio Imager upright or the Axio Observer inverted microscope to provide the optimal conditions for reliable and convenient measurements of non-metallic inclusions in steel.

Steel analysis is now much easier and more precise with the new non-Metallic Inclusions Microscope System (NMI) from Carl Zeiss.

parison of a sample to a reference chart image. What's more, the NMI system allows automatic objective analysis on up to six



The system, offered as a complete package, fully supports the new EN 10247 European standard for determining the content of non-metallic inclusions in steel, along with the following previously existing standards: DIN 50602, ASTM E 45, ISO 4967, and JIS G 0555.

The NMI system can be tailored for further image analysis applications such as grain size analysis and particle analysis, and utilizes either the Axio Imager.Z1m upright microscope or the Axio Observer.Z1m inverted microscope to ensure reliable, reproducible and convenient measurements. All the components of the microscope, ranging from the camera to the motorized table, are controlled by AxioVision Software from Carl Zeiss for full functionality.

With the new NMI system, quality is determined through an automated process performed by repeatable mathematical calculations – a dramatic improvement over the prior methods, which involved visual com-

samples at a time using batch mode, and can output the results of a batch measurement either individually or combined.

The integrated NMI software offers the option of performing measurements on a large Mosaic image, a composite of many individual tile images. This feature addresses the inaccurate classifications that occur during independent individual tile analysis when inclusions cut off at the image edge are not recorded in their entirety. With the NMI system, sample evaluation is not only more accurate, but it is much faster and easier than the previous manual and visual evaluation methods, especially if the sample is measured against multiple standards.

[>>>www.zeiss.com/micro-brochures](http://www.zeiss.com/micro-brochures)



FAQ: How many pixels does a microscope camera need?

Based on the numerical aperture (N.A.) of the objective lens, a microscope can resolve structures of a particular size range (e.g. 400 nm resolution for a 50x with 0.80 N.A. with 550nm wavelength of light).

The number and size of the pixels in the digital camera need to be selected to match this resolving power of the microscope. If the number of pixels is too low or the pixels are too big, it will not be possible to differentiate certain structures because they will be imaged on identical pixels.

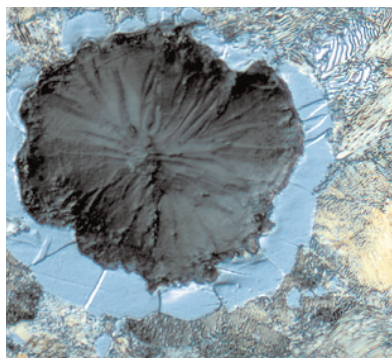
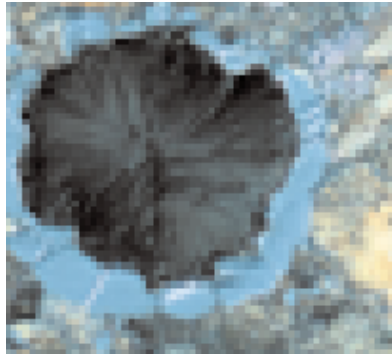
However, if the number of pixels is too high or the pixels are too small, the structure will be imaged by more than the required number of pixels. This will just create empty magnification -- larger files with no additional information.

As a rule of thumb, the number of pixels needed decreases as magnification increases. That said, with increasing N.A., a higher number of pixels is required.

A camera with more than five mega pixels (MP) is well suited for capturing high resolution images at lower magnifications. For high magnifications (e.g., 50x and 100x), a camera with 1.3 MP will usually suffice, as there are enough pixels to equal the resolution of a microscope like the AxioCam MR series.

If a single camera system is used for a broad range of applications, Carl Zeiss recommends selecting cameras with flexible resolution. These cameras use microscanning technology, like that found in the AxioCam HR Series, where the sensor is moved in sub-pixel steps to increase the number of pixels during image acquisition. As a result, a high resolution picture is acquired.

www.zeiss.com/cameras



Iron at 50x magnification, DIC contrast

Microscope-Objective		2/3" CCD Sensor			
		Adapter 1x		Adapter 0.63x	
Magnification	Numerical Aperture	Pixel (x)	Pixel (y)	Pixel (x)	Pixel (y)
100x	0.95	496	393	787	624
50x	0.95	992	787	1574	1249
20x	0.5	1305	1035	2071	1643
10x	0.3	1566	1242	2486	1971



The Axio Observer Inverted Microscope—Superior Performance and Convenience

The Axio Observer inverted research microscope significantly increases the convenience and reliability of material and structural analysis, component measurement, and routine examinations in metal production and processing. A wide range of microscope configurations allow selection from manual to fully motorized operation. In short, the Axio



Observer represents a revolutionary optical accomplishment in the demanding field of materials microscopy.

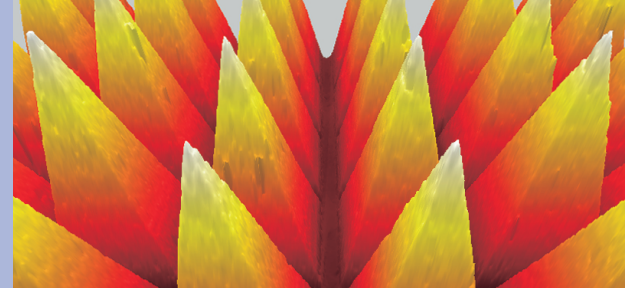
Apochromatically corrected, the Axio Observer's illumination beam path substantially improves performance in all contrasting techniques using incident light. It also ensures brilliant, true-to-color detail rendition in brightfield, and offers optimal stray light minimization in darkfield -- enabling the detection of even the smallest structures and defects. The Axio Observer also supports the use of fluorescence, transmitted light-brightfield, phase contrast, homogenous DIC, C-DIC and polarization techniques.

A complete Axio Observer microscope system with integrated AxioVision software and AxioCam cameras as well as Grains, MultPhase, NMI and Graphite application solutions provides an optimal environment for materials microscopy.

www.zeiss.com/axioobserver

AxioCam HR

With up to 13 Mio. pixels, 14 bit dynamic range and the highest color rendition, this new digital camera offers unparalleled image quality. The AxioCam HR is easy to use and is now available with a FireWire interface.



The LSM 5 EXCITER Delivers 3-D Precision

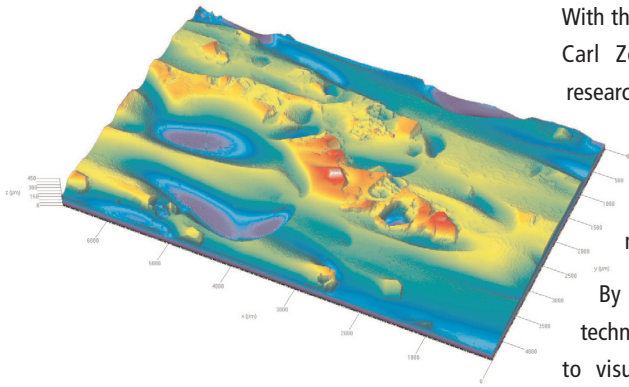
With the advent of the LSM 5 EXCITER from Carl Zeiss MicroImaging, the materials research industry finally has a microscope system that can analyze relatively soft materials like polymers in a non-contact procedure with high measuring accuracy and resolution.

By employing a non-contact confocal technique, the LSM 5 EXCITER allows users to visualize and measure 2-D and 3-D topographies, determine roughness and waviness, and measure porosity and volume content with a high degree of quality and

reliability. Additionally, the possibility of working in both reflected and fluorescent light expands the flexibility of analytical techniques.

The LSM 5 EXCITER can be precisely tailored to meet each user's specific requirements, and can be combined with a variety of high-end microscopes like the Axio Imager and Axio Observer from Carl Zeiss. Additionally, optional Piezo-technology and nanometer scaling allow fast and exact measurements.

>>>www.zeiss.com/confocal-mat



Resources

Upcoming 2007 Exhibits

NEPCON

Booth # 1034

<http://www.NepconEast.com>

October 30-31

Hynes Conv. Ctr. – Boston, MA

Eastern Analytical Symposium (EAS)

Booth # 639

<http://www.eas.org>

November 12-15

Garden State Conv. Ctr. – Somerset, NJ

For More Information

For more information or to request literature, add or remove your name from our mailing list and more, please visit:

<http://www.zeiss.com/mat-news>.

The Clean Microscope

Would you like to know how to recognize and best remove dirt from your microscope? Clean microscopy optics is a prerequisite for successful microscopy with highest possible image quality. Over the years, a variety of cleaning procedures have been recommended. This guide teaches the best cleaning methods for different optical surfaces and the types of dirt to be removed.

>>>www.zeiss.com/cleanmicroscope

Participate in the Internet Application Library... And receive a pair of ZEISS binoculars

Would you like to share your application images with others on our website? We are currently redesigning our website and are adding an application library with application images.

Submitting your application is easy...register at www.zeiss.com/application-library. Simply upload your text and images and we will build a draft website referencing you and your institution. We will work with you directly to make changes as needed before publishing.

The first 10 participants will receive a beautiful pair of ZEISS binoculars.

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