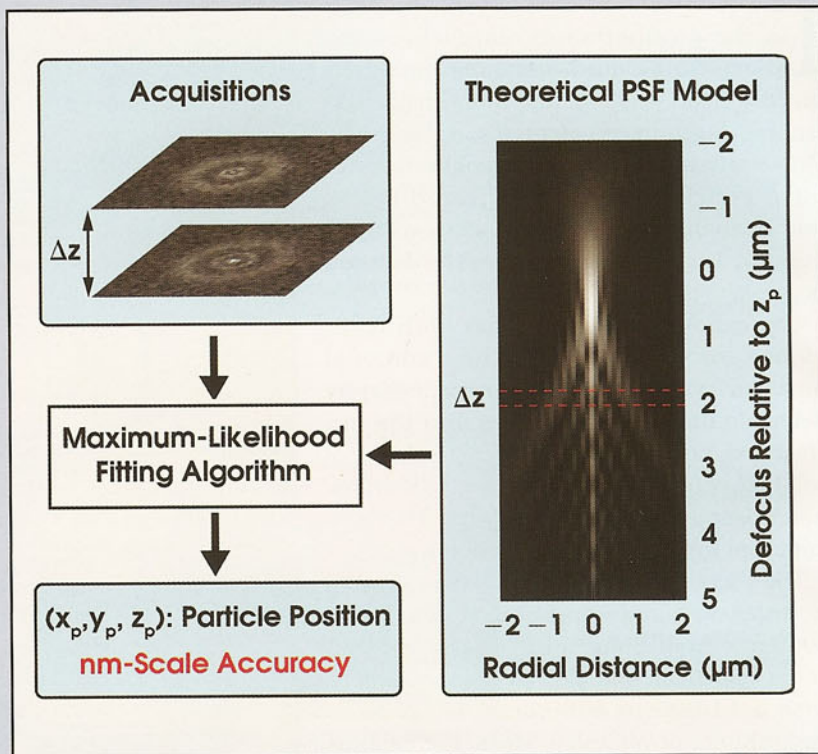


# Accurate Localization in Fluorescence Microscopy

At Ecole Polytechnique Fédérale de Lausanne in Switzerland, scientists have developed a technique for accurately tracking fluorophores in wide-field fluorescence microscopy that requires no customized hardware. It localizes particles to a precision better than 15 nm in the axial direction, and has applications in studies of molecular dynamics and interactions of living cells.

The approach uses the diffraction rings in a stack of defocused images taken at various focal distances, and it takes into account the aberration in the microscope and the noise in the imaging camera. The model-based technique compares the actual diffraction pattern with that predicted for a particle at a given position, and iterates to find the position of maximum likelihood.

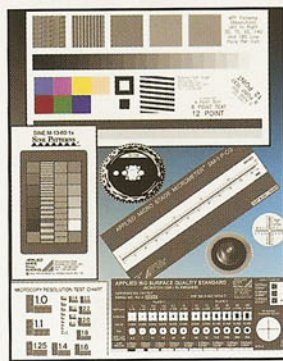
The published results present both theoretical and experimental evidence of the resolving capability of this method. The team used a Zeiss Axio-plan 2 microscope with plan-apochromat oil immersion objective for 63 $\times$  magnification and an AxioCam CCD camera to record the images. Molecular Probes TetraSpeck fluorescent microspheres provided the imaging targets, and a Leica TCS SP2 AOBs confocal microscope confirmed the calculations of their axial positions. Matlab software from The Mathworks im-



plemented the algorithms.

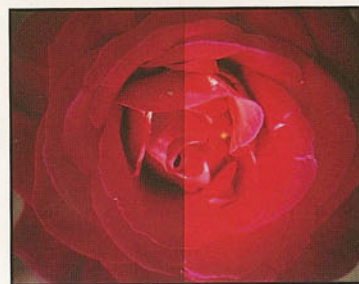
(*Optics Express*, 26 Dec. 2005, p. 10503)

## Standard & Custom Optical Components



Using the latest imaging technology and state-of-the-art metrology, APPLIED IMAGE manufactures a wide variety of standard products, including test targets, image evaluation arrays (analog and digital), reticles, microscopy vision standards, stage micrometers and sinusoidal targets (Sine Patterns). In addition, custom manufacturing services are available for mask-making, encoders, scales, grids and other optical components. Our expert staff is ready to serve you. Give us a call or visit our Web site. **APPLIED IMAGE INC. Circle No. 21**

## Tailored Micro Diffusers



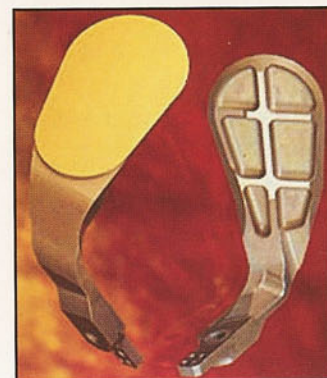
Tailored micro diffusers (TMDs) are holographically recorded surface-relief microstructures with higher brightness and better uniformity than conventional glass bead diffusers. Optimized for applications such as LCD backlighting, RPTV, front-projection displays, avionics and automotive instrumentation, TMDs are manufactured by a roll-to-roll (R2R) process, in a variety of base materials while obtaining a wide range of circular or elliptical angular outputs. TMDs can be tailored to meet your custom requirements. **WaveFront Technology Inc. Circle No. 62**

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## UV-VIS Metal Mirrors



Corning NetOptix announces its new LEC technology, allowing cost-effective production of diffraction-free aluminum diamond-turned mirrors without the need for nickel plating or polishing. The LEC process removes residual diffractive effects of the diamond-turning process without degrading mirror surface figure accuracy on aspheric, flat or free-form mirrors. **Corning NetOptix Circle No. 24**