

 **Newport Celebrates 50 years in Motion Control**
For Motion, Think Newport  **LEARN MORE**

LaserFocusWorld
 International Resource for Technology and Applications in the Global Photonics Industry

Sign-In- Create a Free Account
 Optics.Coatings.Mechanics.Motor Stages

 SEARCH

HOME BROWSE BY TOPIC PRODUCTS BUYERS GUIDE WEBCASTS WHITE PAPERS RESOURCES BUSINESS CENTER OPTOIQ COMMUNITY

JOBS

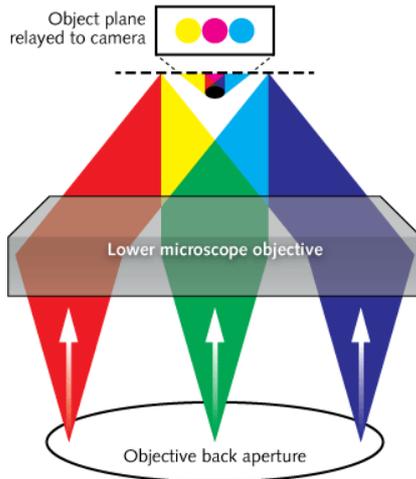
Home > Three-color optical system measures 3D positions of many trapped microparticles

Three-color optical system measures 3D positions of many trapped microparticles

03/06/2012
 By John Wallace
 Senior Editor

Using three colors of light projected through a microscope objective in different patterns, researchers at the Technical University of Denmark (Roskilde, Denmark) simultaneously and unambiguously find the 3D coordinates of multiple microparticles. The scheme can be used while *optically trapping* and manipulating the particles, whether by holographic trapping or counterpropagating-beam trapping.

Red, blue, and green (RBG) light patterns are created by an LED-based digital-light-processing (DLP) projector (which actually projects yellow, cyan, and magenta hues that mix to form RBG) and projected into a microscope to the back aperture of the lower objective, with the green projected on-axis. An optically trapped particle casts shadows that are missing one or more of the three colors; from these shadows, the 3D information on the particles is obtained. Because there is some "bleeding" between the colors (for example, both the red and blue illumination patterns produce a detectable signal in the green color plane), the researchers measure the background signal (offset and color-plane bleed ratios) and compensate using a deconvolution algorithm.



In one experiment using a 50X objective with a numerical aperture of 0.55, 6 μm particles were accurately tracked over a 180 μm vertical distance. A video of seven optically trapped microparticles being manipulated while their coordinates are being measured can be seen at <http://www.jeos.org/supfiles/304/304-1729-1-SP.avi>. Contact *Jesper Glückstad* at jesper.gluckstad@fotonik.dtu.dk.

Social Media Tools

Print Email Save

A A A A

Tweet 3 Synes godt om

Share

Sponsor Information

RSOFT
 Design Group

[WE PROVIDE THE SOFTWARE]

{ You provide the Application }

THE SOURCE FOR PHOTONIC & NETWORK DESIGN SOFTWARE

Easy, Automated And Fast
 Femtosecond Pulse
 Characterization
 Compression And Shaping

Biophotonic
 SOLUTIONS INC.

Learn More...

MULTIPHOTON MICROSCOPY,
 CARS, COHERENT CONTROL...

70 Years of Optical Innovation



START YOUR JOURNEY **EDMUND 70OPTICS**
 anniversary

Topic Index

View Laser Focus World articles by topic, A-Z

Laser Focus World Article Archive

View Laser Focus World past articles now.

Recent Articles

[Nuclear clock could keep time with the Universe](#)

[Microscope photometer from CRAIC Technologies features digital imaging system](#)