Signal Enhancement for Fluorescence Microscopy

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The Wisconsin Alumni Research Foundation (WARF) is seeking commercial partners interested in developing a technique that improves photon collection efficiency and image intensity for scanning fluorescence microscopy.

OVERVIEW

Scanning optical microscopes, such as confocal microscopes, are of increasing importance for looking at living cells and other biological structures. By using fluorescent molecules like GFP (green fluorescent protein), it is possible to locate, track and differentiate cells and cellular structures with scanning fluorescence microscopy.

The quality of the images obtained is dependent on the collection of as much of the fluorescent signal emitted from the specimen as possible. In current models, the amount of light collected from the specimen by the objective lens may be relatively low.

THE INVENTION

UW-Madison researchers have developed a method for significantly improving photon collection efficiency and image intensity by placing a second dichroic mirror on the opposite side of the specimen as the objective lens. Specifically, an excitation beam is focused by an objective lens onto a specimen. The fluorescence emitted from the specimen is collected by the objective lens. This light is also collected by a condenser lens on the opposite side of the specimen and is directed to a dichroic mirror, which reflects the light photons through the specimen and then to the objective lens. This adds to the photons directly emitted from the specimen, thereby enhancing signal intensity.

APPLICATIONS

• Scanning fluorescence microscopy

KEY BENEFITS

• Increases photon collection efficiency
• Improves image intensity of the fluorescent signal by 45 to 70 percent
• No need to increase the intensity of the incident light beam on the specimen
• Reduces photolysis and photobleaching (normally caused by a high intensity incident light beam)
• Does not require a major modification of the existing laser scanning fluorescent microscope designs

ADDITIONAL INFORMATION

Tech Fields
Analytical Instrumentation - Microscopy
Analytical Instrumentation - Optics

CONTACT INFORMATION

For current licensing status, please contact Jeanine Burmania at jeanine@warf.org or 608-960-9846.