



*Imaging is NOT just a  
black and white issue.*

## Principle of Operation

US Patents: 5,926,283 & 5,982,497

Australian Patent: 731,476

Other Foreign Patents Pending

### INTRODUCTION

The **Dual-View™** is a common aperture imaging system that produces multiple, non-overlapping images on a single, two-dimensional detector array. All the images are produced simultaneously and no moving parts are used in image acquisition. The spectral and/or polarization properties of any object of interest can be investigated using the appropriate set of dichroic and spectral filters or polarizers in the system. The general operation of the 2-band system is shown schematically in Figure 1.

The **Dual-View™** is attached to a microscope where the detector is typically located (at the end of the photo/detector port of the microscope). The detector then mounts to the end of the **Dual-View™** via a standard C-mount or F-mount. You can use virtually any detector with the **Dual-View™**, as long as it has a C-mount or F-mount attachment option.

### HOW DOES IT WORK?

A single dichroic filter with a reflective mirror (forming the dichroic module) is placed in the collimated light to split the incident beam into two spectrally separate, independent beams. One beam will contain all wavelengths that are less than the cutoff of the dichroic filter and the other beam will contain all wavelengths that are greater than the cutoff of the dichroic filter. Alternatively, a polarizing beam splitter (PBS) or amplitude beam splitter (ABS) can be used in place of the dichroic filter. This will produce two independent beams that are, in the first case polarization specific, and in the second case, neither spectrally nor polarization specific. These modules are customer specific and can be easily interchanged by the end user. Each of the two independent beams is folded back through the optical system by user-adjustable fold mirrors. After reflecting off the fold mirrors, the content of each beam can be further defined by placing additional filters (spectral emission/barrier, neutral density, polarizers, etc.) in the path of each beam.

Following this filtering process, each beam passes through a common imaging lens, forming two spatially identical, but spectrally different images of the object on the detector (each image is positioned such that it uses one half of the detector total area). The fold mirrors can be adjusted allowing the user to precisely position the images on the detector.

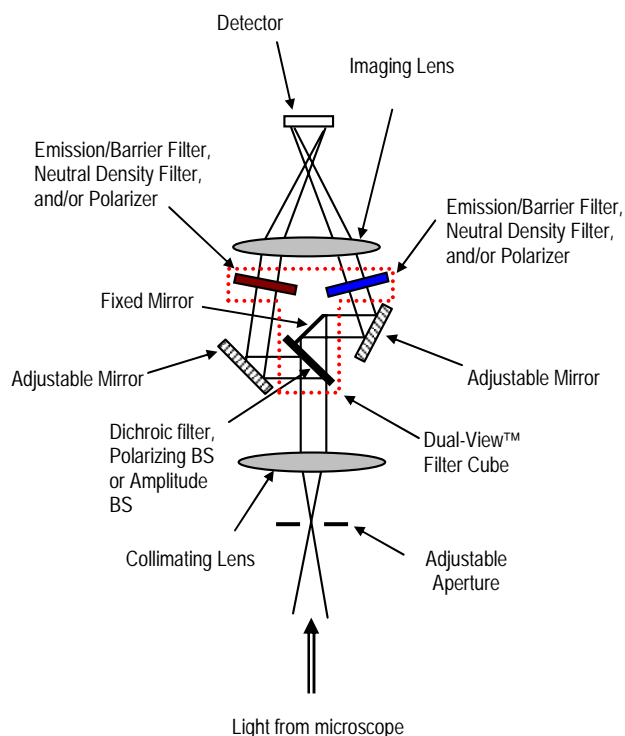


Figure 1: Functional diagram of **Dual-View™** system.

## NEED MORE THAN TWO IMAGES?

The **Quad-View™** system was designed for those sophisticated applications where more than two simultaneous images are required. In the **Quad-View™** design, the single-dichroic/single-mirror module is replaced with a triple-dichroic/single-mirror module, which fits within the same overall package to split the incident beam into four independent channels. The operation of the **Quad-View™** system is exactly the same as for the **Dual-View™** system except that there are four images formed on the detector, one in each quadrant. Figure 2 shows conceptually the operation of the **Quad-View™** system in three dimensions. The adjustable field stop is coincident with the “object of interest”.

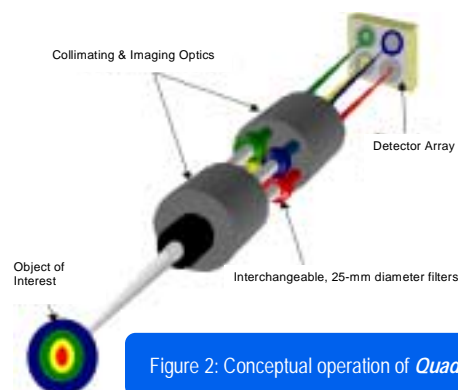
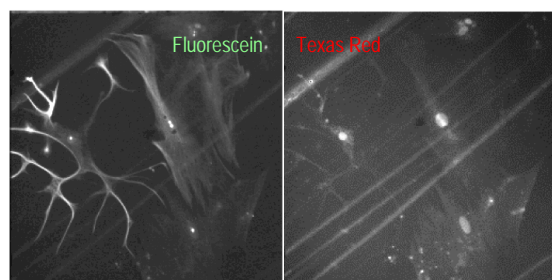
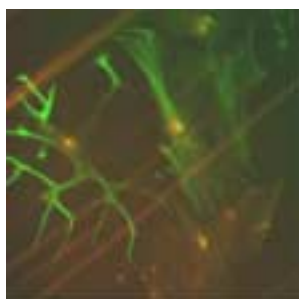
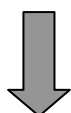


Figure 2: Conceptual operation of **Quad-View™**

### DUAL-VIEW™ IMAGES

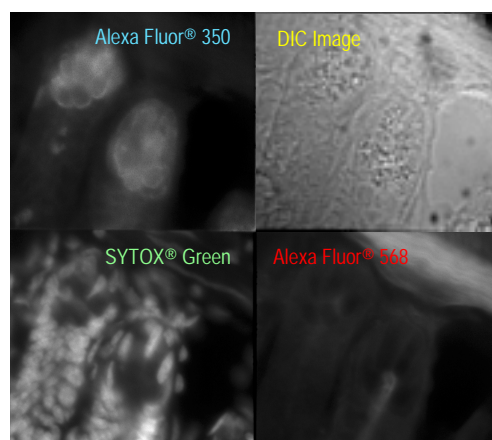


Color Overlay

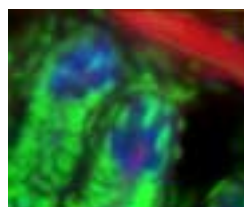


Dual-View™ used to image rat hypothalamus nerve cells  
 - Glia stained with Fluorescein labeled antibodies of GFAP  
 - Nuclei and axon labeling with Texas Red

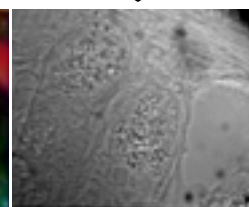
### QUAD-VIEW™ IMAGES



Color Overlay



DIC Image



Quad-View™ used to for simultaneous acquisition of three-channel fluorescence and DIC images. (Mouse intestine, with Alexa Fluor® 350 WGA, SYTOX® Green, Alexa Fluor® 568 phalloidin – Molecular Probes)



**Optical Insights, LLC**

1807 2nd St. • Suite #100 • Santa Fe • New Mexico • 87505 • USA

Phone: 505-955-1585 • E-Fax: 508-526-5660 • Toll-Free Phone: 1-877-467-8467

E-mail: [info@optical-insights.com](mailto:info@optical-insights.com)

[www.optical-insights.com](http://www.optical-insights.com)