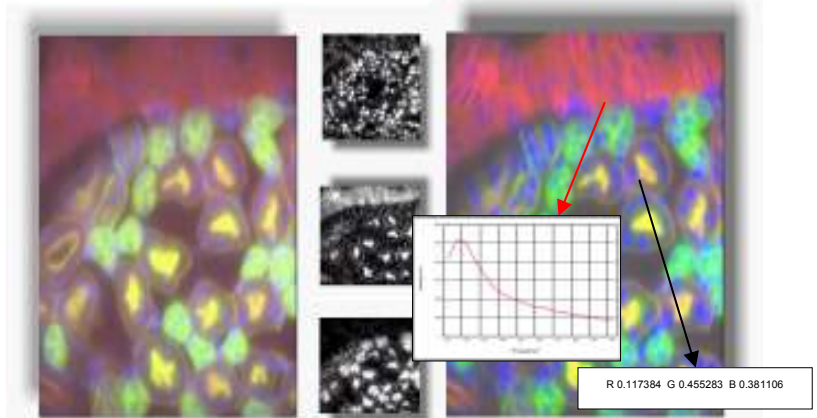


Hyperspectral Imaging Solutions for the Life Sciences



ChromoDynamics patent-pending acousto-optic tunable filter (AOTF) imaging module fulfills the promise of multispectral and hyperspectral imaging through unmatched spectral flexibility and switching speed.

The performance capabilities of this technology make it ideally suited for high-content, high-throughput fluorescence studies as well as spectral transmission and reflectance imaging. Potential applications range from live cell and whole animal studies to fixed slide clinical diagnostics.



Left-Right: Raw Mouse Kidney Section (Fluo-3) DAPI nuclei, Alexa 488 glomeruli and tubules; Alexa 568 actin and brush border. Unmixed blue, red and green images. Quantitative classified image using *ChromoDynamics* AOTF technology

Multispectral and Hyperspectral Imaging

In multispectral and hyperspectral imaging, a series of images of an object are acquired at many different wavelengths, producing what can be thought of as an *image cube*. Coupled with transmission and fluorescence microscopy techniques, hyperspectral imaging enables fast and quantitative image analysis.

What is an acousto-optic tunable filter (AOTF)?

An AOTF is a high-speed, high-throughput, random-access solid-state optical filter with an adjustable optical passband. ChromoDynamics proprietary AOTF technology delivers diffraction-limited image quality with variable bandwidth resolution down to within 1.5 nm. Wavelength switching time, including computer control overhead, is a couple of hundred microseconds.

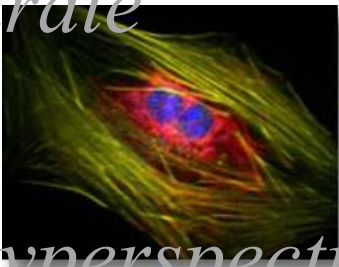
The **ChromoDynamics Hyperspectral Imaging System** features an integrated EMCCD scientific camera, AOTF-based spectral filter system, instrument driver and control module and a powerful, intuitive image capture and hyperspectral analysis software suite.

fast



versatile

accurate



hyperspectral

imaging



solutions



Applications

Powerful image capture and hyperspectral analysis tools facilitate both research tasks and dedicated process applications development

Biological Research

A number of fluorescence microscopy research techniques benefit from the speed and resolution of ChromoDynamics hyperspectral imaging technology:

- Immunohistochemistry
- Quantum Dots (Q-Dots)
- Fluorescence in-situ hybridization (FISH)
- Fluorescence resonance energy transfer (FRET)
- Spectral Karyotyping (SKY)

Medical Diagnostics

ChromoDynamics technology has the potential to take high content/throughput analysis to a new level.



AOTF versus Other Spectral Imaging Techniques:

While liquid crystal tunable filters (LCTFs) have broad tuning capabilities, their bandwidth is fixed and switching times are typically less than 100 microseconds, with significantly lower throughput than AOTFs.

In Fourier transform imaging spectroscopy (FTIS), an interferometer is used to acquire imaging data at a variety of settings, and the resulting data Fourier transformed to provide a spectral image set. With FTIS, the choice of wavelengths and bandwidth cannot be changed and all wavelengths have to be captured regardless of application interest – a process that typically takes tens of seconds.

In tomographic imaging, light is bounced off a diffraction grating, separated and captured on a single CCD chip for subsequent processing and extraction of the spectral information, a slow and computationally intense procedure with limited imaging resolution.

Unlike these techniques, AOTFs allow wavelength and bandwidth to be changed at will and it takes less than 100 microseconds to change settings — capabilities that are ideal for high-throughput multiprobe imaging.

| | |
|-------------------------------|---|
| Tuning | 450 – 800 nm |
| Bandwidth..... | 1.5 nm (at 450 nm), 3 nm (at 800 nm) variable (1 to 16x) at each center wavelength |
| Out-of-band rejection..... | 1:10 ⁻³ |
| Output..... | linearly polarized |
| Total device efficiency | ~30% across tuning range |
| Speed of switching | < 100 microseconds |
| Image quality | diffraction-limited |
| Interface | USB 2.0 |
| Application Software..... | Image Capture and Hyperpsectral Image Analysis Suite |
| Operating System..... | Windows XP® |

Windows XP is a trademark of Microsoft Corporation