TITLE: Extended Focusing Illumination for 3D Microscopy
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TECHNOLOGY: Devices
UTSD: 2864

SUMMARY: The invention is an improved methodology on Light-sheet fluorescence microscopy (LSFM). LSFM provides an alternative imaging technology that overcomes many of the challenges faced by widefield and confocal microscopy. LSFM is particularly useful for imaging applications that require large field of views at moderate spatial resolution (on the order of a couple of microns). For example, LSFM has provided significant insight into zebrafish embryogenesis and neuronal dynamics. Sub-cellular imaging, however, requires sub-micron, preferably diffraction-limited, axial resolution, where beam divergence significantly limits the field of view. Existing commercial light sheet microscopes suffer from low resolution limitations, and described modifications to microscopes to produce higher resolution either limit field of view or drop off intensities at the edges of the field of view. These modifications also limit investigators to 2 color fluorescent detection.

The invention is an imaging system that generates uniform and scalable light-sheets for high resolution, high speed, multi-color 3D fluorescence imaging of biological and nonbiological materials. The instrument is constructed from commercially available components that are uniquely configured to achieve this improved image capture capability.

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