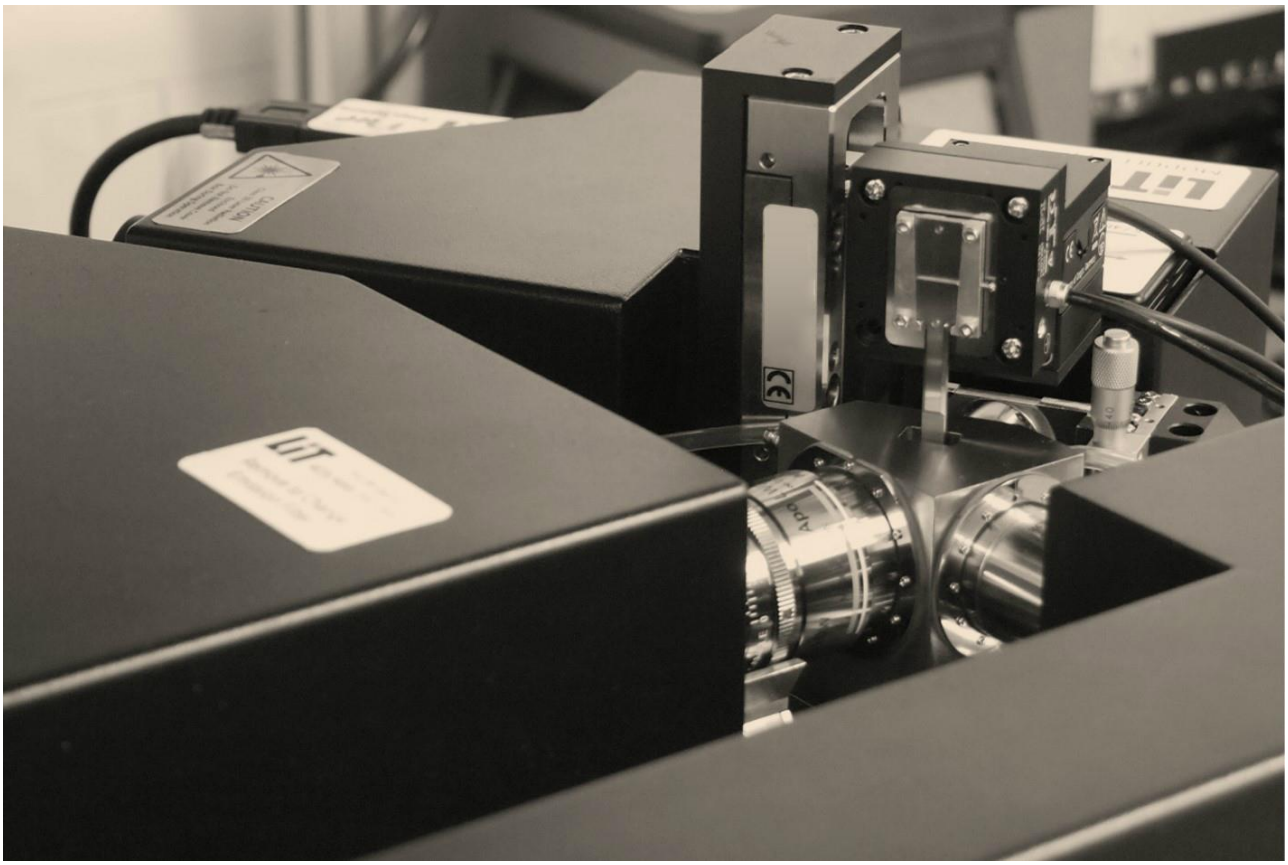
LiTone
Light Sheet Systems



Litone LBS Light Sheet System

The optimal platform for 5D live-cell fluorescence imaging

Product Information V1.1

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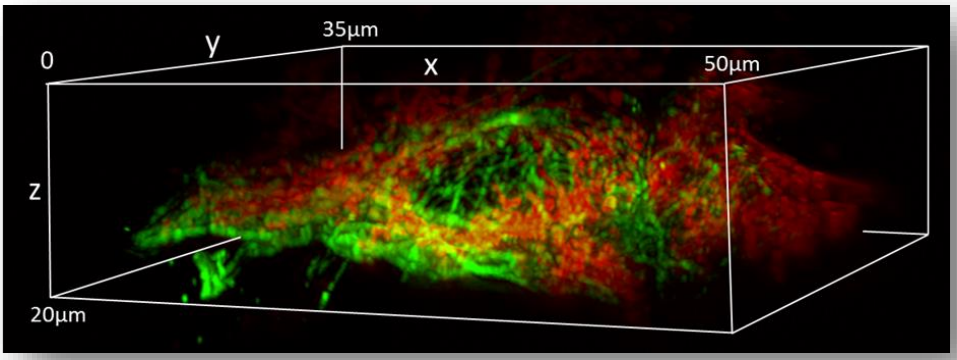
Light Innovation Technology Ltd.

Litone LBS Light Sheet System

for 5D live-cell fluorescence imaging

The LBS Technology



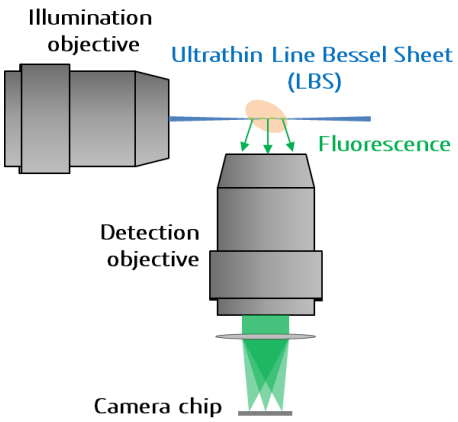
Two-color 3D image of the tubulin (green) and mitochondria (red) captured with LBS technology

The Litone™ LBS light sheet system enables life science researchers to observe the live specimen with sensitivity, resolution, and speed that have never been simultaneously achieved in 3D biological imaging, thus squeeze ever more and better data out of their samples. The Litone™ LBS light sheet system utilizes cutting-edge technologies in optics and engineering to create the ultrathin Line Bessel Sheet (LBS) to provide fine optical sections at the plane being observed. Because extremely low optical power is used for imaging, even the most sensitive specimen can now be imaged for much extended period with uncompromised signal to noise ratio and improved temporal-spatial resolution.

Better than Confocal

Litone™ LBS light sheet system tightly confine the excitation light to a sheet with only a few hundred nanometer in thickness along the focal plane, thus almost every photon emitted from the specimen can be captured and contribute to the final image. Comparing to confocal microscope, Litone™ LBS light sheet system offers:

- **1000x less photo-damage to sample**
- **1000x faster acquisition**
- **2x better axial resolution**



Illumination strategy of Litone™ LBS light sheet system

Litone LBS Light Sheet System

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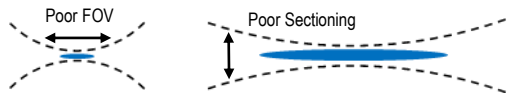
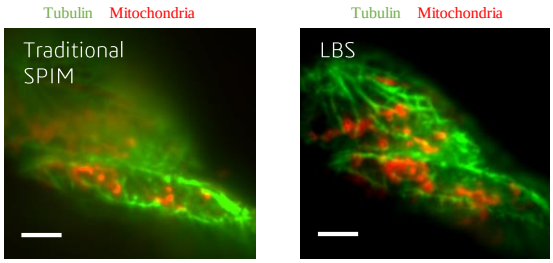
Better than SPIM

Most of the SPIM technologies create the light sheet by sweeping a Gaussian beam or use cylindrical lens to compress a Gaussian beam. The LBS is sophistically crafted to be much thinner and longer than these traditional light sheets, therefore the Litone™ LBS is not only powerful in its low rate of photo toxicity and imaging speed, but also excels in 3D resolution and signal to noise ratio owing to its much improved sectioning ability.



Thin (but short) or Long (but thick) light sheet created by swept Gaussian beam (or cylindrical lens)

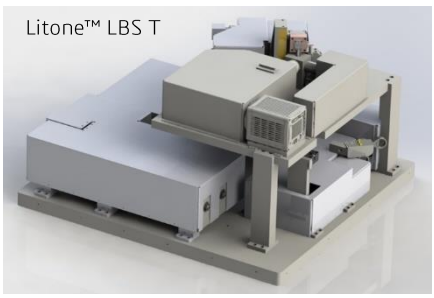
Ultrathin long LBS in Litone system

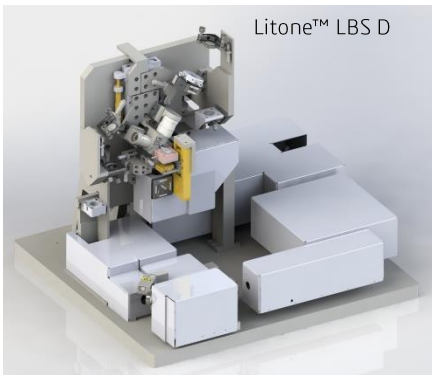


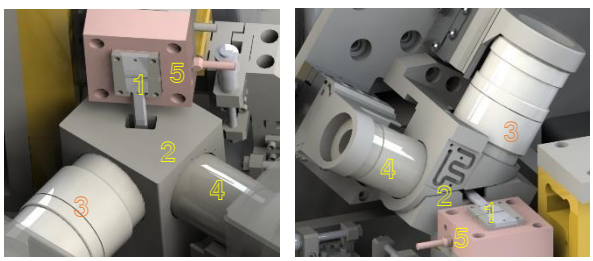
LBS provides improved optical sectioning and SNR than traditional SPIM at cellular level. Scale bars: 3um

Maximized Adaptability

The Litone™ LBS light sheet system is available in two configurations offering maximum flexibility to fit in various research topics. The Tiger Version (T-Version) offers a vertical sample mounting geometry, accepts a wide range of samples from adhesive specimen grown on a 5mm dia. coverslip (e.g. cultured cells) to small animals mounted in a glass tube (e.g. C-elegant, zebrafish). The Dragon Version (D-Version) holds the sample in a conventional horizontal geometry most suitable for high-resolution cellular imaging applications







1. Sample Holder
2. Imaging Bath
3. Detection Obj.
4. Excitation Obj.
5. Scan Stage

Zoom-in of sample holding part
Left: Litone™ LBS T; Right : Litone™ LBS D

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Specifications

Available wavelengths	Any combinations of 405nm (DAPI), 488nm (GFP), 532nm (Cy3.5), 561nm (mCheery), 647nm (Alexa647); Others also possible
Field of View[1]	400 um diagonal
Objectives	Detection Obj.: 25× N.A. 1.1 Water Dipping Excitation Obj.: 63× N.A. 0.75 Water Dipping Epi Fluorescent Obj.: 4× N.A. 0.18 Air
Sample Size[2]	T-Version: up to 2.5 mm radius hemisphere D-Version: up to 0.5mm radius hemisphere
Max Acquisition speed[3]	500 frames/s (980 × 2048 pixels) with sCMOS camera
Spatial Resolution[4]	250nm lateral by 350nm axial
Temporal Resolution[5]	2Hz per channel per volume for sample no larger than 30 μ m (W) by 30 μ m (H) by 30 μ m (L)
Sample Mounting	T-Version: Grown or fix on coverslip or mounted in glass tube with Agra D-Version: Grown or fix on coverslip
Imaging Depth	Usually 30 -150 μ m depending on sample
Incubation	25-40 °C by water circulation
Software	LitScan 1.0 microscope control & data rendering software
Imaging Modes[6]	Epi fluorescent mode, alignment mode and LBS 3D imaging mode
LBS Scan Modes[7]	Sample scan or objective Scan modes

[1]The parameter is for Nikon 25x LWD objective.
[2]The parameter indicates the maximum size of sample that can be hosted by the system. Note that the actual imaging depth strongly depends on the optical property of the specimen
[3]Determined by the speed of sCMOS camera; Reduce the image height can linearly increase the acquisition speed e.g. 1000 frames/s at 480 × 2048 pixels
[4]The parameter is given for a system calibrated for sample size up to 30μm
[5]The temporal resolution depends on the volume of image and mode of scan (refer to “acquisition modes”). The parameter is for imaging a 30 um by 30 um by 50 um volume with 250 slices in sample scan mode
[6]Epi fluorescent mode offers larger field of view with LED illumination for targeting the FOV before 3D imaging in LBS mode.
[7]In general, sample scan can be 4 times faster than the objective scan; Objective scan is more suitable for imaging larger samples with size over 100um.

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