

# DoubleHelix<sup>®</sup>

## Introducing the SPINDLE<sup>®</sup>

### Unrivaled Precision and Depth 3D Imaging and Tracking

#### Select from a range of Light Engineering<sup>™</sup> Applications

##### **Super-resolution:**

Reconstruct 3D super-resolution images with the best precision-depth combination and no axial stitching,

Nanoscale precision for both axial and lateral localization.

##### **3D Particle Tracking:**

Extended depth enables capture of longer particle tracks and faster acquisition.

##### **Extended Depth of Field:**

Single-shot depth range up to 30x clear aperture.

#### Affordable and Adaptable

**Small footprint** allows easy installation even in space-constrained environments

##### **Input and output C-mount adapters**

provide easy support for commercial and custom-built microscopes and cameras

**Highly reliable system** with no moving parts. Switchable phase mask cartridges, auxiliary emission filter holders or maximum experiment flexibility

**Modular design** evolves your existing system into an advanced 3D imaging system with super-resolution capabilities

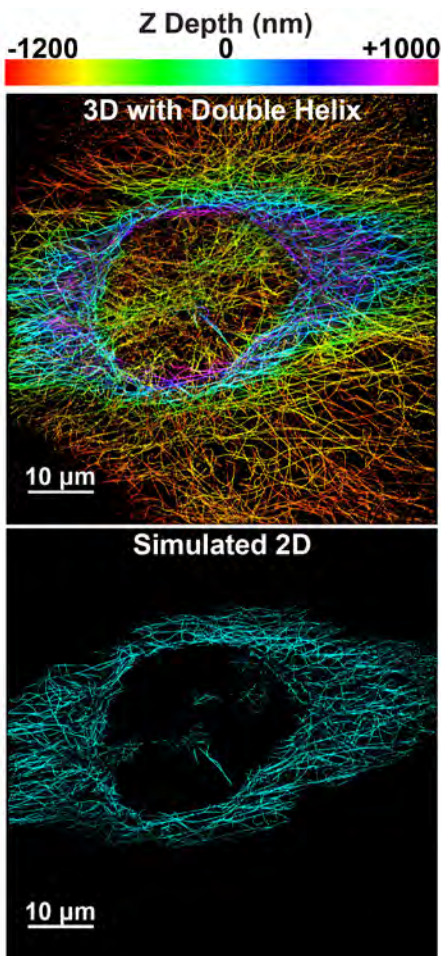
Double Helix Optics' SPINDLE<sup>®</sup> gives researchers the ability to easily capture and analyze 3D images of cellular structures down to the single molecule level.

Using Double Helix Optics' patented Light Engineering<sup>™</sup> technology as its foundation, the SPINDLE can easily be installed on existing microscopes to enable advanced 3D imaging and tracking with super-resolution and extended depth of field capabilities. Built-in bypass mode allows for easy return to non-3D experiments.

- **Patented phase mask** design overcomes traditional limitations enabling 3D imaging with unparalleled depth and axial precision
- **Select from a library of masks** optimized to the emission wavelength of your 3D experiment
- **Compatible with a wide range of microscopes, objectives and cameras**



Replaceable mask to fit with your wavelength needs



**3D Double Helix super-resolution reconstruction of microtubules labeled with AlexaFluor 647.** 3D with Double Helix and simulated 2D reconstructions showing z depth encoded in color. The Double Helix 3D image captures a depth of 2.2 µm. The simulated 2D reconstruction of the same image shows 1 µm of z depth (-500 to +500 nm) and does not contain axial localization information.

“ We expect that the DH-PSF optics will become a regular attachment on advanced microscopes, either for super-resolution 3D imaging of structures, or for 3D super-resolution tracking of individually labelled bio-molecules in cells or other environments ”

Professor W.E. Moerner | Nobel Laureate  
Stanford University

**DoubleHelix**   
See Like No Other™

## Custom designed optics for precision imaging and tracking

- **Full field-of-view** imaging
- **Custom optics** ensure diffraction limited performance over the full field of view of large format sensors
- **Transmission >95%**
- **Built-in corrective optics** to ensure pupil plane alignment to your microscope and objectives
- **Ease of install** with stable alignment of x, y, and z positions of the phase mask in the relayed pupil plane

## Intelligent data analysis

### 3DTRAX™ software, a FIJI plugin provides

- Modules available for 3D SMLM, 3D tracking, and extended depth whole-cell imaging
- SMLM module calculates the position of every particle
- 3D tracking localizes and tracks particles over entire depth range of PSF
- Whole cell extended depth of field imaging sees deeper into sample without scanning
- Automated drift correction available in all modules
- **Intuitive plots** help ensure quality data throughout the analysis process
- **Flexible file export** for extended analysis

## Specifications

Dimensions	211 x 84 x 84 mm
Depth Range	2 - 20 µm
Field of View (FOV)	Larger than 200 x 200 µm
Lateral (x-y) precision	20 nm
Axial precision	35 nm
Light efficiency	> 95%
Mask library wavelength range	400 nm to near IR

\*Custom masks available upon request

Precision specifications listed are based on results generated using Double Helix mask library and will vary according to NA of the objective used and the photon count of the specific experiment. Precision may be better than indicated.

## About Double Helix Optics

Double Helix Optics enables visualization and data capture of objects at an unmatched depth and precision quality. Its Light Engineering™ point-spread function-based technology is advancing the field of 3D imaging, allowing for new discoveries in research and new capabilities of promise to a range of applications. The SPINDLE2, SPINDLE®, engineered phase masks, and 3DTRAX™ software are currently in use by globally recognized scientists.

To learn more contact us at [3Dimaging@doublehelixoptics.com](mailto:3Dimaging@doublehelixoptics.com) | [doublehelixoptics.com](http://doublehelixoptics.com)  
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