

# DoubleHelix<sup>®</sup>

## Introducing the SPINDLE™

### Unrivalled Precision and Depth 3D Imaging & Tracking

Double Helix's SPINDLE™ gives researchers the ability to easily capture and analyze 3D images of cellular structures down to the single molecule level.

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

#### Current Light Engineering™ 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 Single Particle Tracking:

Extended depth enables capture of longer particle tracks and faster acquisition  
Compatible with fluorescent beads, dyes and photoactivatable proteins

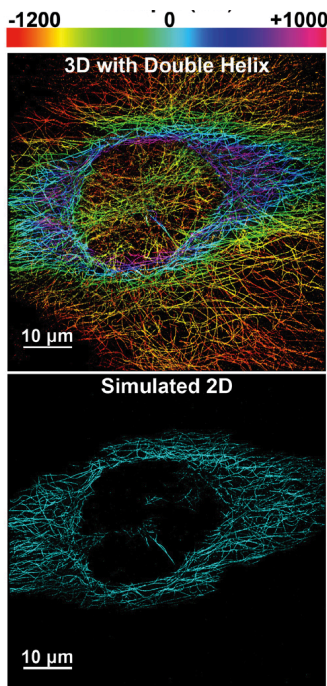
- **Patented phase mask** design overcomes traditional limitations enabling 3D imaging with unparalleled depth and axial precision
- **Select from a library of masks** optimized to the emission wavelength needed for your 3D experiment.
- **Compatible with wide range of microscopes, objectives and cameras**

#### 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 for maximum experiment flexibility
- **Modular design** evolves your existing system into an advanced 3D imaging system with super-resolution capabilities



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  $\mu\text{m}$ . The simulated 2D reconstruction of the same image shows 1  $\mu\text{m}$  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**
  - 3D Localization of molecules
  - 3D Rendering
  - Drift correction
  - Tracking
  - Visualization
- **Intuitive plots** help to ensure quality data throughout the analysis process
- **Quantitative analysis**
- **Ease of file export** for extended analysis

### Specifications

Dimensions	8.3" x 3.3" x 3.3"
Depth Range	2-20 $\mu\text{m}$
Field of View (FOV)	Larger than 200 x 200 $\mu\text{m}$
Lateral (x-y) Precision	20nm
Axial Precision	25nm
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 the Double Helix mask library and will vary according to NA of the objective used and photon count of the specific experiment. Precision levels may be better than indicated.

### About Double Helix

Double Helix is a Boulder CO based optics company that designs and develops next generation high precision 3D imaging products using its patented Double Helix Light Engineering™ imaging techniques. Initial application of the company's technology brings sub-diffraction (super-resolution) 3D nanoscopy to the life sciences and material sciences markets. We focus on ensuring the highest quality 3D imaging technology is available at an affordable price point.

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