

## Optical-HREM Imaging System

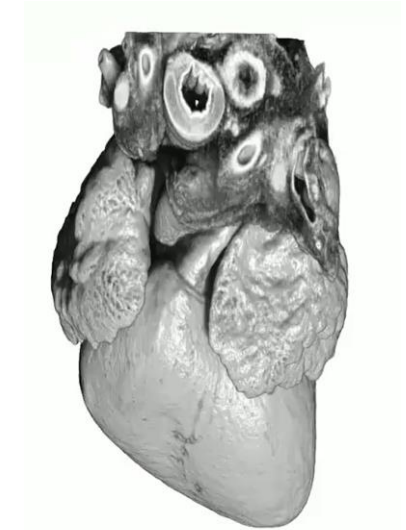
HREM, the cutting-edge High-Resolution Episcopic Microscope by Indigo Scientific. This system is designed to effortlessly capture high-resolution 2D images, perfectly aligned to produce seamless 3D models.

## What is HREM

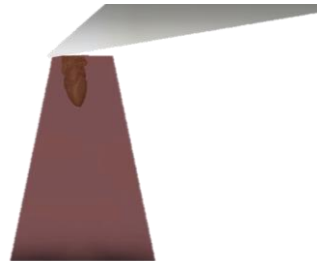
HREM, short for High Resolution Episcopic Microscopy, is an advanced imaging technique that enables *three-dimensional visualization* of various samples, ranging from complete histological specimens like mouse brain histology to fully developed organisms such as pups, embryos, and even plant matter.

The core of the HREM system consists of a precise, custom-made microtome capable of consistently sectioning samples, embedded in resin, in sections ranging from 1 to 10 microns. At each pass, the block-face is imaged, and by combining these two-dimensional images, volumetric data is generated to construct a comprehensive three-dimensional stack.

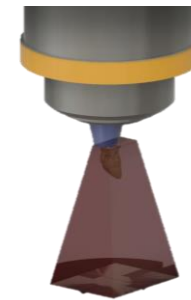
The HREM instrument possesses impressive capabilities, accommodating samples with a maximum size of 30mm (greater on request) along the Z-axis and even larger dimensions along the X and Y axes (upon request). The samples can range from millimetres to the full extent of 30mm. By leveraging its ability to suppress fluorescence of the plastic material (negative fluorescence imaging), HREM can capture high-resolution, clear images regardless of the tissue type or the developmental stage, even when dealing with opaque or translucent tissues.



Samples Prepared and Embedded



Sectioned using Indigos HREM system



High resolution images produced

# Advantages of HREM

## Flexibility for a Range of Samples

One of the key advantages of HREM is its remarkable flexibility achieved through the utilization of negative fluorescence imaging. This innovative approach enables HREM to deliver exceptional clarity and resolution, even when imaging denser tissues or tissues with varying opacities.

Unlike conventional techniques, HREM eliminates the need for tissue clearing, making the imaging process more efficient and convenient.

Moreover, HREM produces high-contrast results, enhancing the visualization of anatomical structures and details.

## HREM Easy Data

High Resolution Episcopic Microscopy (HREM) data is readily applicable for both 2D and 3D analysis. Widely available software packages like Fiji and Dragonfly can be used to generate impressive images by inverting the LUT (Lookup Table).

Additionally, HREM images facilitate straightforward manual segmentation, owing to their user-friendly 2-Dimensional format, enabling precise measurement of specific features.

## Cost Efficiency with HREM

HREM (High-Resolution Episcopic Microscopy) not only boasts superior performance but also remarkable cost savings. Our base models are competitively priced well below alternatives, making cutting-edge 3D microscopy accessible to all. Experience outstanding image quality at a fraction of the cost when compared to alternative methods for 3D analysis.

Indigo is a small but efficient company and uses its resources to give you the best possible product for the best price. Without overheads of larger company, you can expect quality and care with our systems.

## Adaptability and Upgradability

The HREM instrument allows for a diverse array of serial block face imaging techniques. Indigo's HREM instrument gives you the flexibility to adapt to modern block face imaging techniques easily.

HREM offers upgradability and customization options, allowing you to tailor the system to your unique needs. Stay at the forefront of technology and adapt your HREM to meet evolving research demands.

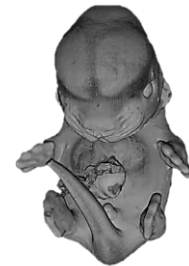
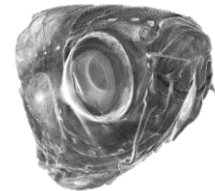
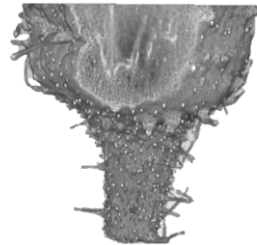
## High Resolution for All Tissue Types

High Resolution Episcopic Microscopy offers exceptional resolution with scanning stages and a choice of optics. It can capture single shots or high-resolution scans with blending, no blocking. With sections as thin as  $1\ \mu\text{m}$ , HREM achieves voxel resolutions of  $1\text{-}8\ \mu\text{m}^3$ , enabling the identification of fine details like individual nerves and blood vessels, surpassing alternative techniques.

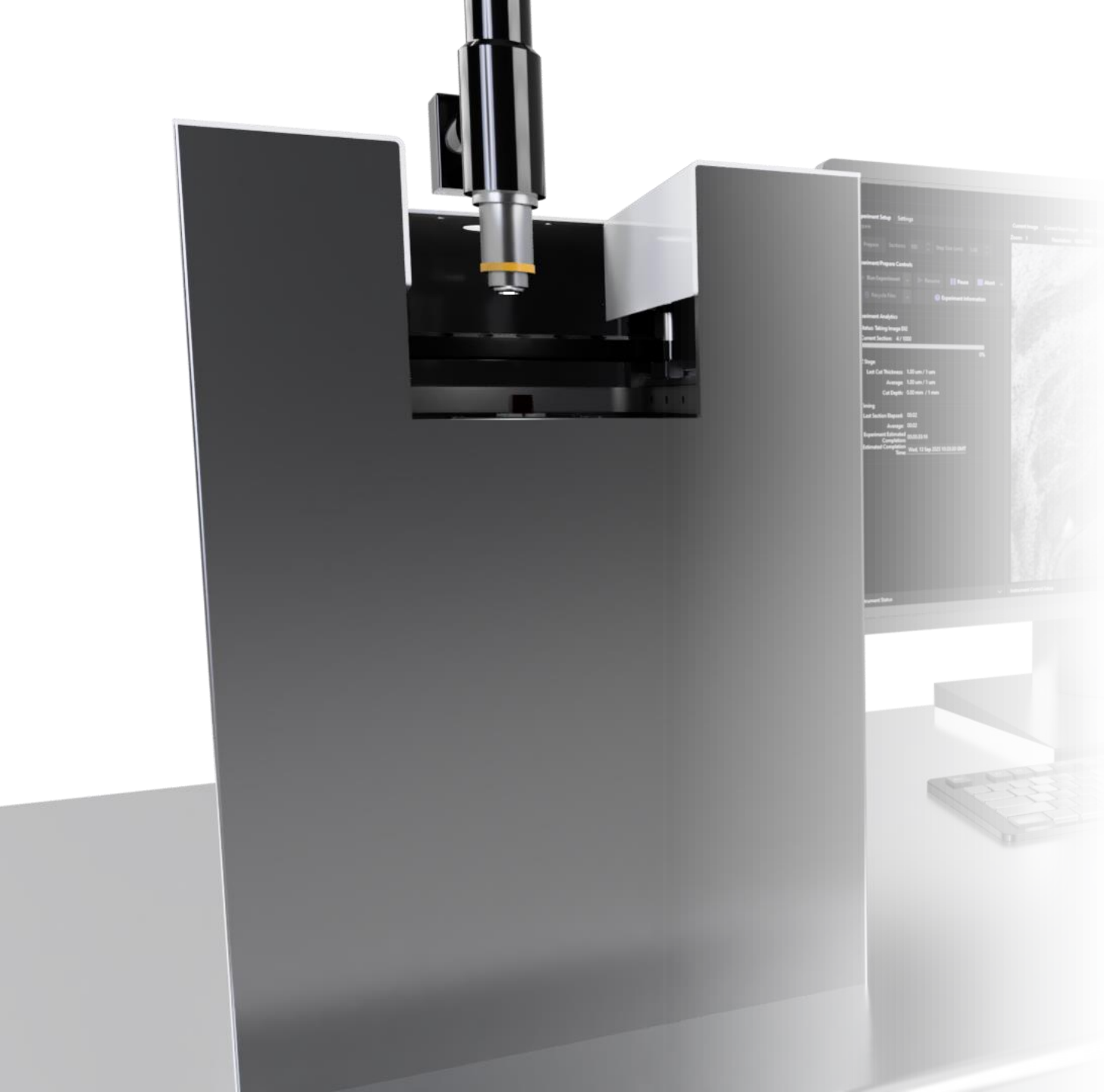
## Dedicated Hardware Integration

HREM (High-Resolution Episcopic Microscopy) redefines excellence by seamlessly integrating the entire imaging system. Unlike other solutions, HREM offers dedicated processes from the microtome to the software, ensuring a flawless imaging experience.

Indigo has meticulously designed this system for both efficiency and unparalleled resolution, leaving no room for compromise.







## HREM Micro

The HREM Micro is a compact imaging solution engineered for laboratories seeking a streamlined approach to high-resolution episcopic microscopy. Tailored for smaller labs, it offers all the essential features required for HREM imaging without the intricacies.

- ✓ **Effortless Integration:** With its compact design, the HREM Micro easily finds its place on any desk. The microtome, reduced in size by 50%, ensures efficient single-sample imaging.
- ✓ **Optical Precision:** This system boasts a straightforward compound or zoom setup that delivers image stacks with a maximum optical field of 22mm and a Z height of 25mm.
- ✓ **Blade Versatility:** The HREM Micro accommodates smaller 60-80mm microtome blades, firmly secured in a blade holder designed for universal compatibility, minimizing cutting vibrations.

### Specifications:

- Optical Type: Fixed Compound or Zoom Optics
- Field of View (Lowest Magnification): 22mm
- Light Configuration: Single Morphological Channel (HREM)
- Moveable Z Range: Maximum 25mm
- Blade Type: 60-80mm Slim Type
- Extraction Unit: Vacuum
- Sample Positioning Control (XY): Manual Screws
- Maximum Samples: 1
- Control Software: HREM Acquire
- Camera: 20-21 Megapixels 1-Inch Camera (Basic Image Control for Exposure, Contrast, and Gain)



## HREM Ultra

HREM Ultra represents the pinnacle of our technological prowess in high-resolution episcopic microscopy. Standard-equipped with an XY stage, this unit is purposefully designed for the seamless imaging of a minimum of 2 samples per experiment.

- ✓ **Fluorescence:** HREM Ultra offers the option for multiple fluorescent imaging, with user-friendly software-controlled lights and filters that simplify the process of capturing multiple fluorescent channels simultaneously.
- ✓ **Blade Versatility:** Enjoy the flexibility of using two different blades - a larger standard tungsten carbide 160mm blade and any smaller microtome blade suitable for polymer cutting, providing adaptability to your specific needs.
- ✓ **Expanded Imaging Range:** HREM Ultra can move an impressive 70mm in the Z direction, and it boasts a maximum field of view of 30mm in both the X and Y directions. This field of view can be extended by utilizing our custom-made stitching and XY scanning system, engineered for minimal vibration and exceptional repeatability, exclusively designed for the HREM technique.

### Specifications:

- Optic Type: Fixed Compound or Whole Zoom Body Optics
- Field of View (lowest magnification): 30mm (expandable with scanning)
- Light Configuration: Single Morphological Channel (HREM)
- Moveable Z Range: Maximum 70mm
- Blade Type: 60-80mm Slim Type + 160mm Thick Type
- Extraction Unit: Vacuum
- Sample Positioning Control (X/Y): High Precision Fast Indigo XY
- Maximum Samples: 4
- Control Software: HREM Acquire
- Camera: 20-21 Megapixels 1-Inch Camera with Advanced Camera Control (Image Inversion and Stitching)

### Optional Features:

- Electronic Focus
- Dual/Multi Light Configurations with Filter Sliders/Wheels
- Multiple Sample Holders (1, 2, 4+)
- Custom Sample Holders for Larger Blocks
- Custom Sample Chucks for Larger Samples
- Adaptation and Integration with Other Technologies

## HREM Acquire – Control Software

Seamlessly integrated with all HREM models, OHREM Acquire is our proprietary, in-house software meticulously designed to streamline image capture and instrument control. Given the intricate nature of HREM instruments, this software is thoughtfully designed to automate and simplify the entire process.

**Time-Saving Methods:** OHREM Acquire revolutionizes experiment efficiency by implementing innovative time-saving methods, dramatically reducing overall experiment duration by optimizing machine operations.

**Manual Control:** Trim poly-cut blocks with precision using manual control or automate microtome cutting operations outside the imaging process, enhancing flexibility and control.

**Effortless Stitching:** Our dedicated stitching software, tailored exclusively for HREM, eliminates the need for intricate Z-axis alignment. It seamlessly blends and assembles images, effortlessly crafting flawless 3D representations. OHREM Acquire provides both automatic and manual stitching options to cater to diverse imaging needs, from fast 4x4 datasets to larger tiling projects.

**Unlimited Images per Section:** Unleash your creativity with HREM, capturing an unlimited combination of images per section. Experiment with different lighting, camera settings, and filters for each shot, expanding the boundaries of your research.

**Effortless Data Management:** OHREM Acquire offers a range of saving options, including jpg, tif, tiff, bmp, and more. Your images seamlessly integrate into your workflow or easily interface with existing 3D software packages like Dragonfly or Fiji.

**No Rolling Licenses:** At Indigo, we provide you with peace of mind. We do not employ rolling licenses. Your system is fully covered for its entire lifetime at your institution or facility. Frequent updates, available to service contract customers and throughout the warranty period, continuously enhance your instrument's capabilities, ensuring it remains at the forefront of technology.

**Feature Requests:** We thrive on user feedback and feature requests, providing you with the opportunity to tailor your machine's performance and ease of use to your unique requirements.



## HREM Consumables

We offer a range of consumables to complement our HREM imaging system.

### **Sample Chucks:**

Specially engineered for resin samples, our custom sample chucks feature unique grooves that securely hold resin specimens during capture.

Standard chuck sizes, such as the 25mm variant, provide a cost-effective solution for mounting and sectioning specimens with ease. These chucks are compatible with all of Indigo's custom split moulds, ensuring seamless integration into your workflow. For those with unique requirements, custom chucks are tailored to your desired sample size, ensuring a perfect fit and adaptability for your specific needs.

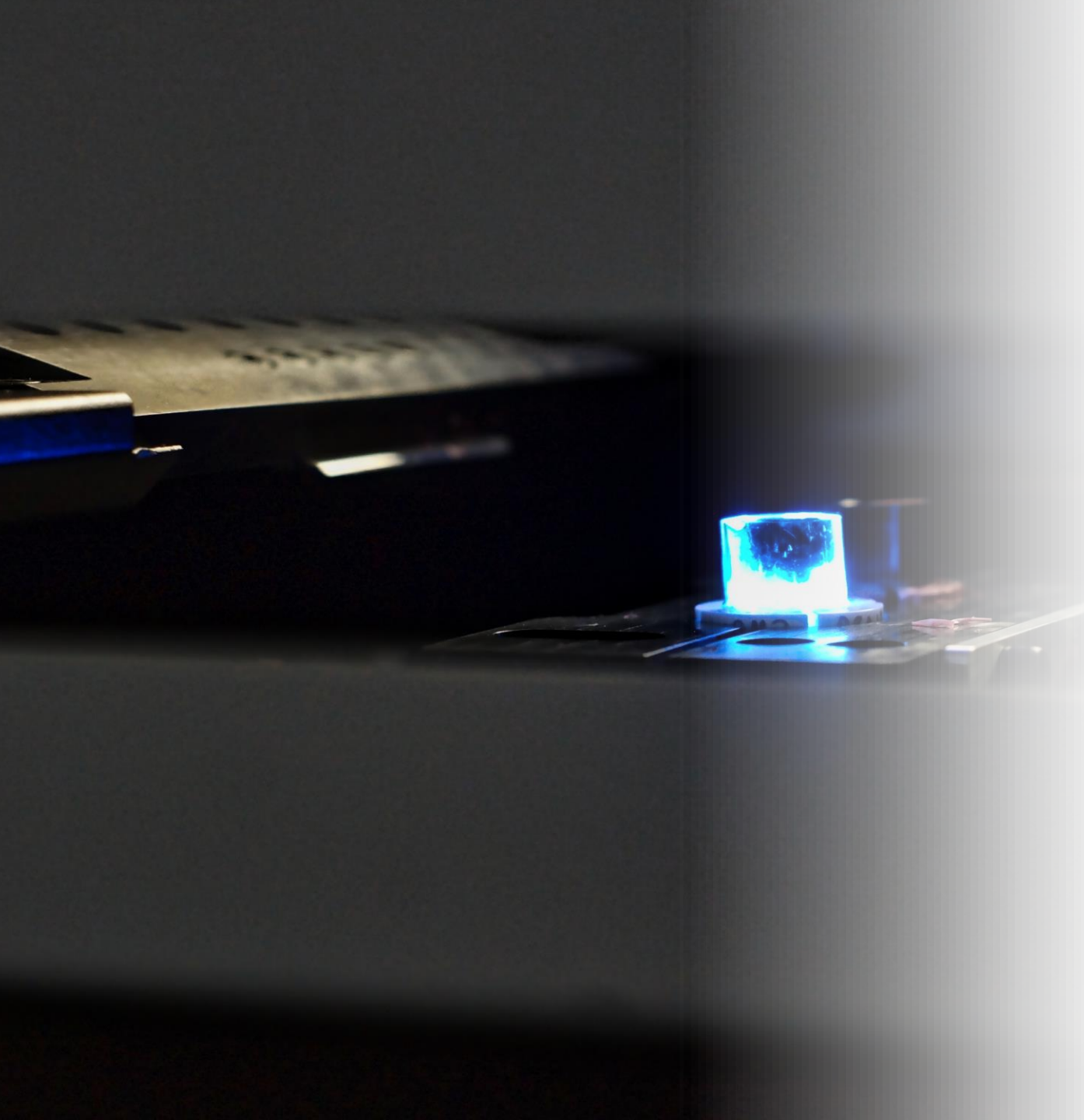
### **Split Moulds for Resin Samples:**

Our split moulds simplify the resin sample preparation process, offering reusable, high-quality plastic construction.

Designed for compatibility with even the most demanding reactions, these moulds feature water-resistant nuts and bolts, assuring that your sample can be easily removed from the mould. Crafted with high-temperature resistance and non-bonding properties, these moulds endure many sample rounds. Available in various sizes, our moulds are meticulously designed, crafted, and shipped to order. Prior to completion, we provide you with all the necessary drawings and information to ensure the resultant block meets your exact specifications.

These moulds are compatible with commonly used HREM sample plastics such as Technovit and JB-4. With a perfect split down the middle and secure metal fasteners, our moulds facilitate effortless extraction of resin blocks, accommodating samples of all sizes without the risk of breakage.





Indigo Scientific, a family-owned imaging company located in the United Kingdom. We boast a dynamic team comprising talented software developers, skilled engineers, and dedicated sales support professionals, all committed to crafting cutting-edge equipment tailored to a wide spectrum of needs.

- ✓ **Global Reach, Handcrafted Excellence:** Indigo Scientific proudly offers HREM systems on a global scale. Each system, bearing the Indigo signature, is crafted in the UK. Your system is then carefully shipped directly from our workshop to your institute/facility.
- ✓ **End-to-End Support:** At Indigo, we don't just stop at delivering your equipment. Our dedicated team will be right by your side to ensure a smooth startup as you embark on your journey with this innovative technique. We provide comprehensive installation support and ongoing assistance to help you maximize the potential of your HREM system

Ready to explore the limitless possibilities of high-resolution episcopic microscopy with Indigo Scientific? Connect with us now at [i-scientific.com](https://www.i-scientific.com).

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