OXFORD CRYOSYSTEMS

COBRA


OXFORD
CRYOSYSTEMS

OVERVIEW

The Cobra is an advanced open-flow cooler that produces a cold stream of gas between 80 - 500 K, creating a controlled nitrogen or argon environment for scientific samples to be studied using diffraction techniques.

Powered by a closed helium circuit, the Cobra eliminates the hassle of liquid cryogens while providing rock-solid thermal stability of better than 0.1 K. **Engineered for continuous 24/7 performance, it's the perfect fit for** high-resolution applications that demand **automated, batch, and screening workflows**, integrating effortlessly into beamlines, home sources, and a variety of X-ray cabinets from leading manufacturers.

NO BARRIERS

The cornerstone of diffraction analysis, open-flow coolers are the primary cryogenic solution for controlled sample environments. Unlike cryostats, which often require physical windows or containment barriers that sit in the beam path, an open-flow cooler directs a precise stream of cold gas directly onto the sample without any enclosing structure.

This technique **eliminates physical obstructions from the experimental field, ensuring an unimpeded path for both incident and diffracted beams**, preserving crystal integrity, minimising background noise, and improving signal-to-noise ratios.

NO ICING

Cryogenically cooled sample environments are essential for unlocking the full potential of diffraction analysis. By lowering sample temperatures, researchers can slowing radiation-induced degradation and maintaining structural integrity of the sample during the experiment, resulting in clearer, more reliable data with every exposure. But ice formation remains a concern.

All OxCryo coolers provide a laminar flow of dry gas that **shields the sample area from moisture in the local atmosphere, allowing samples to reach cryogenic temperatures without the formation of ice.**

CRYOGEN-FREE

Expensive cryogens such as liquid nitrogen and helium are not consumed to achieve cooling power. Instead, helium is used in a closed-loop system to cool nitrogen gas, extracted from the local atmosphere or supplied from your in-house source. The helium is fully retained and recycled throughout the cooling process.

24/7 RUNTIME

The closed-loop, cryogen-free design of the Cobra enables continuous sample cooling day and night, with excellent temperature stability of better than 0.1 K, perfect fit for applications that require automated, batch, and screening workflows without interruptions.

NITROGEN SHIELD

This system, like the Cryostream, eliminates oxygen from the sample environment by using nitrogen, preventing oxidation or damage and halting unwanted reactions, ideal for sensitive chemical studies.

OPTIONS

Choose one, two, or all of our optional customisations. Whether you need a longer transfer line, a wider gas stream, a short nozzle or argon capability, OxCryo is committed to providing bespoke customisations for your scientific research needs. [Pages 12 -18]

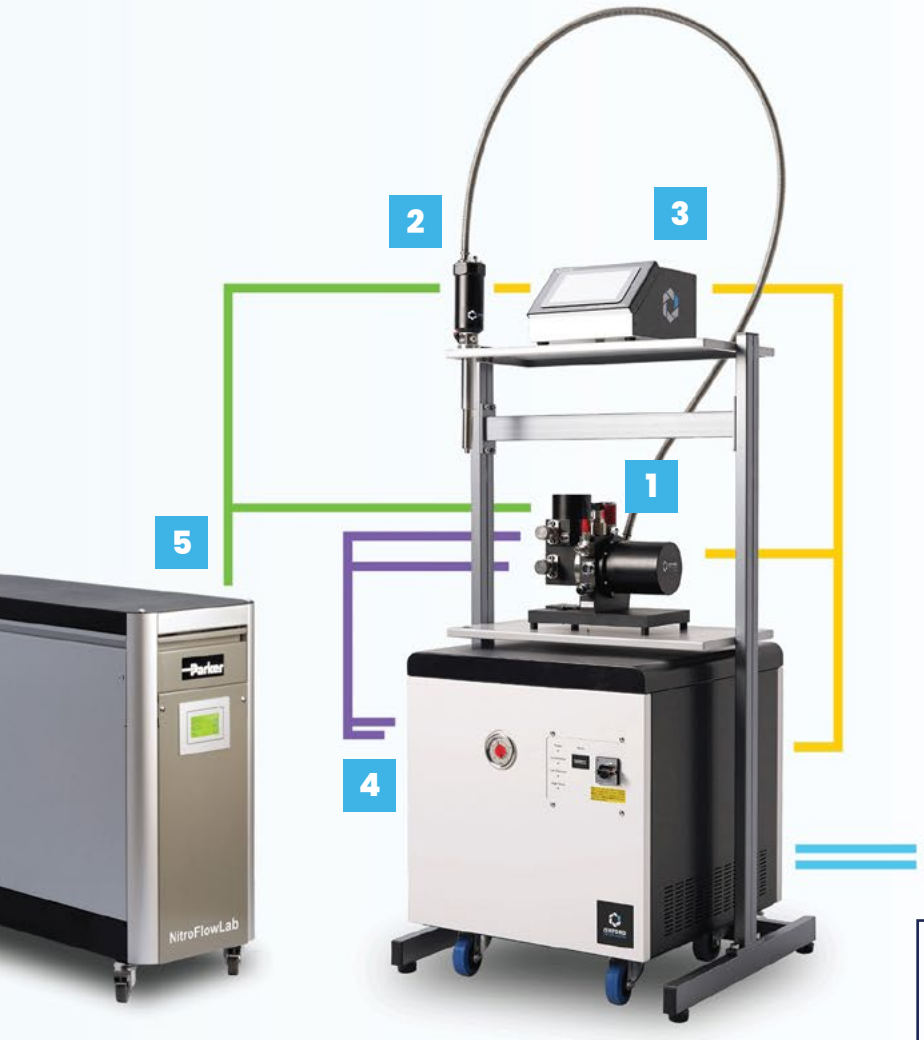
2 YEAR WARRANTY

The Cobra now comes with an additional year of warranty at no extra cost and unlimited remote support from our expert cryoengineers.

HOW IT WORKS

Cobra operates by cooling compressed nitrogen gas at ambient temperature using a Gifford-McMahon (GM) closed-cycle cooler integrated within the system's Refrigerator. This cryocooling process lowers the temperature of the nitrogen without liquefaction, enabling efficient delivery of cold gas for sample cooling.

The pre-cooled nitrogen is routed via a vacuum-insulated transfer line to the Gas Delivery Head, minimising heat ingress and maintaining gas temperature stability throughout transit.



1 Refrigerator

2 Gas Delivery Head

3 Cryo Controller

4 K450 Helium Compressor

5 Nitrogen Generator (Optional)

DATA
HELIUM
NITROGEN
WATER

REFRIGERATOR

At the heart of the Cobra is the Refrigerator. This component incorporates our proprietary “0/40” cryocooler; a compact, highly reliable mechanical cooler. It takes the supplied nitrogen gas and cools it to a set temperature using compressed helium gas, delivered from the K450.

Optimised for maximum cooling performance with minimal wear, **our cryocoolers have a proven track record** and are used in large scale radio astronomy projects like MeerKAT and the SKA-Mid in South Africa.

Cold nitrogen gas exits the Refrigerator via this insulated transfer line, which connects to the gas head.

GAS DELIVERY HEAD

The gas delivery head is permanently connected to the refrigerator, maintaining vacuum insulation along the entire transfer line. When mounted inside your diffractometer using the coldhead stand, it delivers a precisely directed cold-stream of gas onto the sample stage, enabling low-temperature conditions ideal for diffraction analysis.

Cold gas arrives from the refrigerator through this insulated transfer line.

With the refrigerator managing the temperature, the coldhead can be kept **small and lightweight**, easy to handle and secure.

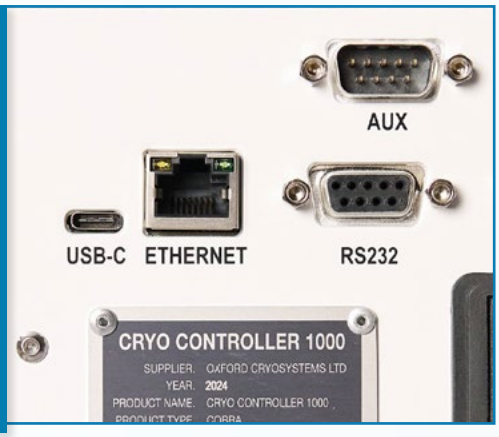
A central cold-stream of gas flows onto the sample stage. This **cools the sample** to your desired temperature with excellent stability of 0.1 K. This **prevents radiation damage**.

An outer stream of gas shields the central cold-stream from the local atmosphere. This **prevents ice formation** from damaging the sample and interfering with the experiment.

Sample pin courtesy of MiTeGen

CRYO CONTROLLER

The central brain of the Cobra cooler, this control unit connects, monitors, and regulates every system component, including the refrigerator, coldhead, K450, and nitrogen supply. It precisely manages flow rates to maintain temperature stability better than ±0.1 K. The unit also provides real-time diagnostic feedback via the front panel and integrates seamlessly with PC software for remote control and monitoring.



Connections on the back of the controller enable **software integration options** for both OEM and custom solutions.

Control and monitor the temperature via the touch screen.

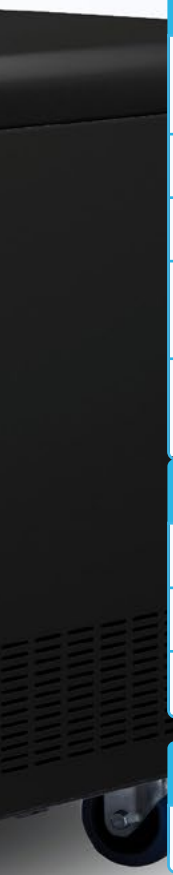
K450 HELIUM COMPRESSOR

Designed to power our bespoke cryocoolers, this 3.5 kW water cooled helium compressor is the driving force behind the refrigeration unit, powering the cryocooler and supplying high-pressure helium gas in a closed-cycle refrigeration process.

The K450 is **low maintenance**, with service interval of 30,000 hours, and helium top up only required up to 12 months.

NITROGEN GENERATOR

When a nitrogen source is not locally available, our custom variant of Parker's NitroFlow is available as a solution. It has been specifically adapted for use with Cobra unit, providing a source of nitrogen gas for both the central coldstream and outer shieldflow.



GAS DELIVERY HEAD	
Temperature Range	80 - 400 K (Standard) 80 - 500 K (Plus)
Nitrogen Gas Flow Rate	5 or 10 L/min
Stability	< 0.1 K
Cooldown Time (Room Temp. to 100 K)	~ 60 min
Transfer Line	2 m (Standard) 3 m (King)

CRYO CONTROLLER	
Weight & Dimensions	7 kg | W: 240 x H: 166 x D: 262 [mm]
Mains Power Supply	100 - 240 V 50/60 Hz
Power Consumption	200 VA

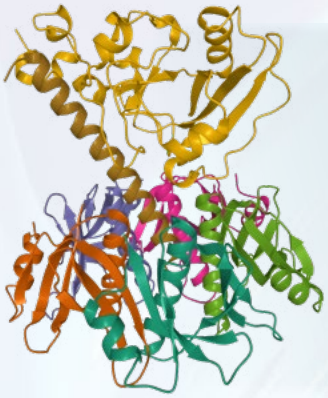
REFRIGERATOR	
Weight & Dimensions	15 kg | W: 278 x H: 200 x D: 277 [mm]

K450 HELIUM COMPRESSOR		
	50 Hz	**60 Hz**
Supply Voltage	200 -240 V	208 - 230 V
Operating Current	17.0 A (@ 240 V)	15.7 A (@ 230 V)
Operating Power	3.4 kW (@ 240 V)	3.6 kW (@ 230 V)
Supply Fuse Rating	20 A (Starting Current: 65 A)	
Weight & Dimension	100 kg | W: 540 x H: 639 x D: 610 [mm]	
Water Cooling Requirements	2-6 L/min | 2-7 bar | 8 - 26 °C | pH 6 - 8	

NITROGEN GENERATOR (OPTIONAL)	
Weight & Dimensions	95 kg | W: 900 x H: 700 x D: 310 [mm]
Mains Power Supply	230 V (50 Hz) or 120 V (60 Hz)

LABORATORY NITROGEN SUPPLY (IF AVAILABLE)	
Gas Purity	> 97.5 % Purity
Gas Pressure	Regulated to 1 - 1.4 bar (Regulator Kit Available)
Gas Flow	Approx. 25 L/min per Cobra

APPLICATIONS

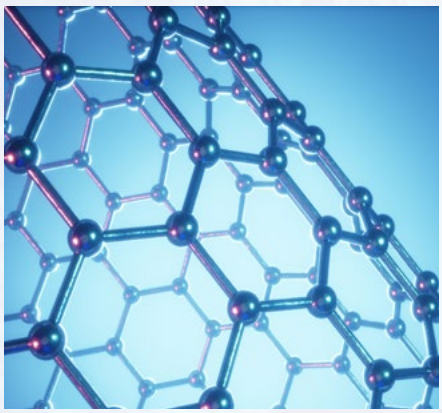


PROTEIN CRYSTALLOGRAPHY

To protect single crystals and powder capillaries from radiation damage, samples must be cooled to cryogenic temperatures. The Cobra is **a standardised solution for cooling single crystals on home sources and beamlines** during crystallographic experiments, with a range of options and accessories that ensure flexibility and customisation.

HIGH THROUGHPUT

High-throughput X-ray crystallography (especially on beamlines) not only requires cooling to preserve crystals during data collection, it needs a cooler that can enable automated, batch sample handling, key for biopharmaceutical research. The Cobra excels at **providing consistent sample cooling for up to 12,000 hours** before requiring preventive maintenance.



MATERIALS RESEARCH

Rapid synthesis and screening of materials libraries at cryogenic temperatures are also possible with the Cobra running 24/7 (e.g. small molecules, solid-state hydrogen storage materials, magnetic materials). With its additional heating capability, **the Cobra Plus has a temperature range of 80 - 500 K**, enabling observations of temperature dependent phase transitions.

NEUTRON CRYSTALLOGRAPHY

When determining hydrogen positions is crucial, Neutron Crystallography offers an excellent alternative to X-ray Crystallography. Unlike X-rays, which are scattered by the electron clouds orbiting around atoms, neutrons are scattered by the nuclei, resulting in similar yet very distinct outcomes in the experiment.

LOW FLUX, LARGE SAMPLES

The main challenge of this technique lies in the inherently low flux of neutron sources, which demands the use of much larger crystals, typically greater than 1 mm^3. Achieving stable cryogenic conditions for such crystals is essential, as cooling preserves structural integrity and allows extended data collection on valuable samples. **The optional Wide Nozzle provides a sample volume 146 % larger to accommodate samples up to 3 mm wide or 27 mm^3 in size.**

INERT ENVIRONMENTS

Traditionally, researchers have protected fragile or reactive crystals by embedding them in oils, resins, or adhesives carefully chosen to minimise background scattering, sometimes with inventive solutions such as dental cement for high-temperature experiments. While workable, these approaches can complicate measurements and add unwanted signal.

To address this challenge, **the Argon Cobra creates a cold sample environment that is inert and oxygen-free.** This prevents degradation without the need for embedding, while the use of gaseous rather than liquid argon keeps contamination to a minimum, an advantage for highly reactive materials.

The available options for the Cobra expand the range of experiments that can be undertaken and allow scientists to conduct research on sensitive samples with greater confidence, opening the way to new insights into hydrogen bonding, enzyme mechanisms, and other subtle molecular features.

FREE ACCESS TO SCIENTIFIC PUBLICATIONS

Explore how researchers worldwide are using OxCryo technology to drive new scientific breakthroughs. Our Bioz integration lets you **search, sort, and filter thousands of published papers** — all accessible without pay-walls — making it easy to discover real-world applications and research powered by OxCryo systems.

OPTIONS

To support the diverse needs of our users, we offer customisations tailored to niche cryogenic applications. **The Cobra can be ordered with one or all of these configurations.** Many of these began as bespoke solutions for specific customers, and we remain committed to ensuring that nothing stands in the way of our customers advancing their science, so **if there's a configuration you'd like which isn't listed here, we want to hear from you!**

KING

The King Cobra is an optional configuration that **extends the vacuum-insulated transfer line** from two meters **to three meters.** The extended line allows the Refrigerator to be positioned further away from the sample stage, offering more freedom in lab layout and integration.

IDENTICAL COOLING

Extending the transfer line may seem like a simple modification, but it introduces measurable effects on gas flow and temperature stability.

This is why the Cryo Controller firmware has been carefully calibrated to compensate for the increased length, ensuring the King Cobra delivers **identical cooling power, cooldown time, and thermal stability** to the standard Cobra.

BETTER VACUUM

Maintaining a high-quality vacuum is critical to minimising thermal load and enabling efficient operation of the Cobra's Refrigerator unit. To support this, the system employs a sorbent (or "sorb"), a material that captures residual gas molecules outgassed from internal surfaces, helping to preserve the vacuum environment over time.

The King Cobra doubles down on this design, integrating an additional sorb within the Refrigerator. This upgrade **reinforces vacuum stability** along the extended transfer line, **delivering improved thermal isolation** and ensuring consistent performance across the system's greater reach.

COMPACT

In powder diffraction, where capillary samples are often cooled within compact X-ray cabinets, the standard Cobra's nozzle length and radial transfer line can restrict horizontal mounting and limit installation flexibility. The Cobra Compact overcomes these constraints through a redesigned delivery head and optimised firmware, maintaining the full precision, stability, and cooling performance of the original system. Its compact form enables seamless integration into space-limited instruments, extending the Cobra's versatility across a broader range of experimental setups.

SHORTER NOZZLE

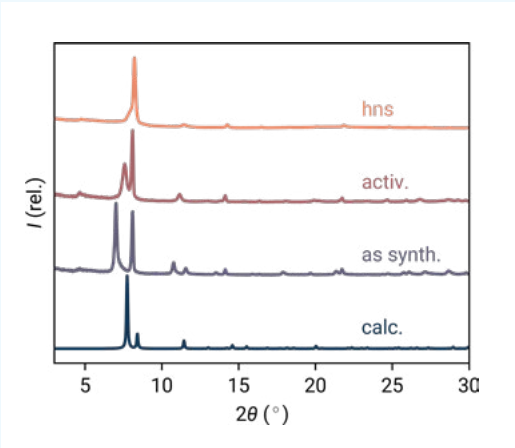
The Compact features a **134 mm shorter nozzle**, engineered specifically for setups where horizontal mounting is required. To ensure the revised geometry does not affect gas flow dynamics or temperature stability, the system's firmware has been updated to actively compensate for these changes, delivering identical performance and precision to the standard Cobra.

RIGHT ANGLE CONNECTION

The right-angle transfer line **eliminates the radial bend** of the standard design, simplifying integration in confined spaces and allowing the Cobra to operate horizontally within powder diffraction cabinets. This change significantly reduces clearance requirements.

PLUS

The Cobra Plus extends the proven performance of the Cobra range with a higher **upper-temperature limit of 500 K**, opening new opportunities for exploring temperature-driven transformations in materials research. From framework flexibility to catalytic activation, controlled heating enables scientists to watch structural evolution unfold in real time. Across a wide range of materials, from catalysts and semiconductors to metal-organic frameworks (MOFs), the Cobra Plus delivers precise, stable, and reproducible heating under ambient or inert gas conditions, revealing behaviours invisible at lower temperatures.



NANOSHEETS

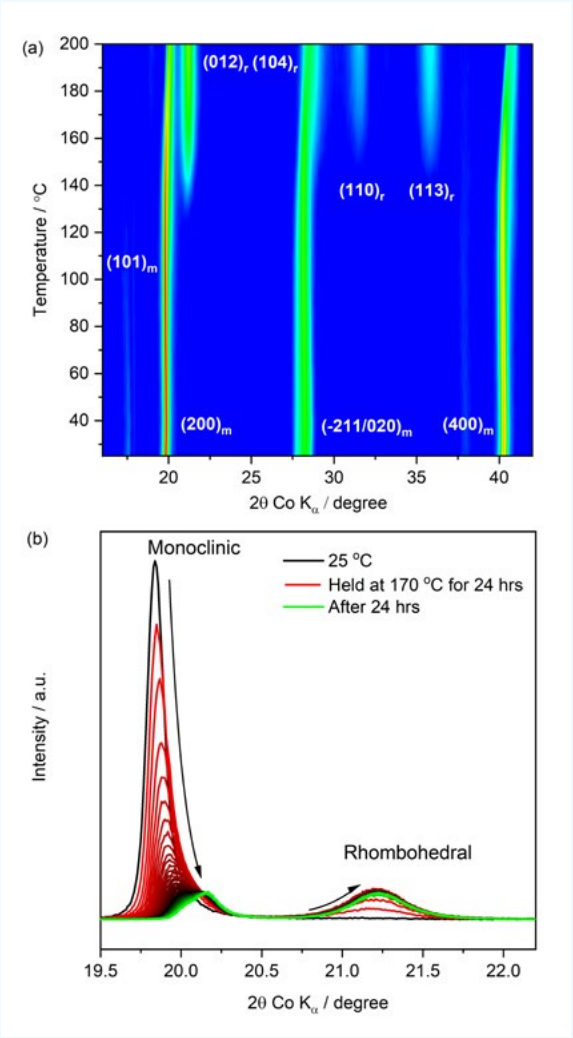
In situ variable-temperature PXRD with the Cobra Plus (80–500 K) enabled researchers to activate the Zr-based MOF GUF-14 before exfoliation into catalytically active nanosheets. PXRD patterns (left) recorded at increasing temperatures reveal how the framework gradually compresses and reorganises before delaminating into a two-dimensional phase with enhanced surface accessibility and reactivity. This transformation turned a dense layered solid into a monolayer material capable of rapid catalytic hydrolysis of organophosphate compounds.

The precise and uniform heating achieved by the Cobra Plus ensured reproducible phase evolution, allowing scientists to map how activation temperature influences nanosheet formation and catalytic performance, insights that are shaping new approaches to functional MOF design and high-temperature materials research.

Modulated Self-Assembly of Catalytically Active Metal–Organic Nanosheets Containing Zr_6 Clusters and Dicarboxylate Ligands

Ram R. R. Prasad, Sophia S. Boyadjieva, Guojun Zhou, Jiangtian Tan, Francesca C. N. Firth, Sanliang Ling, Zhehao Huang, Matthew J. Cliffe, Jonathan A. Foster, and Ross S. Forgan

Applied Materials & Interfaces, 2024, DOI: 10.1021/acsami.4c00604



BATTERY RESEARCH

In recent sodium-ion battery research, a Cobra Plus was key to understanding how Prussian white cathodes behave during controlled dehydration. By maintaining exact temperature ramps and a controlled atmosphere, the system allowed researchers to observe subtle structural shifts, from hydrated to dehydrated phases without interference from oxygen or moisture. These insights are helping to guide the design of more stable, sustainable, and efficient sodium-ion electrodes, supporting the development of cleaner energy technologies.

The analysis revealed that optimal dehydration conditions for Prussian white cathodes are strongly affected by temperature, pressure and environment. The Cobra's precise thermal control and inert environment was a critical component of this research. It demonstrates how the use of controlled sample environments expands possibilities for energy research, enabling scientists to track material transformations as they happen.

Understanding dehydration of Prussian white: from material to aqueous processed composite electrodes for sodium-ion battery applications

F. M. Maddar, D. Walker, T. W. Chamberlain, J. Compton, A. S. Menon, M. Copley and I. Hasa

Journal of Materials Chemistry A, 2023, DOI: 10.1039/d3ta02570e

"The Cobra Plus has been an essential tool in helping us study a wide variety of materials. Its continuous, cryogen-free operation means we can run long experiments overnight or through weekends, which has really boosted our productivity."

Dr David Walker, University of Warwick

"Its broad temperature range and outstanding stability allowed us to precisely control heating experiments and observe how dehydration impacts the material's structural integrity."

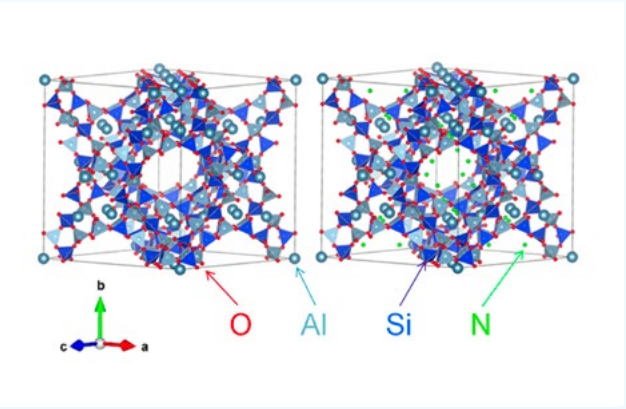
Dr Ivana Hasa, University of Warwick

ARGON

While nitrogen provides the cryogenic cooling needed to preserve samples and improve data quality, argon adds a crucial advantage: **complete chemical inertness.** The Argon Cobra creates a protective argon environment, free from oxygen, nitrogen, and moisture, to prevent degradation and unwanted reactions during analysis. By combining the Cobra's precise temperature control with argon's inert properties, researchers can safely study materials that would otherwise oxidise or decompose under conventional cryogenic conditions such as catalysts, sensitive metals, peroxides, and other moisture- or air-reactive compounds. This unique capability makes the Argon Cobra ideal for advancing studies in energy materials, catalysis, and reactive chemistry.

ZEOLITE RESEARCH

Understanding how gases interact with solid surfaces is essential to catalysis and gas storage, yet such reactions are difficult to observe in real time. Using an Argon Cobra with a custom gas-flow cell and time-of-flight neutron scattering, researchers studied nitrogen adsorption in calcium-exchanged zeolite-X under true working conditions, around 300 K and 1 atm. The stable, inert environment ensured accurate tracking of structural changes during both static and flowing gas exposure.



The study identified a measurable lattice contraction and pinpointed nitrogen adsorption near calcium sites, while correlating gas flow and structure through isotope switching ($^{14}N_2/^{15}N_2$) and inline mass spectrometry. These results demonstrate how precise, argon-controlled temperature stability supports clearer, more reproducible data, paving the way for future operando investigations of catalysts, gas-separation materials, and reactive surfaces.

A high precision gas flow cell for performing in situ neutron studies of local atomic structure in catalytic materials

Daniel Olds, Katharine Page, Arnold Paecklar, Peter F. Peterson, Jue Liu, Gerald Rucker, Mariano Ruiz-Rodriguez, Michael Olsen, Michelle Pawel, Steven H. Overbury, and James R. Neilson

Review of Scientific Instruments, 1 March 2017; 88 (3): 034101 - DOI: 10.1063/1.4978287
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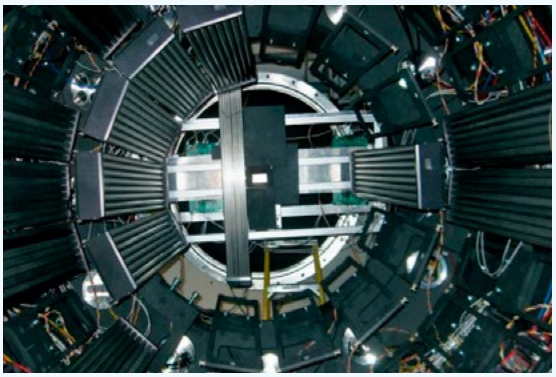
NEUTRON POWDER DIFFRACTION

Scientists at Oak Ridge National Laboratory provide a suite-level review of the six neutron powder diffractometers operating across the Spallation Neutron Source (SNS) and High Flux Isotope Reactor (HFIR). The article outlines how these complementary instruments collectively enable structural studies over an exceptionally broad Q-range, with capabilities spanning ultra-high-flux total scattering, high-resolution time-of-flight diffraction, extreme-pressure environments, and rapid *in situ* or operando measurements.



Across NOMAD, POWGEN, SNAP, VULCAN, HB-2A, and WAND2, researchers detail the unique beam characteristics, detector geometries, and sample environment options that allow crystallographers to investigate materials under temperatures from 50 mK to 3000 K, magnetic fields up to 6 T, and pressures approaching 100 GPa. The review also highlights how the Cobra is widely employed at ORNL for capillary-based studies, enabling rapid, low-background temperature control from 90 – 500 K, suiting high-throughput powder experiments on instruments such as NOMAD and POWGEN.

Together, these instruments form a unified diffraction ecosystem that supports structural analysis in fields ranging from energy materials and catalysis to magnetism, metallurgy, and geophysics, with upcoming upgrades and new instruments poised to expand ORNL's leadership in neutron powder diffraction.

A suite-level review of the neutron powder diffraction instruments at Oak Ridge National Laboratory

S. Calder, K. An, R. Boehler, C. R. Dela Cruz, M. D. Frontzek, M. Guthrie, B. Haberl, A. Huq, S. A. J. Kimber, J. Liu, J. J. Molaison, J. Neuefeind, K. Page, A. M. dos Santos, K. M. Taddei, C. Tulk, and M. G. Tucker

American Institute of Physics, 2018, DOI: 10.1063/1.5033906

DUAL OPERATION

The Argon Cobra operates with either nitrogen or argon, allowing researchers to tailor cooling conditions for each experiment. Gas switching is quick and seamless, with no recalibration required. Whether in standard nitrogen mode or under argon for reactive materials, the Cobra ensures identical temperature stability and contamination-free, reproducible data.

WIDE NOZZLE

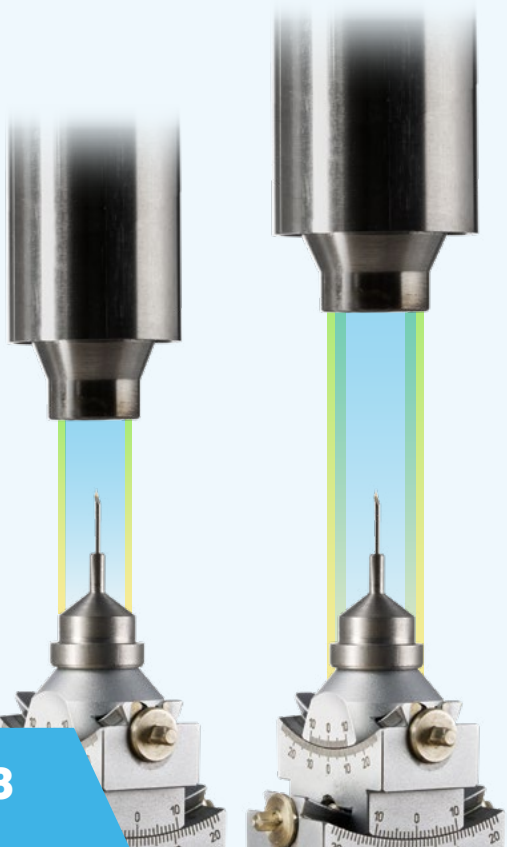
When accurate hydrogen positioning is essential, neutron crystallography serves as a powerful alternative to X-ray diffraction, thanks to neutrons scattering off atomic nuclei rather than electron clouds. However, the low flux of neutron sources requires significantly larger crystals, typically greater than 1 mm^3. To meet this need, the optional Wide Nozzle features a 14 mm aperture, delivering a **146% volumetric increase to the sample area** compared to the standard model, and enabling reliable temperature control for crystals up to 3 mm wide.

LARGER SAMPLES

The Wide Nozzle **allows large samples (3 mm wide) to be cooled efficiently at the standard 7 mm distance**. In neutron crystallography, these crystals often have huge unit cells and require cold neutron beams, so the wider stream ensures stable cooling and reliable diffraction data.

EMBEDDED MATERIALS

Many challenging samples must be embedded in resins, oils, or adhesives to stabilise or transport them. The Wide Nozzle accommodates these mounted or embedded specimens better than the standard width nozzle, ensuring cooling efficiency without compromising diffraction quality.

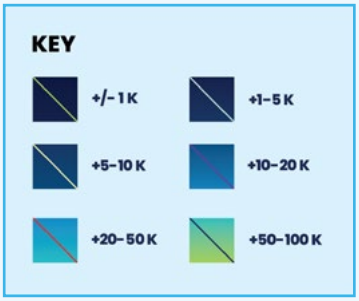


REDUCED SHADOWING

The larger sample area of the Wide Nozzle means standard-sized **samples can be positioned up to 16 mm from the nozzle** without compromising temperature stability. This reduces X-ray beam shadowing and improves data quality.

BROAD APPLICATIONS

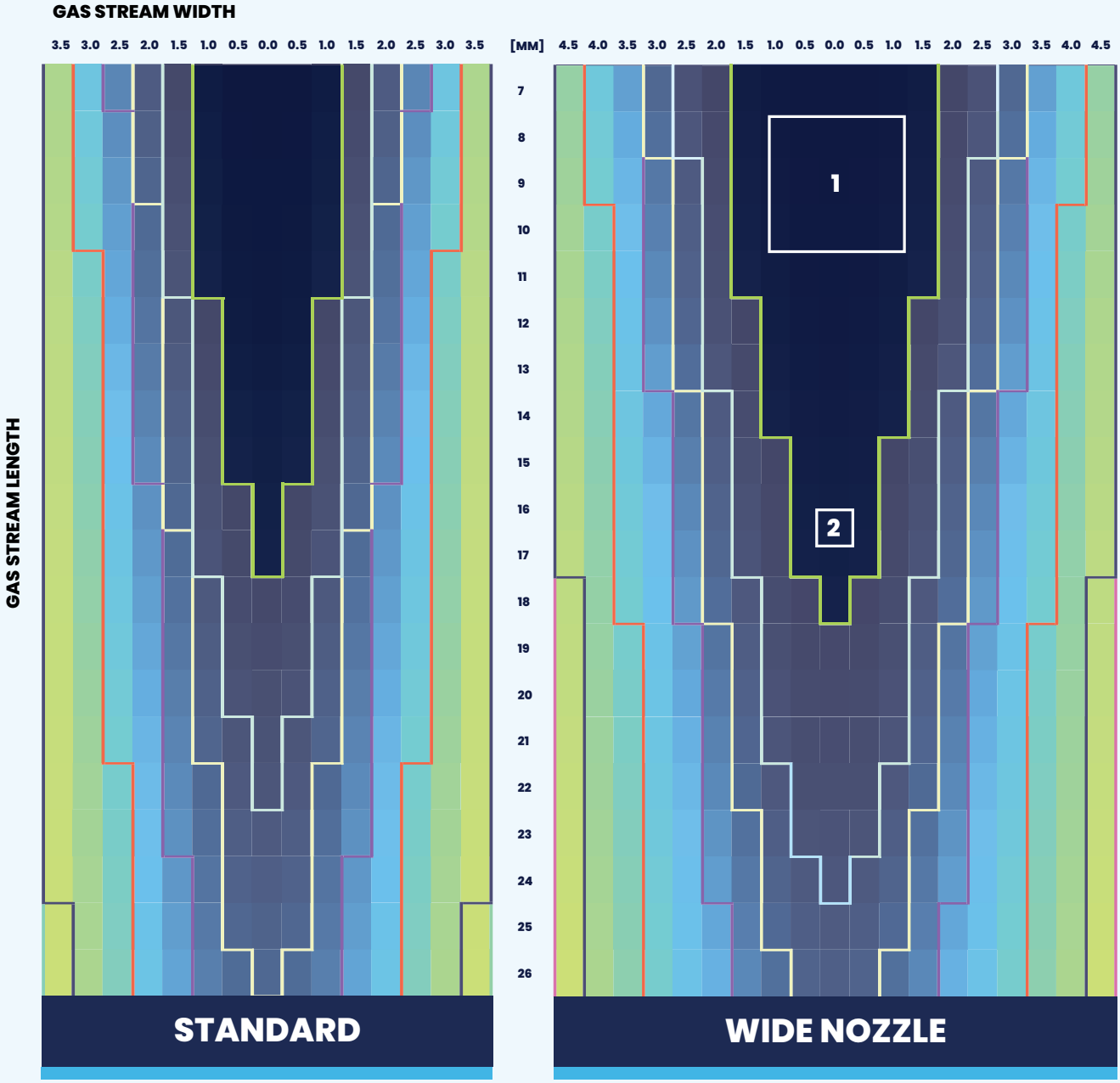
Although initially designed for neutron crystallography, a wider nozzle offers benefits for a variety of synchrotron experiments. The large cold-stream allows researchers to handle complex or delicate materials that would otherwise be inaccessible, broadening the scope of diffraction science. Wide Nozzle is also successfully used in X-ray microscopy / micro Computed Tomography (micro-CT) applications.



THERMAL MAP COMPARISON

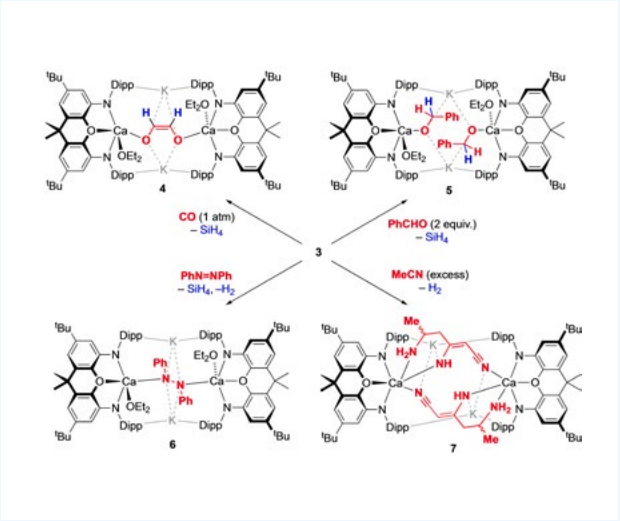
The Wide Nozzle maintains a precise, temperature controlled sample zone (±1 K of the setpoint) across a much broader central zone.

The thermal maps below illustrate how this enlarged area extends the usable sample region in both width and depth, giving researchers greater flexibility to use large samples **[1]** or reduce X-ray shadowing **[2]**.



HYDRIDE CHEMISTRY

Chemists at the Australian National University, working at Australia's Nuclear Science and Technology Organisation (ANSTO) with the University of Bath, report the first room-temperature, solution-stable complex of the hypercoordinate silicon anion $[SiH_6]^{2-}$. The anion is encapsulated within a K/Ca supramolecular "host" that mimics the solid-state lattice of K_2SiH_6, preventing decomposition and allowing detailed study of this elusive, hydride-rich species under ambient conditions. The work demonstrates how precise neutron crystallography, made possible by large single crystals, can confidently locate hydrogen positions in systems where hydrogen defines both structure and reactivity.



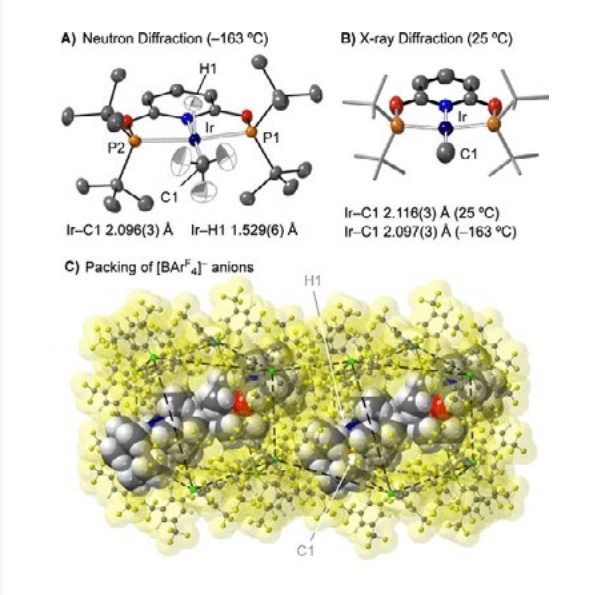
Using large crystals (2 mm × 1 mm × 1 mm), single crystal neutron diffraction resolved the full octahedral hydride array with Si–H distances around 1.59–1.62 Å and slight angular distortions, while NMR showed rapid tumbling in solution. The encapsulating assembly reproduces the geometry of K_2SiH_6, rationalising its stability in solution. Reactivity studies revealed wide ranging small molecule activation: CO couples to form a *cis*-ethylenediolate; benzaldehyde undergoes hydrocalciation; azobenzene is two-electron reduced; and acetonitrile trimerises under the bimetallic template. Together, these results open new pathways for studying hydride-rich anions and reduction chemistry where accurate hydrogen localisation is essential.

Stabilisation of the $[SiH_6]^{2-}$ Anion within a Supramolecular Assembly

Ryan Huo, Alicia J. Armstrong, Gareth R. Nelmes, Douglas J. Lawes, Alison J. Edwards, Claire L. McMullin, and Jamie Hicks

Chemistry-A European Journal, 2024, DOI: 10.1002/chem.202400662

ALKANE ACTIVATION



Chemists at the University of York and the University of St Andrews, working in collaboration with the Australian Centre for Neutron Scattering at ANSTO, have achieved the rare feat of activating methane and ethane directly within a crystalline solid. Using an iridium pincer complex, [Ir(tBu-PONOP)MeH][$BArF_4$], the team demonstrated reversible C–H bond activation through single-crystal-to-single-crystal transformations at 80 °C, conditions that preserve crystal integrity while revealing dynamic molecular behaviour impossible to study in solution.

By combining single crystal neutron diffraction with solid-state NMR and periodic DFT modelling, the researchers identified both the bound Ir–H hydride and a fleeting Ir(I) σ-methane intermediate. Heating under vacuum released methane to form a cyclometalated Ir(III) species, which could be re-converted by exposure to CH_4, proving the process reversible. Similar *incrystallo* reactivity with ethane yielded trapped ethene and dihydride products, representing a stoichiometric solid state alkane dehydrogenation. The work highlights how neutron crystallography and precise temperature control allow scientists to visualise hydrogen motion and follow catalytic steps in real time, under the same solid-state conditions where catalysis actually occurs.

An Operationally Unsaturated Iridium-Pincer Complex That C–H Activates Methane and Ethane in the Crystalline Solid-State

Matthew R. Gyton, M. Arif Sajjad, Daniel J. Storm, Kristof M. Altus, Joe C. Goodall, Chloe L. Johnson, Samuel J. Page, Alison J. Edwards, Ross O. Piltz, Simon B. Duckett, Stuart A. Macgregor, and Andrew S. Weller

Journal of American Chemical Society, 2025, DOI: 10.1021/jacs.4c18122

“A wider bore for the inner part of the cold stream was going to offer us a really significant advantage in the experiment.”

Dr. Alison Edwards, ANSTO

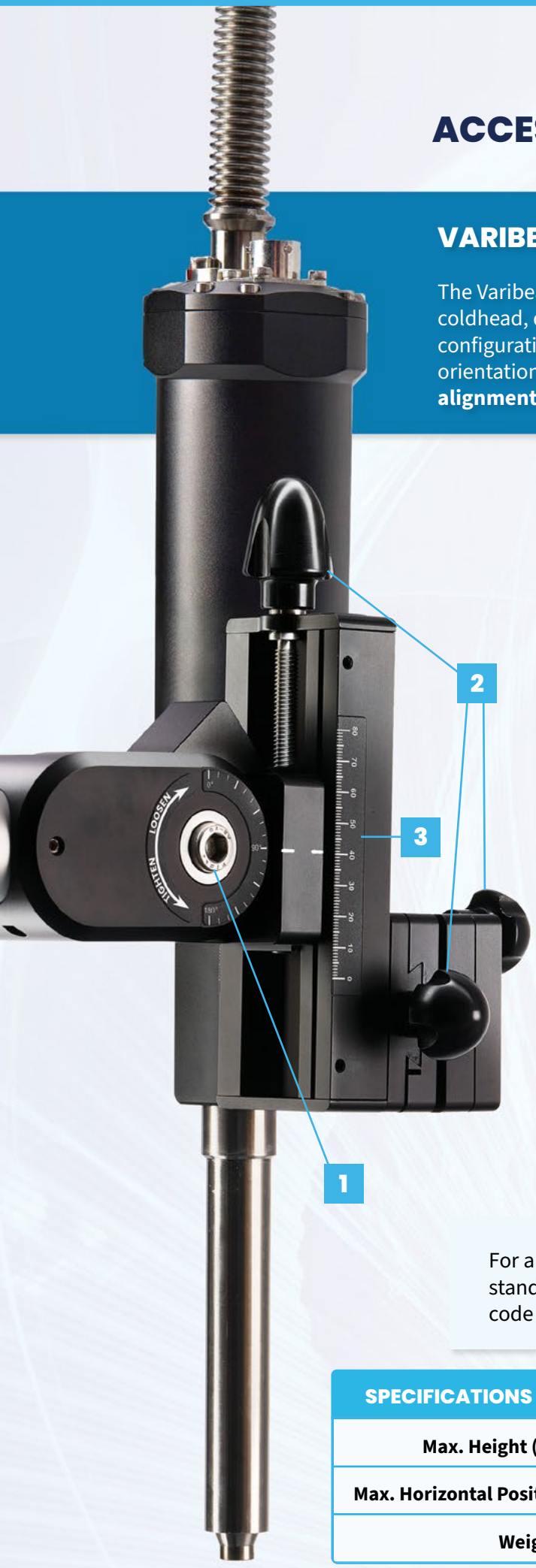
ALISON EDWARDS INTERVIEW

In this exclusive interview, Dr. Alison Edwards (ANSTO) talks about the benefits and challenges of neutron diffraction, how the Wide Nozzle was developed to meet a pressing experimental need on the KOALA diffractometer and the advantages that a larger sample area has brought to her research.

ACCESSORIES

VARIBEAM MOUNT

The Varibeam stand provides a sturdy yet lightweight support for the coldhead, designed for compatibility with a range of diffractometer configurations. It facilitates easy and precise adjustment of orientation and positioning of the nozzle to **ensures accurate alignment of the gas stream onto the sample.**



1 TILT CONTROL

Secure and simple Allen key locks let you make quick, macro-level tilt adjustments to the coldhead, so you can dial in the optimal angle with confidence and accuracy.

2 PRECISION XYZ

Smooth-action knobs provide fine control over XYZ translation, with just the right amount of resistance to make adjustments feel precise and keep positioning reliably locked in.

3 METERED NOZZLE POSITION

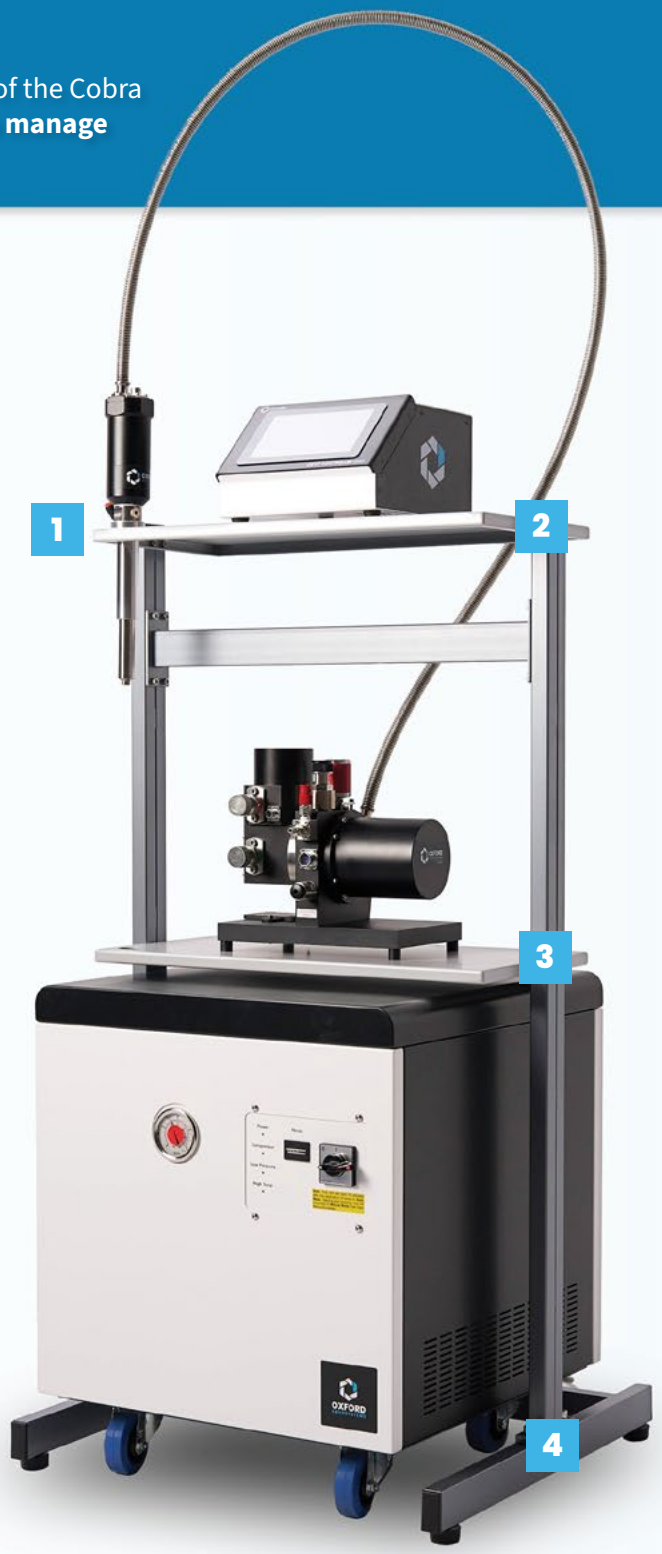
High-contrast printed meters offer clear visual references for both angle and depth, making it easy to record and return to a precise nozzle position. This is especially helpful when using the alignment tool to achieve an exact distance between the nozzle and the sample.

For a step-by-step guide on how the Varibeam stand makes nozzle alignment easy, scan the QR code to watch our nozzle alignment tutorial.

SPECIFICATIONS	
Max. Height (From Base)	600 mm
Max. Horizontal Position (From Column)	430 mm
Weight	7 kg

VERTICAL STAND

Specifically designed to house the various components of the Cobra system, this table stand provides **an organised space to manage cables and wires.**



GAS DELIVERY HEAD 1

A holder for the gas delivery head for when the system is not currently installed or in use.

CRYO CONTROLLER 2

The controller can be positioned at chest height to allow for easy and comfortable use while standing.

REFRIGERATOR 3

Screws securely fasten the refrigerator onto the shelf in either top or mid position.

K450 4

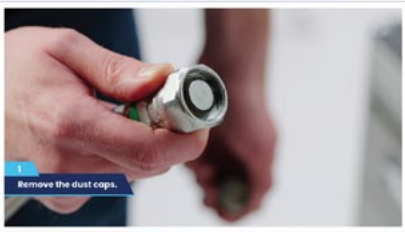
A section for the K450 to be wheeled underneath, maximising floor space.

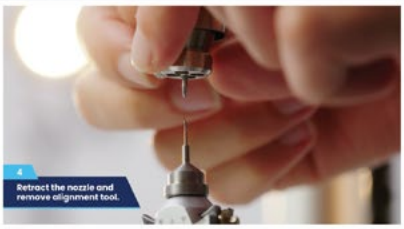
PARTS & SUPPORT

Our dedicated Support team is here to help you ensure your OxCryo equipment performs at its best. From our free expert advice and tailored service contracts, to the maintenance kits available on our e-store and a growing library of resources in our online Support Hub; we're here to keep your system running smoothly.

VIDEO GUIDES

Explore our library of quick, easy-to-follow video guides covering setup, installation, and routine maintenance. Learn from our experts and keep your system performing flawlessly.





SERVICE CONTRACTS

Keep your system in peak condition with our flexible service plans, from parts-only options to full on-site support. Choose the level of cover that fits your lab, and leave the rest to us.


Helium Fill
Helium Gas Supply
Out
In
Helium Gas Return

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