

Cryo Manipulators

A complete range for ARPES

A complete range of cryo manipulators is available for the ARPES Lab. These state-of-the-art cryo manipulators come in 4-, 5- and 6-axes and both open and closed cycle versions, with lowest possible sample temperatures, proven ARPES performance and attractive pricing.

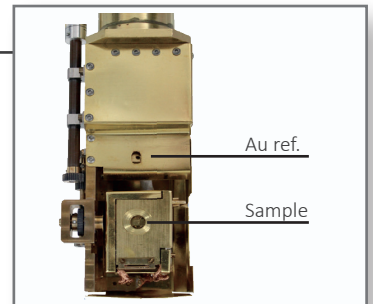
The Extreme 5-axes Closed Cycle Cryo Manipulator achieves guaranteed temperatures lower than 5K, including counter-heating capability. This base temperature yields minimal thermal broadening of 1.5 meV, complementing the high energy resolution of the DA30-L analyzer series. In combination with the ultra-narrow bandwidths of the VUV5k and VUV Laser sources offered by Scienta Omicron, new levels of energy resolution are now accessible to ARPES-Lab users.

All axes are motorized and software integrated, providing precise sample scans and accurate movement between measurement positions (ARPES, LEED, etc.). All Scienta Omicron ARPES-Lab systems include security interlocks that prevent clashes, ensuring a user friendly environment.

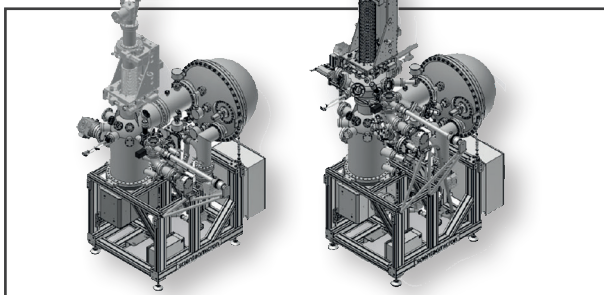
These cryo manipulators are also available as components through your local Scienta Omicron sales representative.



Closed cycle cryo manipulator with highlighted sample stage (insert).



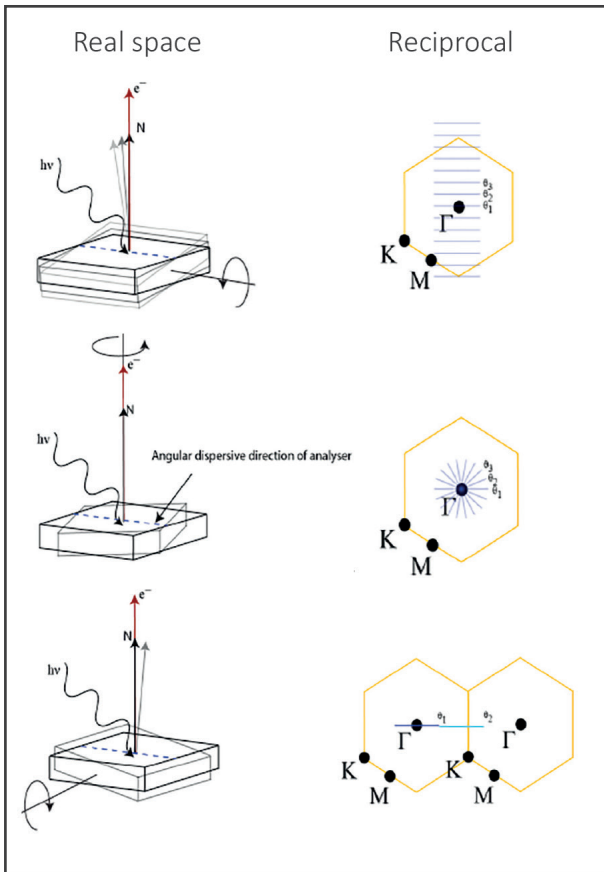
The manipulators feature two sample positions. One primary stage featuring the 5- or 6-axes motion, and one secondary 4-axes stage usually occupied by a reference pin (for evaporating with Au).



Scienta Omicron cryo manipulators – flexible for system design.

Cryo Manipulators advantages:

- Closed cycle temperatures from 4K
- 4-, 5- and 6- axes manipulators available
- All axes motorized and integrated in system measurement control software for high resolution translation and rotation
- System integrated functionality such as bake-out cycle and clash protection



The manipulator rotations are used to align the Brillouin zone points of interest to the analyzer in order to maximize the efficiency of the measurement. Once in position, the DA30-L deflection mode executes the ARPES measurement without further movement of the sample. This ensures reliable measurement position on a fixed sample point. For samples with large BZ the data acquisition can be combined with a manipulator scan.

Open cycle	4-axes	Advanced Plus Extreme	<10K <4K <3.5K
	5-axes	Advanced Plus Extreme	<10K <6K <4.5K
5.5-axes	Advanced Plus Extreme	<10K <7K <4.5K	
	6-axes	Advanced Plus Extreme	<10K <7K <5.5K
Closed cycle	4-axes	Advanced Plus Extreme	<10K <5K <4K
	5-axes	Advanced Plus Extreme	<10K <6K <5K
5.5-axes	Advanced Plus Extreme	<10K <7K <6K	
	6-axes	Advanced Plus Extreme	<10K <7K <6K

Upgrade possibilities: 4-axes manipulators can be upgraded to a higher specification version, both in temperature and number of rotations within the open and closed cycle families. It is for example possible to start with an Advanced closed cycle 4-axes manipulator and later upgrade to extreme closed cycle 5.5-axes.

5.5-axes denotes a 6-axes manipulator with motorized motion except the azimuth which is manually actuated by wobble stick.

Technical Data

Selected Specifications:

- Temperature range
 - Closed cycle: 4-325 K
 - Open cycle: 3.5-400 K
- Fast cooling rate:
 - Closed cycle: RT to 6 K 4-5 hours
 - Open cycle: RT to 10 K <15 min (2-3 hours to ultimate T)
- Vibration level:
 - Closed cycle: <20 μm
 - Open cycle: no source for vibration
- Built in Gold reference sample (evaporator needed)
- Counter heating in all versions for temperature dependent studies
- Strictly non-magnetic materials used, optimized for ARPES

Rotations:

- Polar rotation +/- 180 degrees
- 2nd rotation axes: Azimuth maximum +/- 120 degrees (maximum +/- 180 degrees with decreased lifetime)
- 3rd rotation axes: Tilt -15 (face up) to +45 degrees (face down)

Option highlights:

- Inside cryoshield (typ. 1 K effect on base temperature of primary stage):
 - Second 4K sample receiving station instead of Au reference position
 - Sample isolation/bias
 - 4 electrical contacts on primary sample stage
- Outside, below cryoshield (no effect on base temperature):
 - Heating stage, e-beam, up to 1000 K
 - YAG crystal for photon alignment
 - 2-slot sample parking station
 - Sample cleaving station
 - Angular test device

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