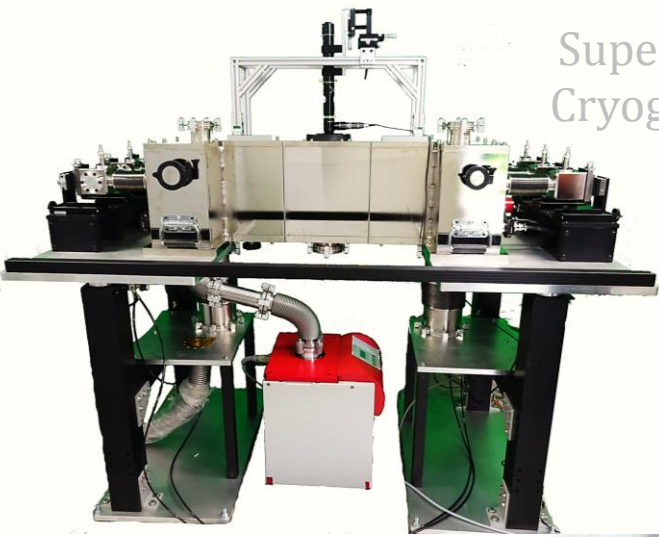


## SCM-CF

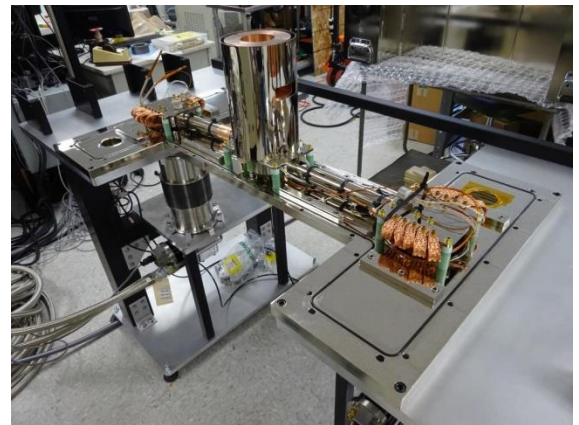
# Superconducting Magnet-based Cryogen-Free Cryogenic Probers



*The Model SCM-CF is cryogen-free superconducting magnet-based cryogenic probe station designed to enable a new dimension in cryomagnetic probing. A widely adaptable system uses up to two closed cycle refrigerators or CCRs (one for sample cooling and one for superconducting magnet cooling) thus permitting low temperature testing at magnetic fields not achievable with single CCR as well as permitting decoupling between the temperature of superconducting magnet and sample temperature. This approach also permits to use superconducting magnets with more than one dimension of magnetic field control. Efficient thermal management, vibration isolation and cost effectiveness makes these systems extremely competitive for testing of spintronic and nanoelectronic devices. Wide range of available options (DC or RF probing, different microscope options) make such systems truly unique.*

### Key Features

- Cost- competitive, stable, reliable, and convenient to use
- Temperature range from 10K to 400K (0.1K accuracy) with 4.2K to 480K (optional)
- Closed- cycle refrigerator for cost effective cryogen-free operations
- Characterization of up to 1" diameter samples (up to 2" diameter optional)
- DC to 67GHz measurements
- 4 micromanipulated probe arms (up to 6 available in optional configurations), with highly accurate XYZ and optionally  $\theta$  adjustment
- Thermally anchored probe tips
- Temperature- controlled radiation shield
- Clear view top window (high purity quartz)
- High frequency vibration damping
- Integration with electromagnet for horizontal magnetic field generation
- High level of customization to accommodate most exotic probing needs



## Specifications :

### Sample size

- Up to 50mm round

### Thermal specifications

- Cryogen-free closed cycle refrigerator including cold head, compressor, chiller and required helium hoses
- **Temperature range:** standard 10K to 400K, 4.2K to 480K available as options
- **Temperature accuracy:** 0.1K
- Thermally anchored prone arms and radiation shield
- Temperature controlled (heater) chuck
- Temperature monitoring of the chuck and probe arm
- Temperature monitoring of radiation shield is optional

### Vacuum

- Base pressure  $1.0 \times 10^{-5}$  torr standard, down to sub- $10^{-6}$  torr optional

### Optics

- **Additional viewports:** can be added by customer request
- **Window materials:** fused silica, custom materials and coatings are available

### Microscope:

- Extra-long working distance zoom microscope
- **Working distance:** 75mm at 10x magnification
- Coaxial illumination with optional programmable shutter

### Cameras:

- Digital cameras ranging from 1 megapixel to 10 megapixels. Included with the camera is software for image and video capture as well as dimension measurement capability

## MCPS-CF

## Specifications (cont.):

### Probes

- DC
- RF (various)
- Active
- High power

### Micromanipulators

- Various resolutions and ranges available

### Cables available

- Cryogenic temperature- compatible coaxial cables
- Cryogenic temperature-compatible coaxial triaxial cable

### Wafer chucks available

- Grounded
- Isolated
- Coaxial
- Triaxial
- All wafer chucks are planar to within 15 $\mu$ m at room temperature
- Thermal expansion is compensated to a large part by design

### Software

- LabView-based software for computer control and monitoring of temperatures. Several temperature testing sequences are pre-programmed and custom sequences can be easily programmed by the end user

### Vibration isolation

- Vibration isolation table with air damping system
- Vibration- isolating bellows

### Options

- Fiber optic probes
- High level of customization to the customer needs

### Magnetic field generation

- Vertical, horizontal or multidimensional magnetic field, up to 5T in vertical direction, up to 2T in horizontal direction or up to 1T in multidimensional configuration  
Hall probe for active magnetic field control is optional  
Wide range of quench and safety protections

## SCM-CF

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