

Cryostat and temperature controller**Sample chamber**

Dimensions	Φ21mm x 100mm, top loading
Construction	Non-magnetic, double walled
Temperature range	
Temperature range	80K-450K
Cryogen	Liquid N ₂
Exchange gas	Air, port available for evacuation/flushing

Measurement and control

Sensors	Pt100 and K-type thermocouple
Temperature	
Measurement resolution	0.01K
Control stability	Better than ±0.1K in isothermal mode
Ramp-rate	1K/min-10K/min in steps of 0.1K/min
Control algorithm	PID
PID parameters	User configurable

Heater

Heater power	40 Watt
Winding type	Non-magnetic

Others

Computer connectivity	USB
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X-T measurement with AC susceptometer and lock-in amplifier**Sample**

Sample size	5mm (dia) x 10mm (length)
Field strength	4 Oe RMS field at 80Hz

Primary driver

Frequency range(s)	10Hz-10KHz
Reference output	2V peak-to-peak
Reference generation	Direct digital synthesis

Lock-in detection

Integration time	1 sec
Pre-amp gain(s)	1, 10, 100
Post-amp gain(s)	1, 10, 100

Measurement

Measurement resolution	16-bit
Measured quantities	Both amplitude and phase

Others

Computer connectivity	USB
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R-T and I-V measurements with 4 probe insert and I-V source & measurement unit

Source mode	Current or voltage
Current source specification	
Current source range(s)	100μA, 1mA, 10mA
Current setpoint resolution	Better than 0.05% of full-scale
Voltage compliance	10V
Voltage source specification	
Voltage source range(s)	10V
Voltage setpoint resolution	Better than 0.005% of full-scale
Current compliance	10mA
Ammeter specification	
Current measurement range(s)	100μA, 1mA, 10mA
Current measurement resolution	6½ digit
Volt-meter specification	
Voltage measurement range(s)	100mV, 1V, 10V
Voltage measurement resolution	6½ digit
Input impedance	>10 ¹² Ω
Ohmmeter specification	
Resistance measurement range(s)	10Ω, 100Ω, 1kΩ, 10kΩ, 100kΩ, 1MΩ, 10MΩ
Resistance measurement resolution	6½ digit
Others	
Computer connectivity	USB

Data acquisition and control software: Qrius 1.1

Computer automation of R-T and X-T measurements using above mentioned modules have been provided by Qrius 1.1 software. It allows easy control of all experimental parameters and real time recording and plot of physical quantities. The software runs on Ubuntu 12.04, and is provided on an easy-to-use, installable Live DVD.

Other user provided accessories required to run the system

The following is a list of accessories that need to be provided by the user for proper operation of XPLORE-1.1 PQMS setup:

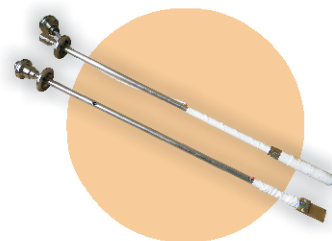
Rotary vacuum pump with KF-25 bellow

Minimum of 3 litres of liquid nitrogen

Computer with DVD drive, USB 2.0 port, 2GB RAM, 100GB of hard-disk space and Pentium dual core or above processor

Our commitment to customers

XPLORE 1.1 stands out for its excellent specifications, performance and user-friendliness. These qualities, we believe, follow directly from our commitment to customer care. Indeed, our Product Development team interacts constantly with customers to gain insight into their needs. This inevitably leads to well-designed products and to regular upgrades with enhanced features. Our commitment does not stop there. Wherever possible, we customise our products to meet your specific requirements. Which is why, you can count on our efficient customer service to help you, whenever you are in need of help.



Excellent Support
High-End Specifications
Amazing Cost-Effectiveness

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XPLORE 1.1 PQMS

Physical Quantities Measurement System

XPLORE 1.1 PQMS is an easy-to-use, versatile system for acquiring experimental plots of magnetic ac susceptibility and electrical resistance of your sample as a function of temperature in the range of 80-450K.

Temperature Controlled Environment

Cryostat

Wide insert port to allow convenient top loading of sample in exchange gas
Cryogen: Liquid Nitrogen
Dewar Capacity: 4 Litres
Facility to continuously replenish liquid N₂



Construction

Non-magnetic construction
Double-walled insulation for improved temperature control
Vacuum-ready sample chamber for replacement of exchange gas



Temperature Controller

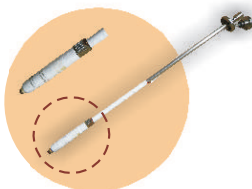
Temperature Range: 80-450K
Temperature Stability: ± 0.1 K
Programmable temperature sweep rate
Independent sample temperature measurement



Magnetic Susceptibility Measurement

Magnetic AC Susceptometer

(A device which measures the response of the sample to a sinusoidally varying magnetic field)
Non-magnetic primary & secondary windings
Enhanced sensitivity through excellent compensation
High signal-to-noise ratio achieved via direct coupling to a lock-in amplifier



Lock-In Amplifier

In-phase & 90° out-of-phase measurement
Amplitude & phase of the secondary pick-up relative to the primary excitation voltage
Selectable pre- and post-amplification for a wide range of signal levels



4-Probe R-T and I-V Measurement

4-Probe Insert

Designed for easy mounting of sample.



Precision I-V Source & Meter

Current and voltage ranges designed for resistances ranging over 10 orders of magnitude
Automatic cancellation of thermal voltages by current reversal (Δ -mode) for enhanced accuracy
Direct readout of the resistance through XPLORE's software package



Software Package: Qrius 1.1

User-selectable temperature, current, and voltage sweep rates
Manual and automatic range selection for sources and measurements
Real time measurement, display, and recording of physical parameter values
Online plotting of R vs T, I vs V and χ_{ac} vs T data
Offline analysis of acquired data
Export of data to ASCII file format



Applications of XPLORE 1.1

Teaching

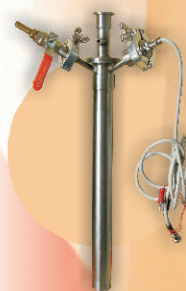
Suitable for BTech/MTech (material science) & BSc/MSc (condensed matter) experiments centered on the determination of the transition points for the change of phase between:

The para-, ferro-, antiferro-, ferri- and diamagnetic states

The normal, superconducting, semiconducting and insulating electrical states of selected samples

Research

Immediate investigation of magnetic ac susceptibility & electric conductivity behavior of research samples as a function of temperature



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