Quantum Design

LATIN AMERICA

Raising The Science

Materials Science

Spectroscopy

Cryogenics

Optics

Nanoscience

Sample Synthesis

Biotechnology & Chemistry

Industries

Microscopy

Quantum Technology

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Quantum Design

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Quantum Design develops and manufactures automated temperature and magnetic field testing platforms for materials characterization, as well as portable liquid Helium plants. These systems offer a variety of measurement capabilities and are in widespread use in the fields of physics, chemistry, biotechnology, materials science, nanotechnology, and quantum information research.

The Quantum Design PPMS® represents a unique concept in laboratory equipment: an open architecture, variable temperature-field system, designed to perform a variety of automated measurements. Available measurement options include all required hardware and electronics to immediately begin collecting publication-quality data, while the system is also easily adapted to custom user experiments. The expandable design enables combining many features in one instrument to make the PPMS the most versatile system of its kind.

Quantum Design PPMS® DynaCool™

The PPMS DynaCool uses a single two-stage Pulse Tube cooler to cool both the superconducting magnet and the temperature control system, providing a low vibration environment for sample measurements in a truly cryogen-free package. It offers continuous low temperature control and precise field and temperature sweep modes. The PPMS DynaCool also comes standard with an integrated cryopump, which makes it compatible with all available PPMS measurement options, or any other user-designed experiments.

Key features:

- No need for liquid cryogens
- Temperature range of 1.8 K – 400 K
- 9 T, 12 T and 14 T magnets available
- Continuous Low-Temperature Control – maintains temperatures below 4.2 K with smooth temperature transitions when warming and cooling through 4.2 K
- Controlled temperature Sweep Mode
- Fully automated operation of available PPMS measurement options
- Built-in Cryopump for high vacuum applications ($<10^{-6}$ Torr)
- New electronics built using CAN architecture for improved reliability
- Standby mode conserves power while requiring only a short recovery time

Most common applications:

- Electrical Transport:
  - AC Resistance (ETO); DC Resistance
  - Horizontal Rotator; Pressure Cell (Transport)
- Magnetometry:
  - VSM + Large Bore; VSM Oven
  - AC Susceptibility (ACMS II); FORC Software
  - Fiber Optic Sample Holder (FOSH)
  - Pressure Cell (Magnetometry); Torque Magnetometer
- Thermal Measurements:
  - Heat Capacity; Thermal Transport (TTO); Dilatometer
- Sub-Kelvin Capabilities:
  - Dilution Refrigerator; Helium-3 Refrigerator
  - Adiabatic Demagnetization Refrigerator (ADR)
  - Sub-Kelvin Measurement Options (AC Resistance, DC Resistance, Heat Capacity, AC Susceptibility)
- Multi-Function Probes:
  - User-designed experiments using MFPs
  - Photoconductivity; CryoFMR
  - Optical Multi-Function Probe
- Raman & FMR Spectroscopy:
  - Raman Laser and Spectrograph
  - CryoFMR and PhaseFMR
- Optics:
  - Light Sources; Optix Breadboard
- PPMS Microscopy:
  - SPM for PPMS

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DynaCool™
PPMS®

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Quantum Design's MPMS3 represents the culmination of more than 30 years of development and design in the world of SQUID Magnetometry. Providing users with the sensitivity of a Superconducting Quantum Interference Device magnetometer and the choice of multiple measurement modes, the MPMS3 offers new levels of performance in magnetic research while including those aspects of past Quantum Design SQUID magnetometers that customers have grown to appreciate and depend on.

The MPMS3 incorporates major advances in data acquisition, temperature control and magnetic field control with $\leq 10^{-8}$ emu sensitivity. The award- winning design of Quantum Design's MPMS3 also provides expanded software functionality within its user-friendly MultiVu interface. Combining the highest level of system performance with the possibility of using all previously available MPMS measurement options, the Quantum Design MPMS3 truly represents the next generation of advanced SQUID magnetometry.

A variety of options and measurement modes are offered for the MPMS3, such as: VSM and DC-Scan modes, AC susceptibility, Ultra-low field (ULF) capability, 1000 K Oven option, High-vacuum, Electrical Transport, Sample Rotator, Fiber Optic sample holders and light sources for the investigation of photomagnetism, Pressure Cell up to 1.3 GPa and a Helium-3 Refrigerator capable of reaching 500 mK.

Most common applications:

- Thin Magnetic Films
- Superconductors
- Magnetic powder samples
- Nanoparticles
- Spin Glasses
- Geomagnetism
- Photomagnetism
- Magnetic Anisotropy
- Magnetoelectric Multiferroics
- Biomagnetism

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MPMS®3

Key features:

- SQUID Sensitivity
- 7 Tesla Magnet with QuickSwitch™ technology
- Maximum ramp rate: 700 Oe/sec
- Temperature Range: 1.8 – 400 K with Rapid Temp™
- 300 to 1.8 K in 25 min. (typical)
- Multiple measurement modes (DC, VSM and AC Susceptibility)
- Software controls for the temperature and magnetic field readily enable the automation of complex data acquisition procedures
- Cryogen Free with EverCool®

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Helium Liquefiers, Purifiers and Recovery Systems

Quantum Design's full line of liquefiers and innovative helium recovery, storage and purification systems allow you to recover and liquefy the helium gas currently being lost from the normal boil off and helium transfers of your cryogenic instruments. A perfect helium recycling solution for research and medical cryostats, Quantum Design's helium liquefiers and recovery systems allow you to break your dependence on cryogen suppliers and no longer be subject to higher costs and undependable supply. You will also be doing your part to conserve a precious natural resource which is vital to scientific research and medical treatment.

Quantum Design liquefiers are mobile and easy to move around your laboratory, which makes the transfer of liquid helium more convenient than ever. Liquefiers are doorway- and ramp-friendly, and the transfer process is as easy as transferring from your current storage Dewars. Our helium recycling technology is also modular so that systems can be designed for needs small or large, and then expanded as needs grow.

Most common applications:

- NMR
- MRI
- MEG
- Cryostats and any instrument whose magnet is cooled by helium

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NexGen
LIQUEFIERS

Liquefier Features:

- Easy-to-Use, Fully Automated Touch Panel Operation
- Portable Liquefiers for Easy Transfers
- 160 or 250 Liter Capacity, 25+ L/day
- Self-Cleaning, Uninterrupted Service
- Software with Intuitive User Interface for Easier Operation
- Modular Design: Your System Can Grow as Your Helium Needs Evolve

Purifier Features:

- Purifies 30 liters of helium gas per minute to 99.9995%
- Fail Safe Operation – Stops operation before "dirty" gas passes through system
- Full regeneration of system only takes 5 hours
- Regeneration easily accomplished through automated software
- Ensures highest liquefaction rates possible
- Hydrogen removal option protects instruments from plugging

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Quantum Design OptiCool®

The OptiCool by Quantum Design is a new optical cryostat using an innovative design that puts the sample volume in the heart of your optical environment. A custom 3.8 inch bore, split-coil, conical magnet offers fields perpendicular to the optical table up to ±7 tesla. The highly integrated design means, even with a magnet, your sample isn't buried inside a large cryostat, far away from the optics. Seven side optical ports and one top optical port allow for optical access to your sample from a wide array of directions.
The OptiCool optical cryostat is a cryogen-free system with automated software to control temperature and magnetic field. At the push of a button you can change your sample temperature from 1.7 K to 350 K, with or without an applied magnetic field. A generous 89 mm diameter by 84 mm tall sample volume provides exciting possibilities in experiment design.

Sample Pods

The OptiCool's Sample Pod provides a place to build and customize your experiment on the bench. When you are ready to make a measurement, the Sample Pod easily plugs into the pre-wired temperature control column. Having multiple experiments arranged on multiple pods allows you to switch experimental hardware quickly. Sample Pods are available in both a standard configuration and a large-volume configuration depending on the experimental needs. Each type of pod can be further configured by changing the riser pieces (available in three lengths; included with the system) to adjust the height of the mounting plate.

Standard Sample Pod – Allows for mounting plate positions at 56.4 mm, 32.8 mm and 12.4 mm below the magnet center. Large-Volume Sample Pod – Allows for mounting plate positions at 131.3 mm, 111.0 mm and 87.4 mm below the magnet center.

Key features:

- 8 Optical Access Ports:
- 7 Side Ports (NA > 0.11)
- 1 Top Port (NA > 0.7)
- Temperature Range: 1.7 K to 350 K
- 7 T Split-Coil Conical Magnet
- Low Vibration: <10 nm peak-to-peak
- 89 mm x 84 mm Sample Volume
- Automated Temperature & Magnet Control
- Cryogen Free

Most common applications:

- MOKE / CryoMOKE
- Raman / FTIR Spectroscopy
- Photoluminescence
- UV / VIS Reflectivity & Absorption
- AFM / Microscopy
- NV / Color Defect / Vacancy Centers
- Nanomagnetism
- Time Resolved Magnetic Spectroscopy
- Quantum Optics
- Spintronics

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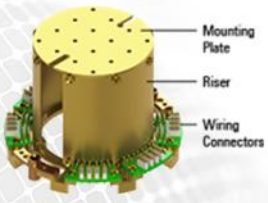
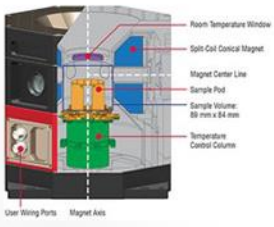
OptiCool®
By Quantum Design





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The Quantum Design PPMS® represents a unique concept in laboratory equipment: an open architecture, variable temperature-field system, designed to perform a variety of automated measurements. Available measurement options include all required hardware and electronics to immediately begin collecting publication-quality data, while the system is also easily adapted to custom user experiments. The expandable design enables combining many features in one instrument to make the PPMS the most versatile system of its kind.

Quantum Design PPMS®

The Quantum Design PPMS® represents a unique concept in laboratory equipment: an open architecture, variable temperature-field system, designed to perform a variety of automated measurements. Available measurement options include all required hardware and electronics to immediately begin collecting publication-quality data, while the system is also easily adapted to custom user experiments. Sample environment controls include fields up to ±16 T and a temperature range of 1.9 - 400 K. The expandable design enables combining many features in one instrument to make the PPMS® the most versatile system of its kind.

Key features:

- Compatible with more than 20 Quantum Design Measurement Options that seamlessly integrate with the MultiVu software environment
- Versatile sample mounts couple easily to the 12 electrical leads built into the cryostat insert for consistently reliable electrical acces
- Software controls for the temperature and magnetic field readily enable the automation of complex data acquisition procedures
- Sample chamber has 2.6 cm diameter to accommodate custom probes
- Interface with external 3rd party instruments, whether controlling these from within MultiVu or directing the PPMS from external software, such as NI LabVIEW
- Select from 9, 14 or 16 T longitudinal, or 7 T split-coil transverse magnet

Most common applications:

- Electrical Transport:
  - AC Resistance (ETO); DC Resistance;
  - Horizontal Rotator; Pressure Cell (Transport)
- Magnetometry:
  - VSM + Large Bore; VSM Oven;
  - AC Susceptibility (ACMS II); FORC Software;
  - Fiber Optic Sample Holder (FOSH);
  - Pressure Cell (Magnetometry); Torque Magnetometer
- Thermal Measurements:
  - Heat Capacity; Thermal Transport (TTO); Dilatometer
- Sub-Kelvin Capabilities:
  - Dilution Refrigerator; Helium-3 Refrigerator;
  - Adiabatic Demagnetization Refrigerator (ADR);
  - Sub-Kelvin Measurement Options (AC Resistance, DC Resistance, Heat Capacity, AC Susceptibility)
- Multi-Function Probes:
  - User-designed experiments using MFPs;
  - Photoconductivity; CryoFMR;
  - Optical Multi-Function Probe
- Raman & FMR Spectroscopy:
  - Raman Laser and Spectrograph;
  - CryoFMR and PhaseFMR
- Optics:
  - Light Sources; Optix Breadboard
- PPMS Microscopy:
  - SPM for PPMS

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PPMS®
Physical Property Measurement System

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Quantum Design PPMS® VersaLab™

Quantum Design's PPMS® VersaLab is a portable, cryogen-free cryocooler-based material characterization platform. With a temperature range of 50 – 400 K, this 3 Tesla platform is perfect for accomplishing many types of materials characterization in a limited space.

As with all Quantum Design instruments, the PPMS® VersaLab is a fully automated turnkey system with a user-friendly interface. It is specifically designed for material characterization up to 3 Tesla and over a wide temperature range without the need of liquid cryogens or high power infrastructure. This makes the PPMS VersaLab perfect for small laboratories where space is at a premium, as well as educational labs that might not have the full facilities of major laboratories.

Most common applications:

- Electrical Transport:
  - AC Resistance (ETO); DC Resistance
  - Horizontal Rotator; Pressure Cell (Transport)
- Magnetometry:
  - VSM + Large Bore; VSM Oven
  - AC Susceptibility (ACMS II); FORC Software
  - Fiber Optic Sample Holder (FOSH)
  - Pressure Cell (Magnetometry); Torque Magnetometer
- Thermal Measurements:
  - Heat Capacity; Thermal Transport (TTO)
- Multi-Function Probes:
  - User-designed experiments using MFPs
  - Photoconductivity; CryoFMR
  - Optical Multi-Function Probe
- Raman & FMR Spectroscopy:
  - Raman Laser and Spectrograph
  - CryoFMR and PhaseFMR
- Optics:
  - Light Sources; Optix Breadboard
- PPMS Microscopy:
  - SPM for PPMS

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PPMS® VersaLab™

Key features:

- Compact size and portability requires less lab space
- No need for liquid cryogens
- Runs almost all PPMS measurement options
- No high power requirement for operation
- A perfect solution for physics education classes and labs