



Quantum Design announces that it has a new development project to produce a Pulse Tube Cryocooler-based version of its popular Physical Property Measurement System (PPMS). The concept of this new system, called the **DynaCool™**, will be to provide all the current capabilities of the PPMS without the need for any liquid cryogenes.

The **DynaCool** device will be displayed at the 2009 March Meeting of the American Physical Society (APS) in Pittsburgh. Current development work has resulted in a device that can perform temperature scans from 1.9 to 400 K at fields of 9 or 14 T.

The **DynaCool** system uses a two-stage Pulse Tube cooler to not only cool the superconducting magnet but also provide the cooling for the temperature control system and the internal thermal shield. Utilizing a new approach to cryocooler equipment design, the DynaCool system employs a new ⁴He-based temperature control system and gas flow technology.

The **DynaCool** will also incorporate an integrated CryoPump that can be used to pump the sample space to a vacuum of $<10^{-4}$ Torr. This allows for the easy installation the various PPMS Measurement Options or user experiments that may require a high vacuum environment.

Features

- No use of cryogenic liquids
- Fully automated operation of all PPMS applications/options
- Built-in Cryopump for high vacuum application
- New electronics using CAN architecture for improved reliability
- Standby mode conserves power and requires only 30 minutes to become fully operational

Benefits

- Avoids the cost and inconvenience associated with the use of liquid helium and liquid nitrogen
- System requires only electricity (7.5 kW), water and helium gas for operation
- Can be used even where no liquid helium is available and infrastructure
- Eliminates need for expensive helium reliquification equipment
- Can be operated only when measurements are needed

Design Goals (Specification are subject to change)	
Temperature Range	< 1.9 to 400 K Continuous Low Temperature Control and Temperature Sweep modes
Temperature Uniformity	<0.5% in sample region
Magnetic Field Range	9 and 14 T Full field sweeps, switch-less magnet
Time to be Operational	9 T system: ~24 hours; 14 T system: ~36 hours
Maintenance Interval	2-3 years The Pulse Tube cryocooler is designed to be maintenance free. This assumes that the cryocooler compressor is connected to a water chiller. The scope of the maintenance is the replacement of the adsorber in the compressor unit.
Power Requirements	
System	200-230V, 50/60 Hz, single-phase
Compressor	220/230 VAC, 3-phase 60Hz or 380/420/460 VAC, 3-phase, 50Hz