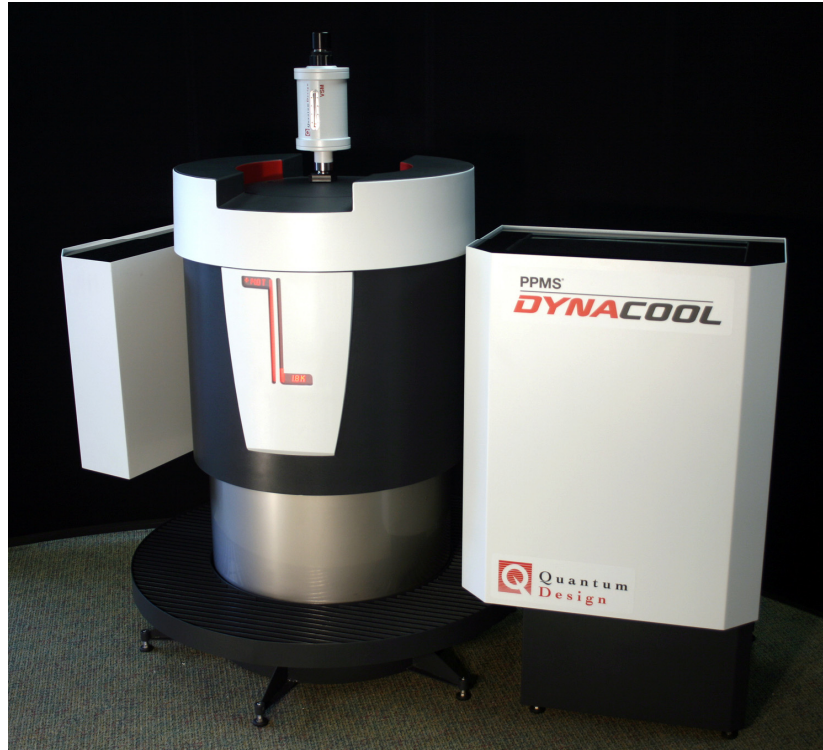




## Work-in-Progress Report: PPMS<sup>®</sup> DynaCool<sup>™</sup>

### Cryogen-free Physical Property Measurement System (System availability – Summer 2010)



Quantum Design is proud to announce 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<sup>™</sup>**, 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 tesla.

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 <sup>4</sup>He-based temperature control system and gas flow technology. The DynaCool is capable of cooling the entire sample space to temperatures as low as 1.9 K.

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

## Features:

- No use of cryogenic liquids (helium or nitrogen)
- Fully automated operation of all PPMS applications/options
- Built-in Cryopump for high vacuum application
- New electronics built 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
- 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 tesla (Full field sweeps, switch-less magnet)

**Time to Be Operational:** 9 tesla system: ~24 hours; 14 tesla system: ~36 hours

**Maintenance Interval:** 2-3 years (The Pulse Tube cryocooler is designed to be maintenance free\*.) The scope of the maintenance is the replacement of the adsorber in the compressor unit. (\*This assumes that the cryocooler compressor is connected to a water chiller.)

**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

Check our website for future announcements – [www.qdusa.com](http://www.qdusa.com).