

Release date: 11th June 2009

Development of new materials facilitated by innovative Cryogen-free instruments

Oxford Instruments is proud to have delivered the world's first integrated Cryofree[®] dilution refrigerator with a 12T superconducting magnet. This system operates without liquid helium and only uses a single pulse tube refrigerator. It offers the unique ability to control temperatures from below 10 mK to 30K and magnetic fields up to 12T on the same instrument without any external manipulation of the sample environment. This is a breakthrough for applications such as neutron scattering where sample alignment is paramount. Having a single piece of equipment saves experimental space and time and will bring new research capabilities. For many families of novel materials tracking phenomena such as spin ordering and antiferromagnetism over wide temperature ranges in a magnetic field is key to understanding their intrinsic behaviour. This tool holds great promise for the development of future new materials.

Dr Michael Cuthbert, Business unit manager for the Ultra Low Temperature (ULT) products, commented: "The performance of the system through its test programme has been outstanding with temperatures below 10 mK achieved with the magnet at 12T central field, with an ultimate base temperature of 8 mK achieved in zero field. One of the many challenges in building this system was not only to provide the lowest possible temperature coupled with the 12 T field, but also temperature control up to 30K on the sample holder with the magnet at full field. With careful engineering, over four decades of temperature control was achieved keeping the applied field of 12T. The magnet cooling stage remains stable below 3.5 K throughout the controlled temperature regime with sample stage temperature stability within a fraction of 1% of set point across the entire range."

This achievement was facilitated by the considerable experience Oxford Instruments has gained over the last six months in building Cryofree dilution refrigerators, resulting in more than twenty systems being shipped over the last six months.

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Issued for and on behalf of Oxford Instruments NanoScience

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Notes to editors

About Oxford Instruments NanoScience and Oxford Instruments plc.

Internationally recognised as world leaders in superconductivity and ultra low temperature cryogenic environments, Oxford Instruments NanoScience is driving innovation in these fields. The company's leading-edge technologies support research in nanotechnology, solid state and condensed matter physics. Combining outstanding technical expertise, original thinking and a commitment to meeting customers' needs, Oxford Instruments NanoScience enables real advances both in research and commercial applications by providing the high quality technological environments needed to meet demanding experimental requirements. Oxford Instruments NanoScience is part of the Oxford Instruments plc group.

The Oxford Instruments plc group designs, supplies and supports high technology tools, processes and solutions with a focus on physical science, bioscience, environmental and industrial research and applications. It provides solutions needed to advance fundamental nanoscience research and its transfer into commercial nanotechnology applications. Innovation has been the driving force behind Oxford Instruments' growth and success for over 40 years, and its strategy is to effect the successful commercialisation of these ideas by bringing them to market in a timely and customer-focused fashion.

The first technology business to be spun out from Oxford University over forty years ago, Oxford Instruments is now a global company with over 1,500 staff worldwide and a listing on the London Stock Exchange (OXIG). Its objective is to be the leading provider of new generation tools and systems for the Physical Science and Bioscience sectors.

This involves the combination of core technologies in areas such as low temperature and high magnetic field environments, Nuclear Magnetic Resonance, X-ray electron and optical based metrology, and advanced growth, deposition and etching. Our products, expertise, and ideas address global issues such as energy, environment, terrorism and health and are part of the next generation of telecommunications, energy products, environmental measures, security devices, drug discovery and medical advances.

For further information, please visit: www.oxford-instruments.com