

Press Release

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Freedom from the limitation of Liquid Helium opens up Ultra Low Temperature and High Magnetic Field Research



Physics research projects that involve ultra low temperatures have a major operational issue to address when competing against non-cryogenic proposals for research funding. This is ultimately due to the rising cost and increasingly unreliable supply of liquid helium, required for the cooling of conventional cryogenic equipment. However, there are now new technologies coming to the market that overcome this hurdle by offering the option of cryogen free measurement environments.

Systems based on closed cycle mechanical coolers have developed rapidly, providing the physics community with alternative means of reaching ultra low temperatures. Dr. Enrique Diez at Salamanca University, Spain has been trying out a radical new Cryofree[®] ³He refrigerator from Oxford Instruments, the special Heliox[®] ACV designed to fit with a Cryofree 12 T magnet.

Dr Diez commented, “Four years ago, when I started to set-up my laboratory devoted to magneto-transport in nanoelectronics devices; we concluded that technologies based on liquid helium were clearly not sustainable and we looked for new environmentally-friendly technologies that could provide ultra-low temperature and high-magnetic field environments without the use of liquid helium. We chose Oxford Instruments as the ideal partner and we

developed a special Heliox ACV solution capable of working with a Cryofree magnet of 12 T with a room temperature open-bore of 55 mm.

In addition to the dramatic reduction of operating costs and the preservation of the natural resources of helium, there are many advantages compared to a regular ^3He refrigerator. Operating this system is extremely simple, just pump out the vacuum space, press one button and wait. A very important advantage is that you can measure continuously from millikelvin to room temperature (without having to merge data measured in two cryostats) i.e. you do not need an additional system for studies in the range 10-300 K. On the other hand having the magnet outside your cryostat, provides the possibility of new experiments in biophysics and gives you much more flexibility if you do not need much sample space”

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Notes to editors:

About Dr. Enrique Diez and his research programme at Salamanca University

Dr Diez is a physicist currently researching unconventional nanostructures looking for unique physical properties bearing in mind their uses in novel devices. He is interested in particular in the development of devices and techniques for the generation and detection of sub-THz and THz radiation to be used in a wide range of applications (Communications, Healthcare, Security, Life Sciences).

Dr. Diez also continues his pioneering experimental and theoretical studies of the effects of correlated disorder and other fundamental aspects of low-dimensional systems. In particular, the metal-insulator transition in the quantum hall regime and more recently, the electronic and thermal properties of mesoscopic structures and its applications for refrigeration and thermometry.

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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. Our superconducting and cryogenic products also drive analytical instrumentation such as NMR and FTMS that are vital tools for drug discovery and life science applications. 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.

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 1,300 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.

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