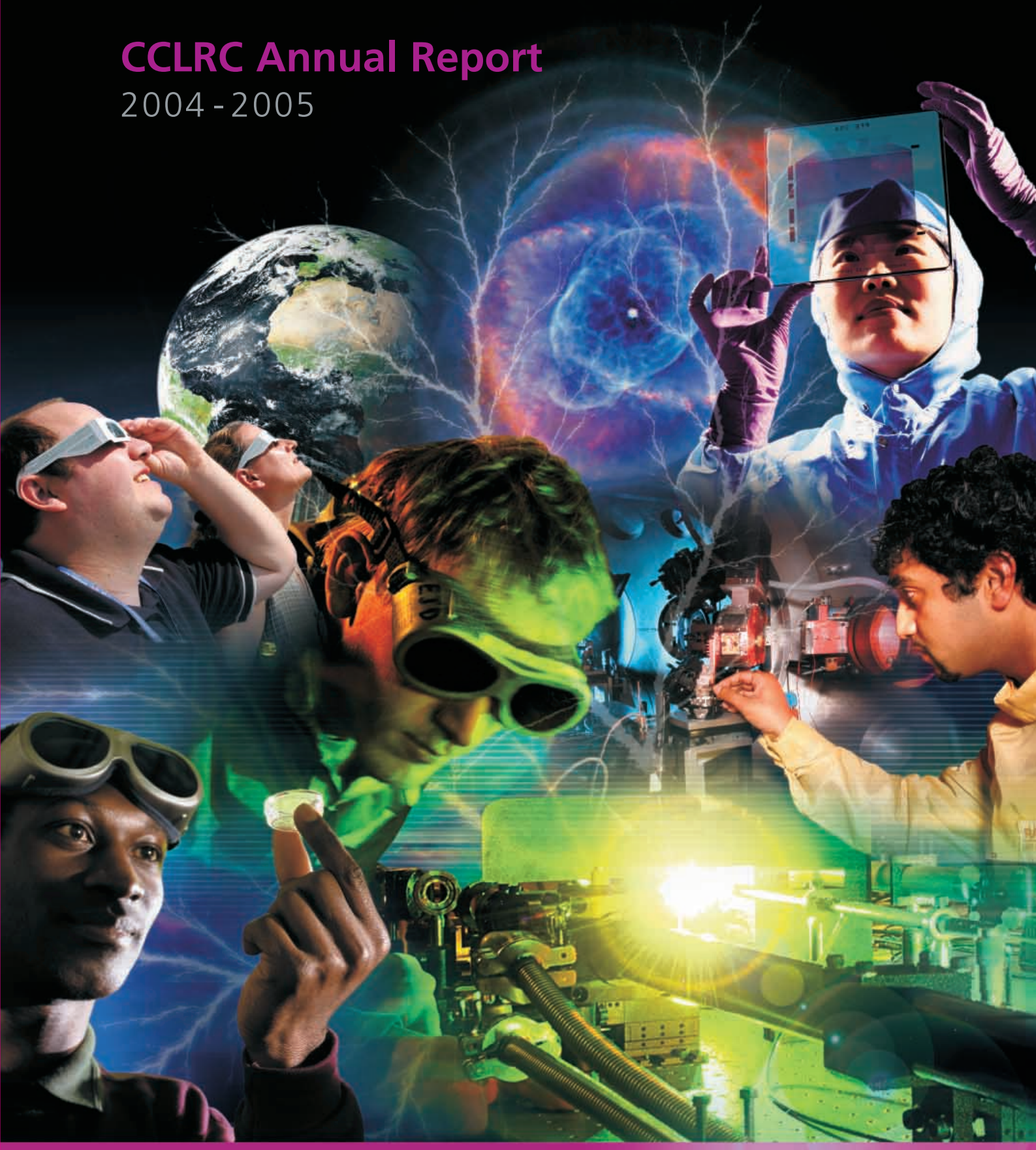
CCLRC

CCLRC Annual Report
2004 - 2005



Council for the Central Laboratory of the Research Councils

The Council for the Central Laboratory of the Research Councils' objects, as defined in its revised Royal Charter, are:

(a) to promote and support high-quality scientific and engineering research by developing and providing, by any means, facilities and technical expertise in support of basic, strategic and applied research programmes funded by persons established in this Our United Kingdom and elsewhere;

(b) to support the advancement of knowledge and technology (including the promotion and support of the exploitation of research outcomes), meeting the needs of the Research Councils, other customers and their user communities and, in such matters as Our Secretary of State may from time to time agree, to co-ordinate the development of policies and strategies to provide access for scientists to large scale facilities both nationally and internationally, thereby contributing to the economic competitiveness of Our United Kingdom and the quality of life;

(c) in relation to the activities as engaged in by the Council under (a) and (b) above and in such manner as the Council may see fit:

- to generate public awareness
- to communicate research outcomes
- to encourage public engagement and dialogue
- to disseminate knowledge; and
- to provide advice.

Edited by Stephanie Hills

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CCLRC Annual Report
2004-2005

Council for the Central Laboratory of the Research Councils (CCLRC)
Report and Accounts 2004-2005

Presented pursuant to the Science and Technology Act 1965, C4, S(1), 2(2), 3(3)
on 6 July 2005.

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Council Members

The following were members of the Council during the year 2004 - 05.

Chairman

Professor Sir Graeme Davies FREng	University of London	

Chief Executive

Professor John Wood FREng

Members

Professor Colin Blakemore	Chief Executive, MRC	*until 30/9/04*
John Burrows	Business Growth and Development Ltd	
Dr Derek Chadwick	Novartis Foundation	
Professor Mike Cruise	University of Birmingham	
Professor Graham Davies	University of Birmingham	
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Professor Robert Donovan	University of Edinburgh	
Professor John Durell	University of Manchester	
Professor Julia Goodfellow CBE	Chief Executive, BBSRC	*until 30/9/04*
Professor Peter Gregson	University of Southampton	
Professor Ian Halliday	Chief Executive, PPARC	*until 30/9/04*
Anne Kensall	Business Advisor	
Professor John Lawton CBE FRS	Chief Executive, NERC	*until 30/9/04*
Professor John O'Reilly FREng	Chief Executive, EPSRC	*until 30/9/04*

OST Representative/Observer

Paul Williams

Leading world class science in the UK

The Council for the Central Laboratory of the Research Councils (CCLRC) is an independent, non-departmental public body of the Office of Science and Technology which itself is part of the Department of Trade and Industry.

The CCLRC works with the other research councils to set future priorities that meet UK science needs. The CCLRC operates three world class research laboratories; the Rutherford Appleton Laboratory in Oxfordshire, the Daresbury Laboratory in Cheshire and the Chilbolton Observatory in Hampshire.

Each laboratory offers advanced facilities and expertise to support scientific research;

- ISIS, the world's most powerful pulsed neutron and muon source - used to study the atomic structure of materials;
- Synchrotron Radiation Source, the UK's brightest source of ultraviolet light and X-rays – for non-invasive research in materials and life sciences;
- Central Laser Facility with high-power, state-of-the-art laser facilities for research in fundamental and applied science and engineering. The Central Laser Facility includes Vulcan, the world's highest intensity focused laser;
- Europe's largest Space Science and Technology department providing satellite and ground based instrumentation, testing and data analysis for Earth observation, astronomy and planetary science;
- Co-ordination and support of particle physics research in the UK and contribution to experiments at particle physics laboratories around the world including CERN;
- High capability computing using HPCx, one of Europe's most powerful academic research computers, e-Science, networking services and user support, and research in theoretical and computational science;
- Microelectronics facilities for the design, procurement, testing and commissioning of new devices and systems;
- World-leading wafer scale manufacturing processes for micro- and nano-engineering;
- Research into alternative energy production, radio communications and radar.

The CCLRC is UK associate member of the Institut Laue-Langevin, France, a high intensity neutron flux reactor for particle physics, nuclear physics, chemistry, the life sciences and materials science. It is also a partner in the European Synchrotron Radiation Facility, France, Europe's most powerful SR source.

On behalf of the UK government, the CCLRC is also the main shareholder in Diamond Light Source Limited. The Diamond synchrotron light source is the largest science facility to be built in the UK for more than 30 years and is due to start operations in 2007.

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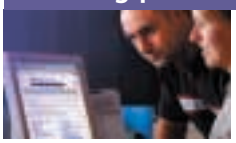
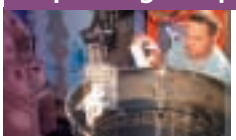
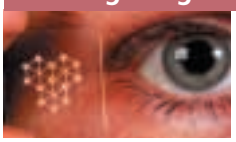
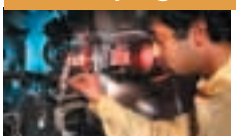
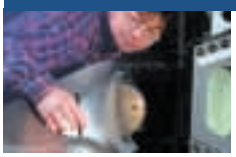










Introduction

Balancing delivery of world leading science and technology on a day to day basis with the need to plan for the future on a ten to twenty year time horizon is one of the main challenges for the work of the CCLRC. Visitors constantly comment on the range of activities, length scales and time scales that we operate within. With the excitement of discovery and leadership comes considerable responsibility for the future which the Council is keen to embrace.

The last year has seen the CCLRC grow into its role as a strategic advisor to the UK government on the need for future large scale science facilities and the positioning of the UK within a European and global context. We are working with the Office of Science and Technology and other research councils to update the 10-year Roadmap for the UK - a list of new facilities or significant upgrades to existing facilities that require major capital investment.

Following the UK's lead, the US Department of Energy has produced a roadmap for the US. Now the CCLRC has been instrumental, through the European Strategy Forum on Research Infrastructures (ESFRI) which I chair, in initiating the creation of a European Roadmap for research infrastructures. It is clear that there are many exciting projects that might start to be realised at a European level over the next 20 years.

The European Roadmap will be wide ranging, covering humanities, the biological, medical and social sciences as well as physical sciences and engineering. This is a major European initiative and will assist the European Commission as well as Member States to inform funding decisions.

A key element in future funding decisions is as much about socio-economic and European integration as about the science to be undertaken. This is a critical time when decisions made in the UK have ramifications well beyond our own shores.

Essential to supporting these international programmes is the need for a critical mass of scientists and engineers who capture the vision and can realise it wherever a facility is built. Building this capacity in new member states has to go hand-in-hand with sound investment. Likewise, the UK cannot remain complacent and I was delighted that the Council adopted a comprehensive training and education policy which covers all areas of our activity.

International partnerships remain essential to global science. For example, CCLRC space science collaborations through ESA with the China National Space Administration led to the successful launch of the Double Star mission which will study the effects of the Sun on the Earth's environment and CCLRC particle physicists are key members of the team designing and assembling the Atlas detector for the Linear Hadron Collider at CERN - the largest international science collaboration to date.

We still continue to develop high level links with research institutes and laboratories around the world which will benefit national and international science programmes. In October I visited the USA, signing Memoranda of Understanding with Stanford Linear Accelerator Center and the Jefferson Lab as well as visiting Oakridge, Argonne and Lawrence Livermore to build on existing good relationships. There are many exciting new opportunities to collaborate with other countries on projects that will have a profound impact on our understanding of science.

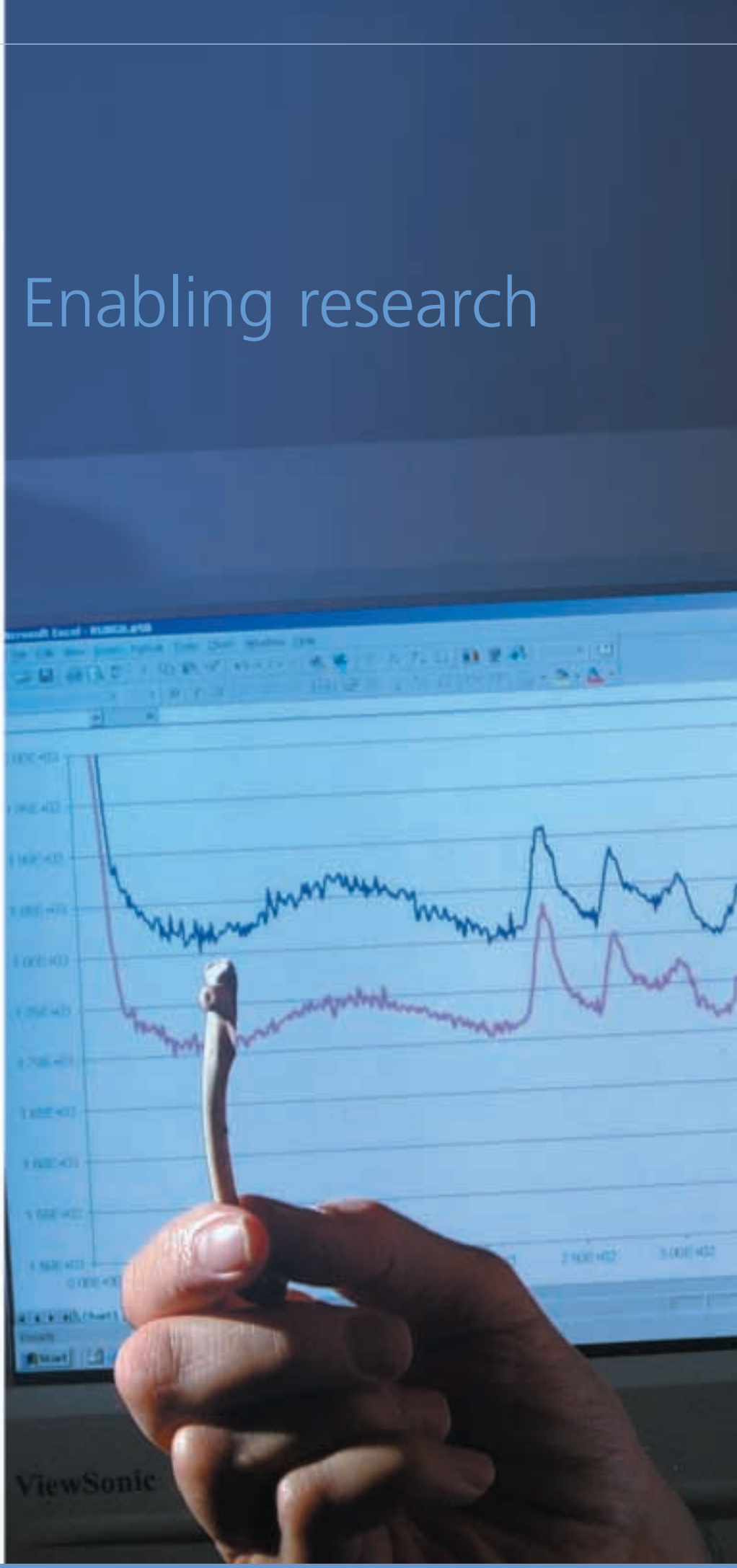
During the year we have spent much effort on re-aligning the organisation to accept the challenges of the future. This has put extra demands on staff especially within the context of the public announcement for the closing of the Synchrotron Radiation Source at the Daresbury Laboratory. The CCLRC team will continue to work with regional and national partners to ensure that the two main campuses remain viable and vibrant for the needs of the UK scientific community.

John Wood

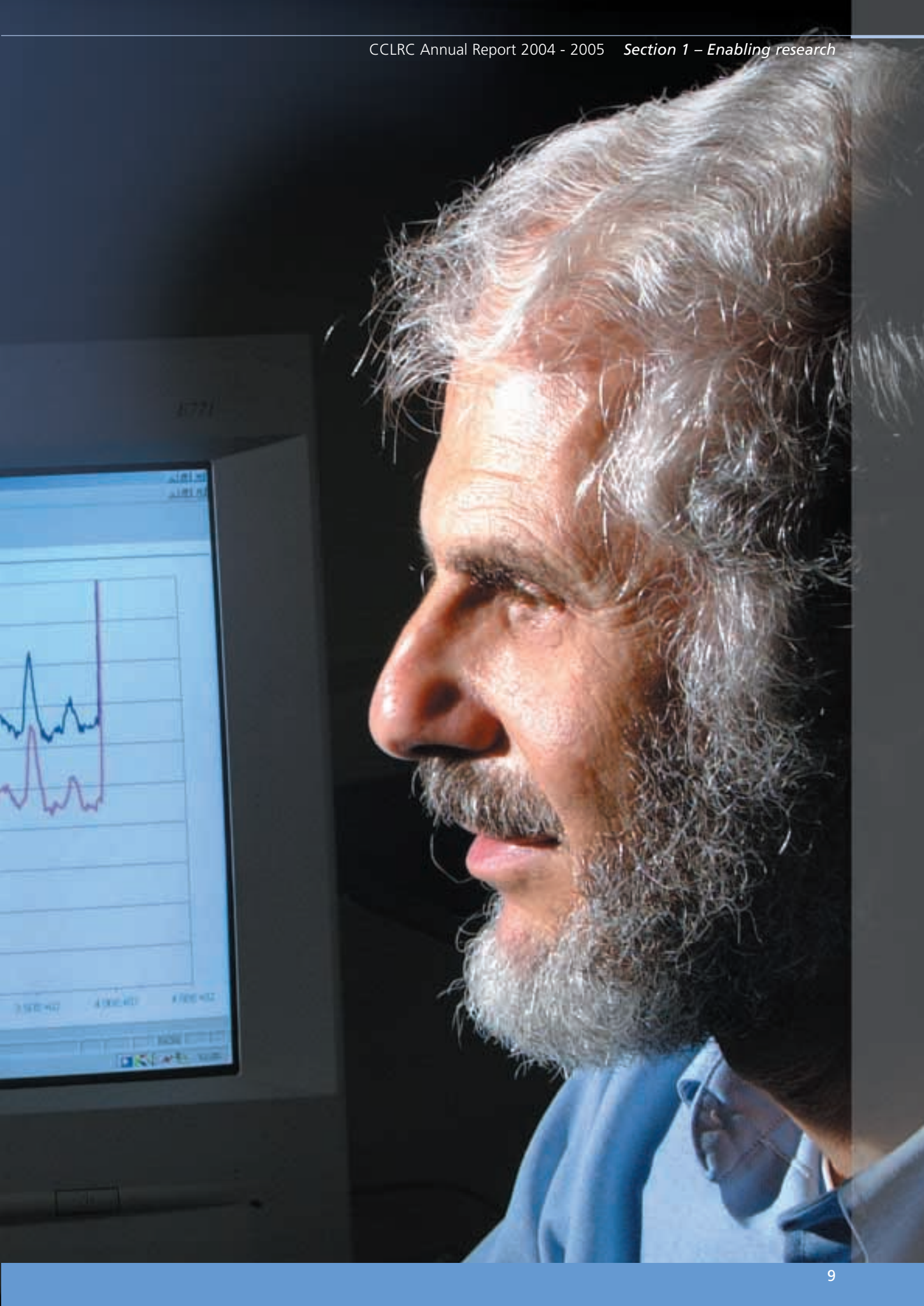
Chief Executive

Professor John Wood (r) with (l to r) Cherie Booth QC, Chancellor of Liverpool John Moores University, Professor Colin Whitehouse, Director CCLRC Daresbury Laboratory and Mike Chesters, Director Synchrotron Radiation at the opening of a new beamline at the SRS. The beamline is dedicated to understanding how genes make proteins and builds on research into genetic diseases such as motor neurone disease.

Section 1 Enabling research



Professor Michael Morris of the University of Michigan has been developing laser spectroscopy techniques for non-invasive probing. The research has applications for disease diagnosis and quality control in the pharmaceutical industry.



Planetary exploration

From the landing of the Huygens probe on Titan to seeing SMART-1 orbit the Moon, 2004-5 has been a busy and exciting year for the CCLRC Space Science and Technology Department.

SMART-1 reached its high level orbit of the Moon in November 2004 and started firing its engines to reach the lower altitude science orbit in February 2005. Its successful journey is the first European demonstration of ion drive propulsion (gaining energy by expelling mass), proving that this mechanism could be used to get to distant planets more efficiently. On board SMART-1 is the Demonstration Compact Imaging X-ray Spectrometer (D-CIXS), designed and built by CCLRC scientists to produce the first global survey of absolute lunar elemental abundances using X-rays. The resulting data will help to answer the question of what the Moon is made of and whether it originated from the Earth.

Meanwhile, in January 2005, the Huygens probe finally landed on Saturn's largest moon, Titan, after its epic seven-year journey through the solar system on board the Cassini spacecraft. CCLRC scientists played a major role in designing and building the Surface Science Package on board the Huygens probe, which gathered valuable data as it parachuted through Titan's atmosphere and finally landed on the surface. From mapping the different layers of clouds in the atmosphere to discovering that the surface of Titan has a texture similar to 'crème brûlée', the carefully designed package including impact, tilt, acoustic and thermal sensors has helped to answer many of the long-standing questions about the enigmatic Titan.

An artists impression of SMART-1.

Looking to the future, CCLRC space scientists are hoping to play a big part designing orbiting and landing instruments for Aurora, a European Space Agency programme for exploration of the solar system. In addition, they are leading the X-ray experiment for the BepiColombo mission to Mercury, scheduled to launch in 2012.

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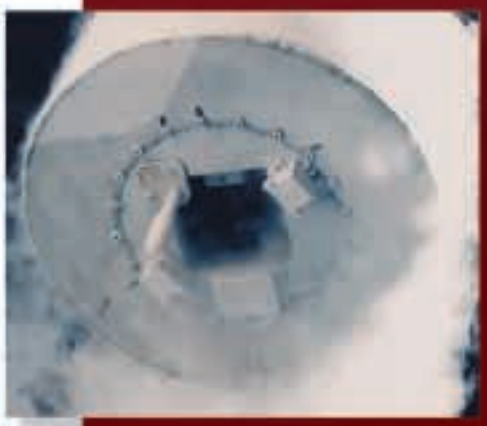


Huygens SSP Probe.

CCLRC scientists played a major role in designing and building the Surface Science Package on board the Huygens probe.

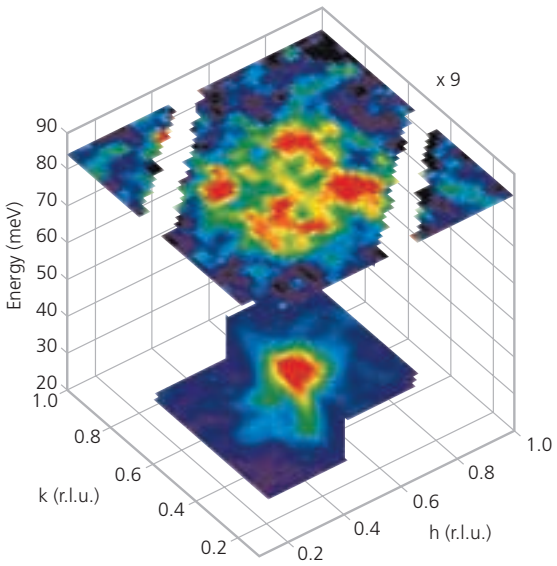
Artist's impression of CASSINI and Saturn from Titan.
Courtesy ESA.

www.sstd.rl.ac.uk

Mapping superconductors

How does a superconductor transmit electricity without losing energy? This is a puzzling question, but answers are being found from studies looking at magnetic fluctuations inside high-temperature superconductors (ceramics), using the MAPS instrument on the ISIS pulsed neutron and muon source.

From medical scanners to revolutionary propulsion systems, ceramic superconductors have become an essential part of modern life and yet no-one is sure how they work. When cooled below a critical temperature, ceramic wires can carry current with 100% efficiency and conduct up to 140 times more power than conventional copper wires. Now two studies have been uncovering the secret behind ceramics by looking at the magnetic interactions inside them.



Sections through the wavevector and energy dependent spectrum of magnetic fluctuations in the high transition-temperature superconductor $YBa_2Cu_3O_{6.6}$. Red regions correspond to wave vectors and energies where the fluctuations are particularly strong. A very similar pattern or 'fingerprint' was observed in another ceramic superconductor, $La_{1.875}Ba_{0.125}CuO_4$.

At the CCLRC Rutherford Appleton Laboratory, scientists have used the MAPS instrument to probe the interior of single crystals of ceramic superconductors. An intense beam of neutrons is scattered from the sample and collected by 40,000 detector pixels located over an area of 20 m^2. By measuring changes to neutron speeds, the exchanges of energy between neutrons and the sample can be calculated, and related to what is happening at the atomic level.

It is widely believed that magnetic fluctuations bind the electrons into the pairs that are essential to produce the superconducting state. Experiments on two very different ceramic superconductors showed that the magnetism at the atomic level was nevertheless very similar. Both experimental teams believe that they have observed the fingerprint of what might be the binding glue.

The results were published in the journal Nature and are an important step forward in understanding how these superconductors work.

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The unique capabilities of the MAPS instrument, pictured with instrument scientist Chris Frost, enabled these experiments. The 40,000 detector pixels located over an area of 16 m^2 give an unmatched window into the interior world of superconductors by measuring changes to neutron speeds as they travel through the instrument and exchanges of energy between the neutrons and the research material.

Ceramic superconductors have become an essential part of modern life and yet no-one is sure how they work…

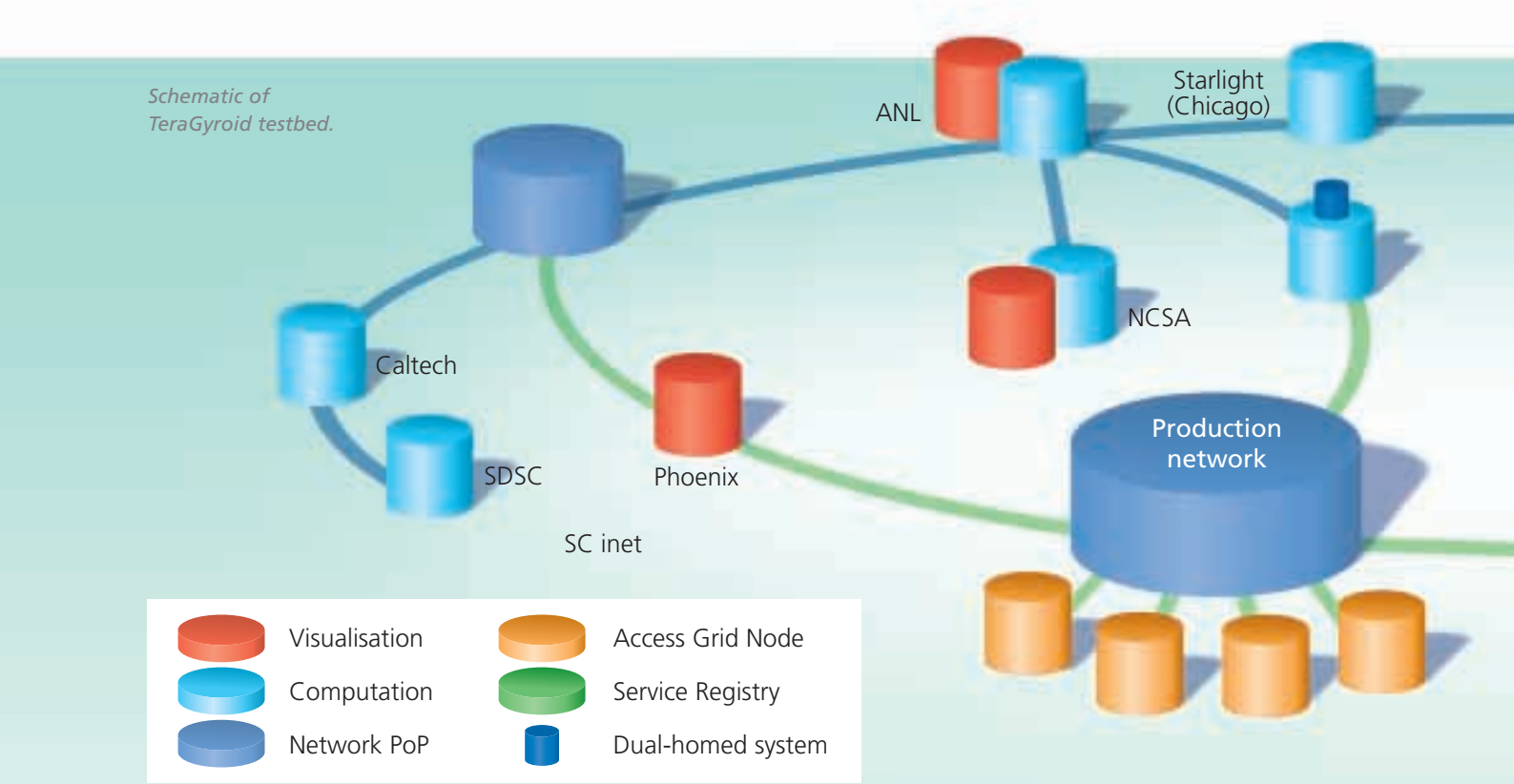
www.isis.rl.ac.uk

The TeraGyroid experiment

Using not just one supercomputer, but many running in parallel, the TeraGyroid experiment has demonstrated the huge potential of international Grid technology and increased the understanding of gyroids, a particular kind of liquid crystal that is commonly found in cell membranes.

Imagine a molecule that attracts water at one end, but repels it at the other. This is what an amphiphile is like. This rather exotic chemical species produces interesting complex patterns (known as gyroids) when it is dispersed in solvents, or oil and water mixtures. Some gyroids are of particular interest in biology because their structure may influence the movement of other molecules across a cell membrane.

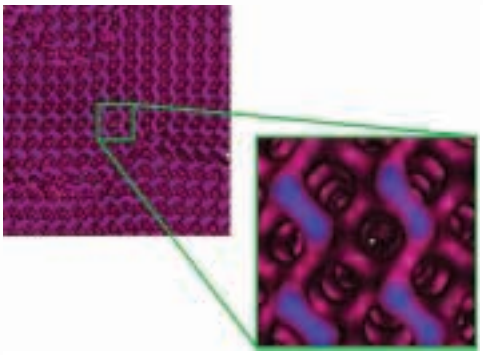
Gyroid structure depends on many parameters (such as the abundance of chemicals, initial distribution and strength of coupling) and extremely large computer models are required to understand their formation. This turned out to be the perfect problem to demonstrate the capabilities of the Grid; a new computing network that links up some of the most powerful supercomputers in the world, allowing



Schematic of TeraGyroid testbed.

the results from the computations to be visualised anywhere and enabling scientists to interact collaboratively.

Over 100 scientists were involved in the TeraGyroid experiment, working with the UK project coordinator Richard Blake from the CCLRC Daresbury Laboratory. Linking six supercomputers, including the HPCx high capability computer at the Daresbury Laboratory and the Pittsburgh Supercomputing Centre in the USA, enabled the team to exploit some 5000 processors and nearly 6 Terabytes of memory. By running multiple small-scale simulations to find emerging gyroid structures and then zooming into the most interesting regions in large-scale simulations, the scientists have been able to produce new insights into the structure and stability of gyroids that would have taken years to produce on a single supercomputer.



Gyroid domains with differing orientations and close up showing the regular crystalline gyroid structure within a domain.

The TeraGyroid experiment has demonstrated that international Grid computing can be a huge success. Now a new project is being selected to benefit from the power and flexibility of the Grid.

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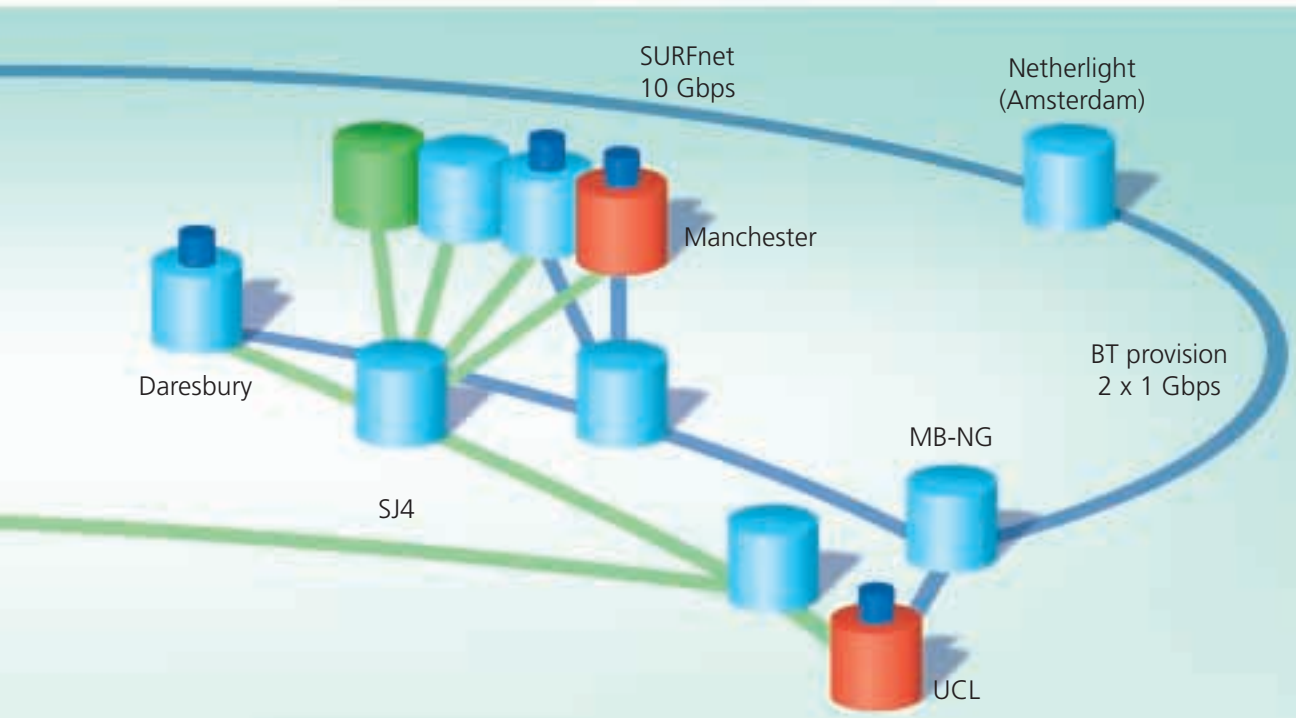
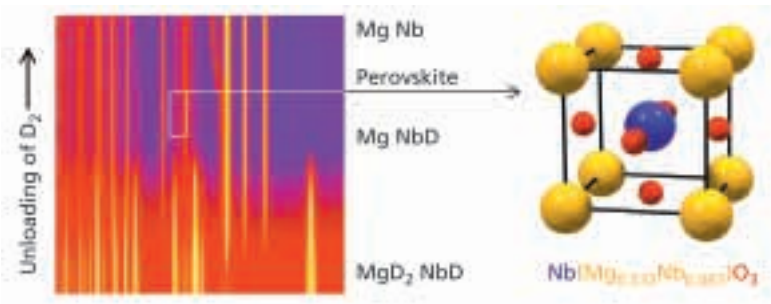


Storing hydrogen

One of the main hurdles to using hydrogen as a fuel is finding a safe, economical and practical way of storing it. Magnesium is one of the most promising hydrogen storage materials, but it has a slow hydrogen sorption rate. However, making nanostructured magnesium and employing catalysts like Niobium (Nb) or Vanadium (V), is known to speed up the process dramatically.

Gijs Schimmel and Fokko Mulder (TU-Delft, The Netherlands), Jacques Huot (University Québec, Canada) and Laurent Chapon (CCLRC) have used ISIS, the CCLRC pulsed neutron and muon source to explore the microscopic processes that occur during hydrogen sorption.

As hydrogen is a light element it is difficult to observe using more traditional methods such as X-ray diffraction. However, ISIS is the ideal tool to track hydrogen as it inserts into a magnesium structure.



Neutron diffraction measurements revealed the process of hydrogen storage in a sample of niobium-catalysed magnesium hydride. From these measurements the hydrogen content in the small amount of niobium catalyst was determined and a Nb-Mg-O perovskite phase was discovered that may transport hydrogen.

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Schimmel and his colleagues carried out in-situ neutron diffraction studies of nanostructured and catalysed magnesium samples. They found that on the onset of hydriding, a hydrogen deficient MgH_2 phase was observed, which likely shows higher hydrogen diffusion speeds.

In addition they were surprised to observe a cubic perovskite (Mg, Nb)O_3 phase when catalysed magnesium samples were used, and believe that this helps to speed up the sorption process by forming pathways through the oxide barrier around the magnesium particles.

Having shown that the large binding energy of magnesium is the main limiting factor for hydrogen sorption, they are now using ISIS to study magnesium alloys that may decrease the binding energy. In addition they are looking at aluminium based materials and new materials like Metal Organic Frameworks (with large internal surfaces for hydrogen sorption). Understanding exactly how hydrogen inserts into different storage structures is vital if fuel cells are to become a realistic way of using energy.

Finding a safe, economical and practical way to store hydrogen for fuel.

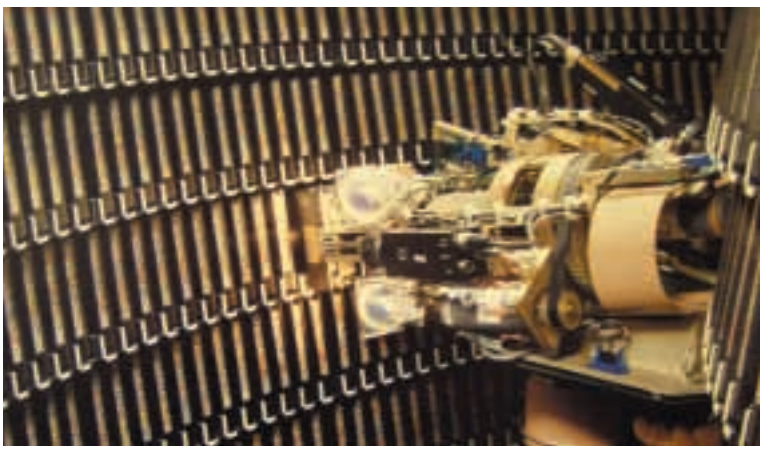
Fokko Mulder and Gijs Schimmel (TU-Delft) preparing a sample.

www.isis.rl.ac.uk

Saving data for the next generation

Scientific research tends to generate large quantities of data, all of which needs to be stored safely and to remain accessible for many years to come so that future scientists can interrogate past results and compare them with their own. What is the best way of storing these data so that it can still be used when the technology that processes it will have changed?

CCLRC has recently set up an Institutional Repository with over 20,000 e-Publications spanning the last 40 years of research. Now scientists are researching questions of data storage and open access to develop a system that will support the entire scientific process from proposal, through data curation, to publication. Storing all these data takes up a lot of space and, in the future, the researchers have calculated that they will need 10 Petabytes of storage capacity just to store CCLRC data; equivalent to about one million desktop computers.



A robot arm retrieves data from the Atlas Petabyte Store.

Repositories, like the one the CCLRC has set up will help wider public access. However, to make such repositories really useful, it is important that they all use standard formats so that they can be searched easily wherever they are based. The CCLRC has already built up significant expertise in archiving research data and now its researchers are keen to pass this knowledge on to other institutions.

Working alongside the Universities of Edinburgh and Glasgow and the UK Office for Library Networking, CCLRC researchers are also involved with the recently formed Digital Curation Centre (DCC). The aim of the DCC is to support UK institutions to store, manage and preserve their data. With ventures like the DCC and e-Publications it is hoped that valuable scientific data will remain available to all for a long time into the future.

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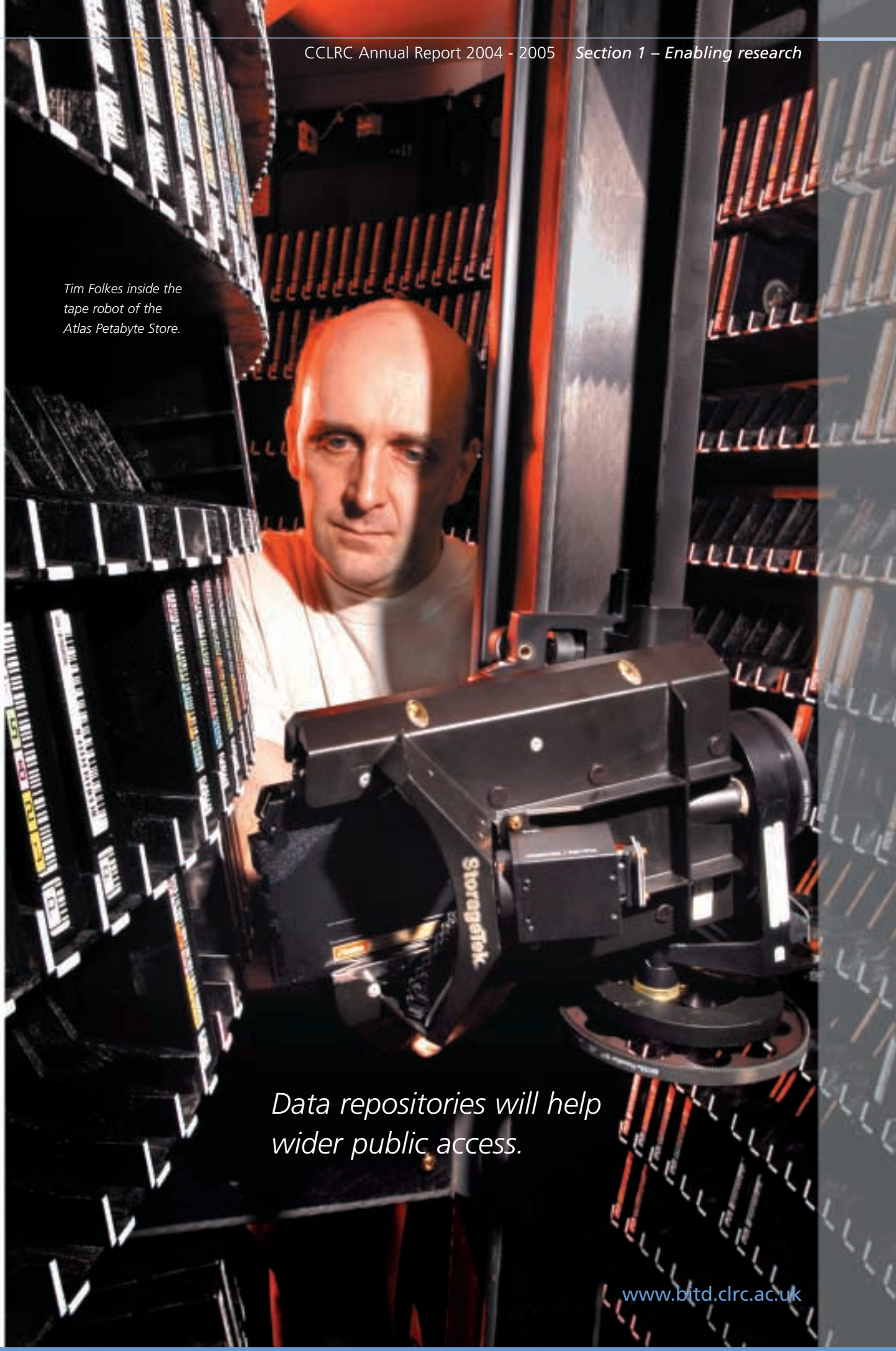


Tim Folkes inside the tape robot of the Atlas Petabyte Store.

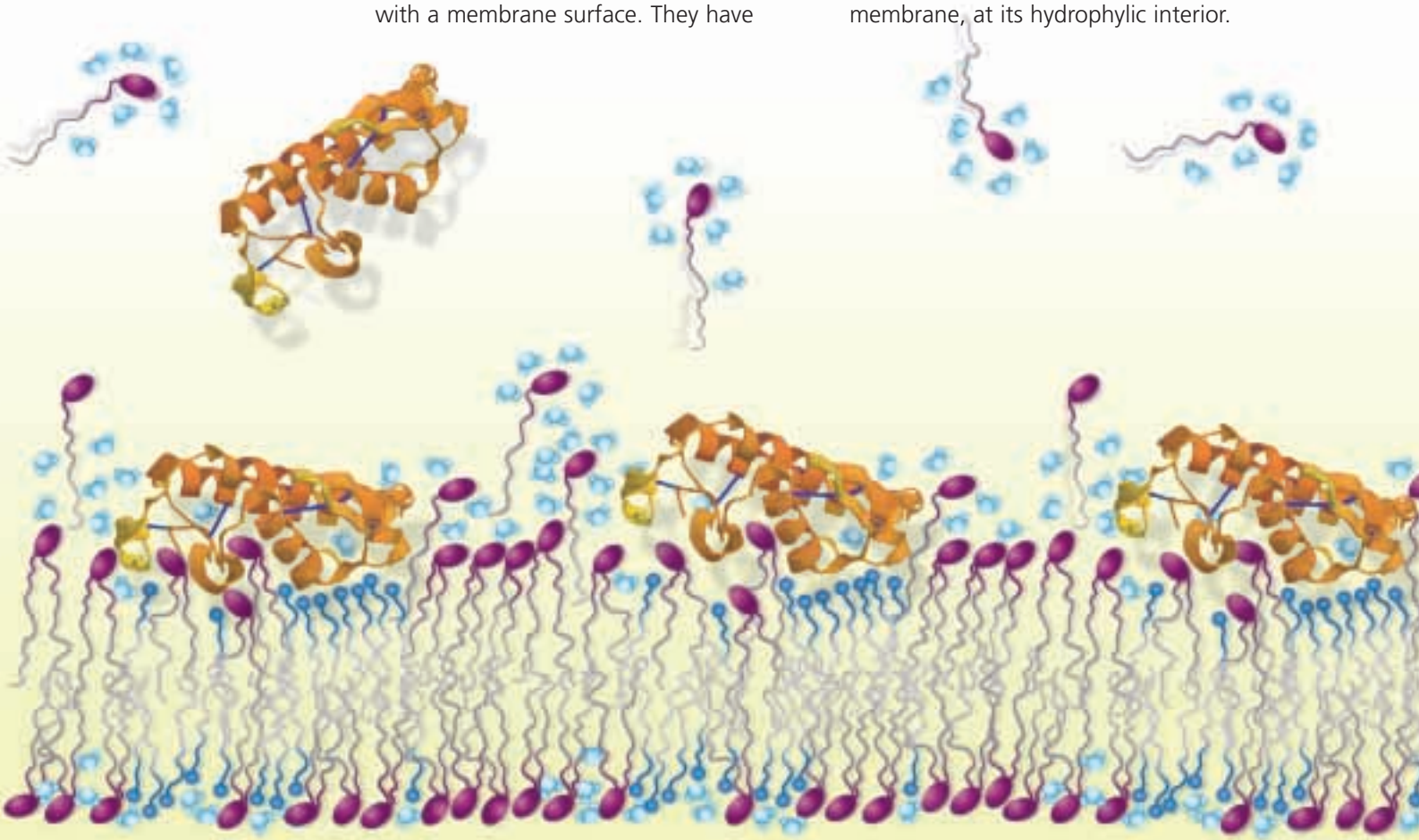
Data repositories will help wider public access.

www.bitd.clrc.ac.uk

From snake bites…

Phospholipase A_2 (PLA_2) is an important enzyme which occurs in a wide range of environments from snake venom to our own digestive and immune systems. It plays a key role in maintaining cell membrane composition, signal transduction and inflammatory response. Until recently little was known about what controlled the specificity and activity of these enzymes, but studying them with ISIS, the CCLRC pulsed neutron and muon source, has enabled scientists to find some answers.

Unlike other enzymes, PLA_2 is only activated when it associates with the cell membrane, not when it is in solution. Using neutron reflectivity, Hanna Vacklin, (University of Oxford) and John Webster (CCLRC) studied the interaction of PLA_2 with a membrane surface. They have managed to determine the location of the enzyme in its catalytic environment for the first time, and to monitor the reaction rate simultaneously. One of the key findings from this study was that the enzyme interacts with the core of the membrane, at its hydrophylic interior.



In particular Vacklin and Webster studied porcine pancreatic PLA_2, an enzyme found in the mammalian digestive system. To analyse their results, they calculated the specular reflectivity and fitted this to the observed results. They then built up a model for the adsorbed layer in porcine pancreatic PLA_2, describing each layer at the interface in terms of thickness, scattering length density and roughness.

This kind of information is important for developing models of other PLA_2 catalysis and understanding how membrane composition regulates biological activity. Eventually this could help with the development of better treatments for snake bites, or perhaps ways of using PLA_2 biochemistry to block inflammation and fight infection. It may also have applications in tumour-specific cancer therapy.

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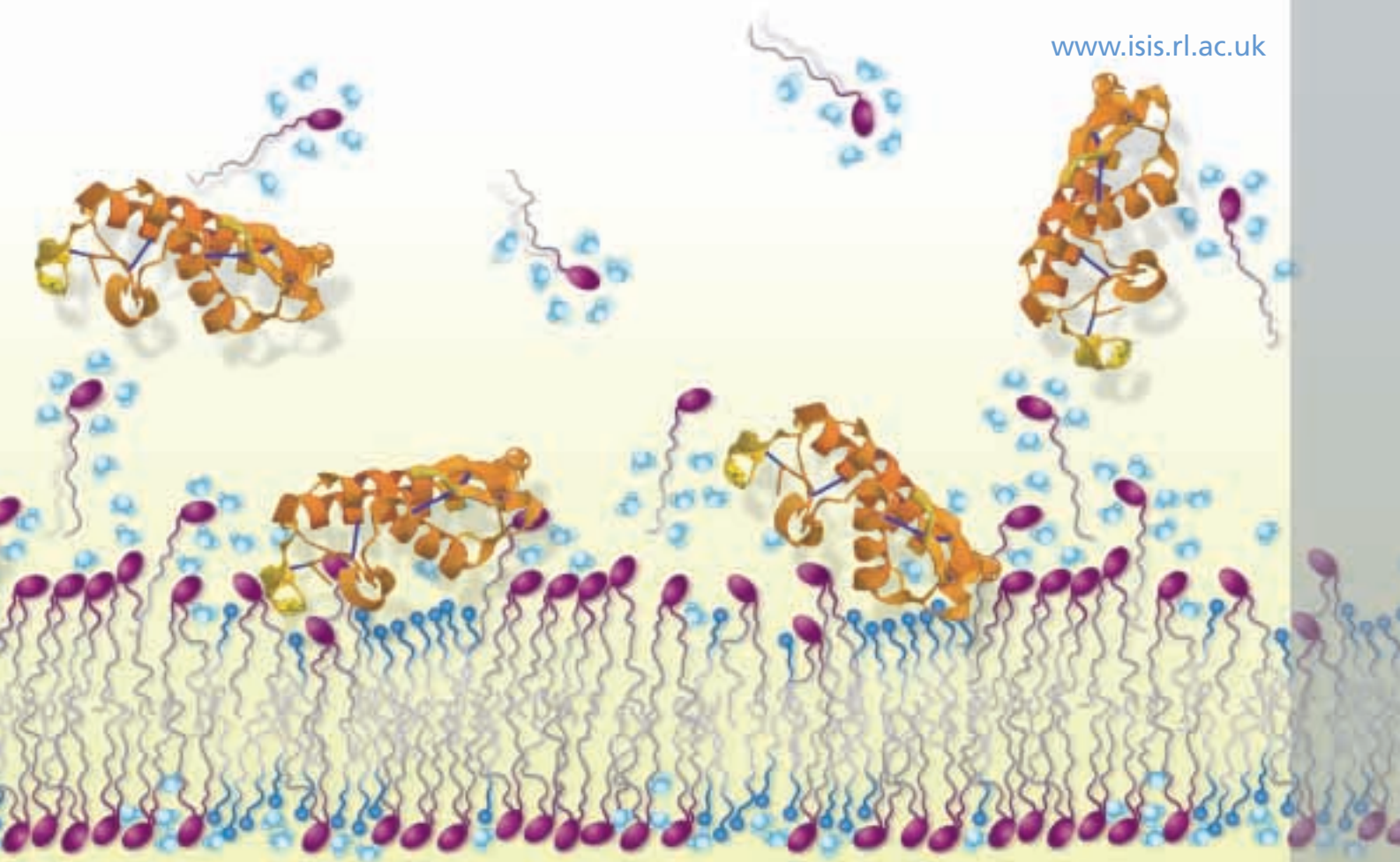
…to cancer treatments

www.isis.rl.ac.uk



A forum for fundamental physics

In April 2004 the Centre for Fundamental Physics (CfFP) was launched. It is a CCLRC funded initiative to foster fundamental physics through a visitors' programme and the organisation of cross disciplinary meetings and workshops. Already it has proved itself to be a great success, supporting three major meetings in 2004 and hosting a number of visiting physicists from around the world.

With the aim of encouraging junior scientists and providing a friendly forum for people to discuss their work, the CfFP organised BritGrav4, the 4th British Gravity Meeting, and held it at the CCLRC Rutherford Appleton Laboratory in September 2004. From tutorial-style talks by senior scientists to research presentations given by more junior scientists, there was something for everybody. The relaxed atmosphere appears to have paid off and a number of new international collaborations were forged. The Institute of Physics Gravitational Physics group was so impressed that they have asked CfFP to organise the 2005 BritGrav meeting as well.

Leading physicists got together in Pescara, Italy at a CfFP-supported meeting in September 2004 to consider how to test one of the cornerstones of General Relativity, The Equivalence Principle. Much of the meeting was dedicated to discussions on organising the first test of the equivalence principle in space.

The Symposium on Cold Matter/Atom Wave experiments in space was held at the CCLRC Rutherford Appleton Laboratory in December 2004. Experimentalists and theorists gathered from all over the world to discuss the possibility of developing hypersensitive equipment to measure general relativity concepts such as frame dragging.

With many more exciting meetings lined up for 2005/6 including discussions on neutrinos and cosmic rays, and a number of expert scientists keen to visit the CCLRC laboratories, the CfFP is leading the way in tackling some of the biggest remaining problems in physics.

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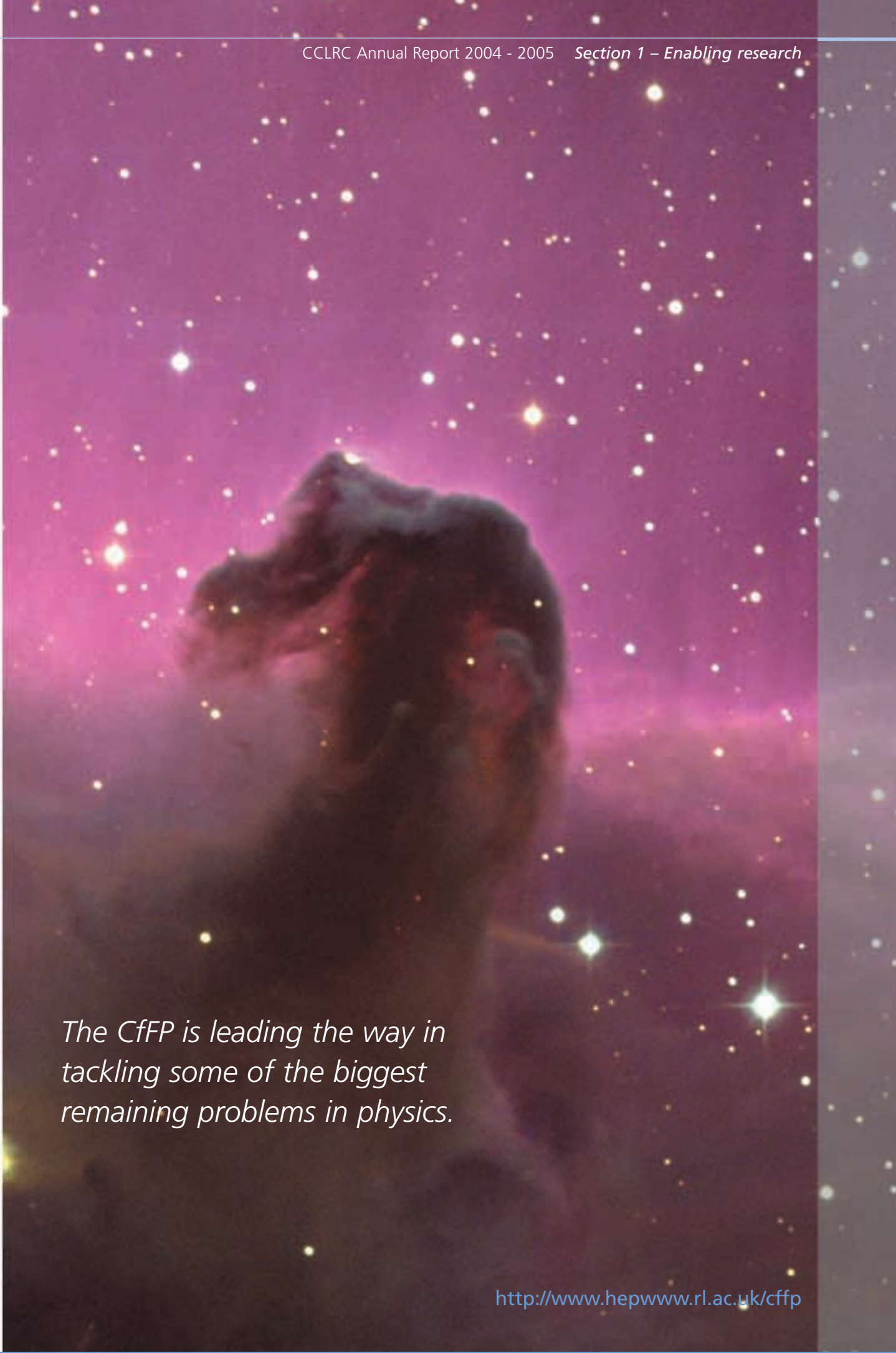
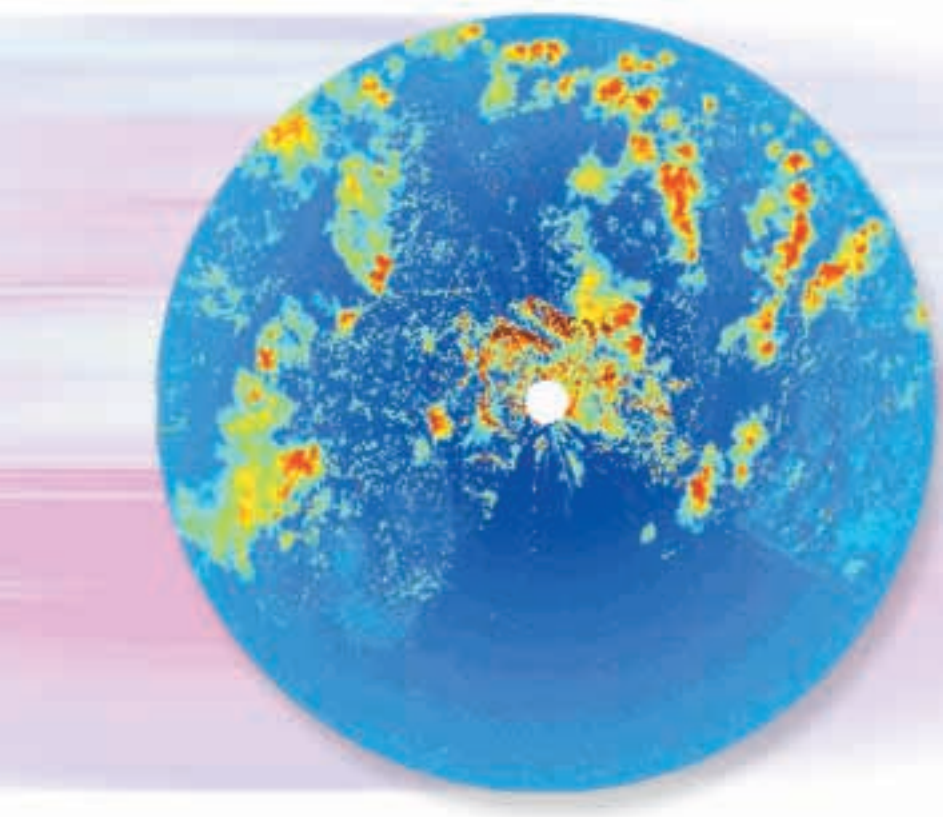


The CfFP is leading the way in tackling some of the biggest remaining problems in physics.

http://www.hepwww.rl.ac.uk/cffp

Storm chasers

As the flooding in Boscastle, Cornwall in August 2004 demonstrated, summer storms can be destructive and devastating. Climate models predict that as global warming takes effect, the UK can expect more of these extreme weather events.



Structured convective showers within a 100 km radius of the Chilbolton Observatory on 10 July 2004 – the x and y axes are range in km and the intensity scale is radar reflectivity in dBZ.

At the Chilbolton Facility for Atmospheric and Radio Research, the CCLRC is hosting the Convective Storms Initiation Project; an experiment to better understand the meteorological conditions that cause these storms to develop. Partners on the project include the Meteorological Office, NERC's Universities' Facility for Atmospheric Measurement and the Universities of Leeds, Reading, Salford, Manchester and Wales, Aberystwyth.

Using the radar facilities at the CCLRC Chilbolton Observatory, along with a Doppler Lidar, a wind profiler, a network of automatic weather stations and a Cessna weather research aircraft, the researchers are able to follow the development of summer storms. Each time a storm starts to build, the radar dish is turned towards it to pick out the cloud location and measure the dynamics of what is happening in the atmosphere. Meanwhile, the Cessna takes off and flies into the storm area to record the temperature and humidity structure. Back at the University of Reading and the Meteorological Office, this data is used to create operational models of convective storms and work towards being able to forecast where and when these storms will occur.

During July 2004 a successful pilot project was carried out and the scientists were able to pick out arcs of rain, caused by a density current moving outwards as warm air rises and cold air sinks. In summer 2005 the project will be operating through June, July and August and the team hopes to gather some high quality data, leading towards a better understanding of these dramatic storms.

Contact: Charles Kilburn
Email: c.a.d.kilburn@rl.ac.uk

Clouds over Chilbolton. Courtesy: C Allet, INSU/DT, France

Judith Agnew aligning the UV Lidar used for atmospheric measurements.

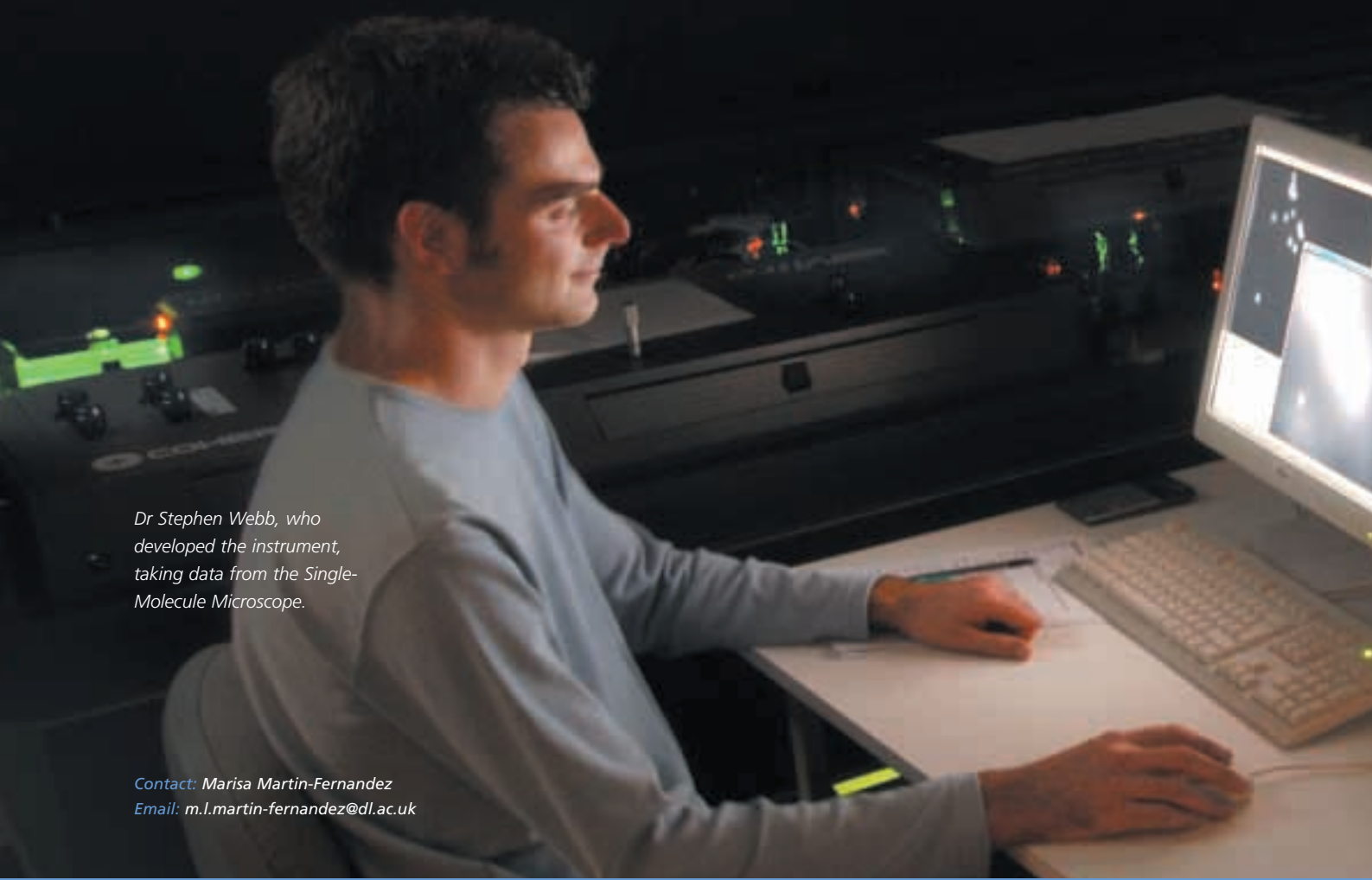
Each time a storm starts to build, the radar dish is turned towards it, to pick out the cloud location and measure the dynamics of what is happening in the atmosphere.

www.rcru.rl.ac.uk

Stopping cancer in its tracks

Plasma membrane receptors are some of the most important proteins in our bodies, controlling how and when cells grow, differentiate and die. For the first time researchers at the CCLRC have been able to directly observe the molecular mechanisms that enable individual receptors to transduce a growth signal across cell membrane, using a new instrument developed at the CCLRC Daresbury Laboratory.

When a receptor detects a chemical signal in the cell's external environment, it transduces this signal across the plasma membrane to the cell interior, initiating a cascade of interactions that ultimately lead to the cell's response. In the past, high-resolution optical microscopes have enabled researchers to detect individual receptor molecules, but they have not been able to determine the molecular mechanisms by which cell signals are transduced.



Dr Stephen Webb, who developed the instrument, taking data from the Single-Molecule Microscope.

Contact: Marisa Martin-Fernandez
Email: m.l.martin-fernandez@dl.ac.uk

By building an instrument that combines total internal reflection fluorescence (TIRF) illumination and multidimensional single-molecule microscopy (MSMM), Dr Marisa Martin-Fernandez and her team have managed to observe how receptors interact with each other and change orientation during signalling. TIRF illumination makes use of the difference in refractive index between the glass coverslip on the microscope slide and the water in the cell, illuminating just the surface layer of the cell. Meanwhile, MSMM images the fluorescence from the receptors at 30 millisecond intervals, with changes in light colour and polarisation indicating how the molecules are interacting. The unique combination of these techniques in one instrument will enable scientists to get real-time images of any receptor molecule and understand the molecular mechanisms that lead to signal transduction.

Currently, the team is collecting data on ErbB receptors; the main receptor molecules involved in the development of breast cancer tumours. The scientists hope that eventually the information they gather will enable doctors to intervene at the molecular level and stop the interaction that leads to signalling.

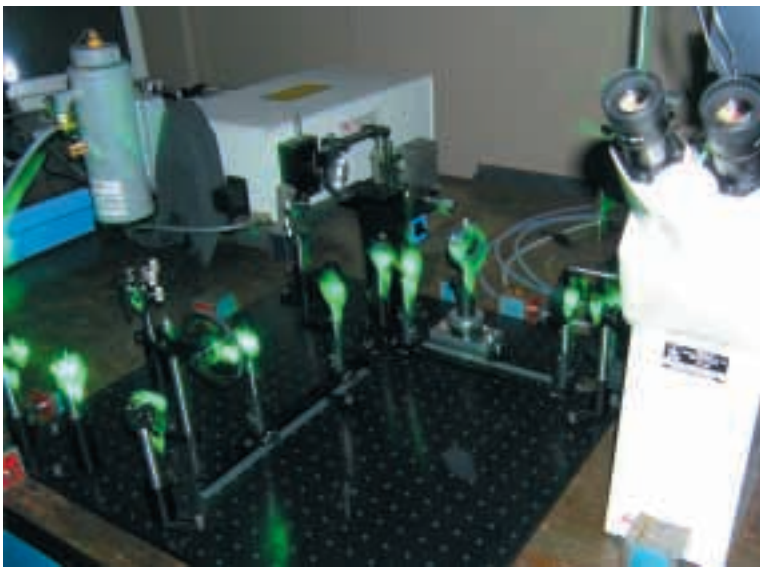
The unique combination of these techniques in one instrument will enable scientists to get real-time images of any receptor molecule.

www.srs.ac.uk

Tweezing water

For the first time, using the laser microscope facility at the CCLRC Rutherford Appleton Laboratory, scientists have developed a method to trap individual aerosolised water droplets and hold them for up to an hour, enabling them to study the reaction chemistry on a single droplet.

This breakthrough has opened up a range of new applications in the environmental sciences, as well as exciting new possibilities in combustion and respiratory sciences. Using these 'optical tweezers' Martin King (Royal Holloway University of London) and Katherine Thompson (Birkbeck University of London) have discovered a previously unknown mechanism that occurs when ozone reacts with cloud droplets, which could have important implications for global warming.

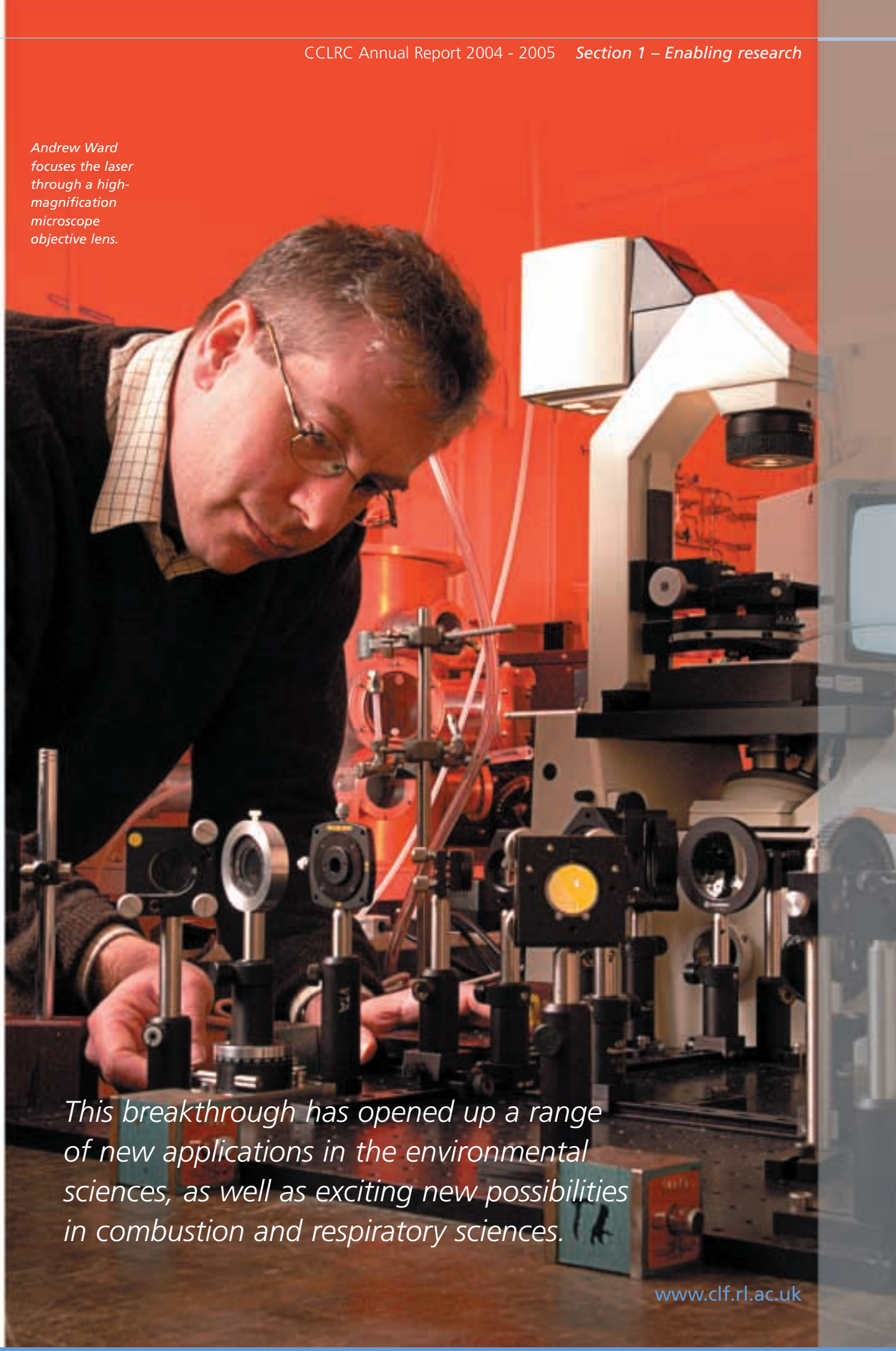


The combination of lasers, microscopy and spectroscopy required to create the optical tweezers apparatus.

Andrew Ward from the CCLRC Central Laser Facility constructed the 'optical tweezers' by aligning a laser beam through a high-magnification microscope objective lens. By focusing on a tight spot he was able to balance the refraction and forward scattering effects acting on a tiny droplet, so that it could be held stationary in free space. Once he had perfected the technique, King and Thompson used it to study ozone reacting with oleic acid, an organic compound that occurs in some airborne particles. They discovered that the oxidising effect of ozone tended to destroy the oleic acid and increased the droplet size by more than a fifth. This means that pollutants like ozone could have a dramatic effect on cloud formation and rainfall, potentially influencing the speed at which global warming occurs.

The next stage of the research will be to combine the microscopy techniques with the large aerosol test chamber normally used by the CCLRC's Space Science and Technology department. This will enable the reaction properties of the bulk aerosol phase to be simultaneously compared with that of an individual droplet.

Contact: Andrew Ward
Email: a.d.ward@rl.ac.uk



Andrew Ward focuses the laser through a high-magnification microscope objective lens.

This breakthrough has opened up a range of new applications in the environmental sciences, as well as exciting new possibilities in combustion and respiratory sciences.

www.clf.rl.ac.uk

Sharing science through the Grid

Gone are the days of researchers working alone in a laboratory. Successful modern science is about working together, sharing expertise and specialist equipment, and exploiting the power of computing. The CCLRC e-Science program is helping to make life easier for the modern scientist by hiding the complexity of technology and providing structured access to scientific data.

Since its creation in April 2001, one of the main aims of the e-Science program has been to provide the UK research community with access to some of the powerful facilities operated by the CCLRC. Four years later and that aim is rapidly becoming a reality, with a number of promising research projects sharing expertise and tapping into the powers of Grid computing.

e-HTPX (e-Science resource for High Throughput Protein crystallography) is an example of just one of those projects. It allows researchers to obtain and analyse data from the Synchrotron Radiation Source at the CCLRC Daresbury Laboratory quickly and efficiently. This is a demonstration of the potential of the e-Science approach, and points the way for future synchrotron radiation facilities such as Diamond now under construction at the CCLRC Rutherford Appleton Laboratory.

Meanwhile, EVE (Excitations Visualisation Environments) is enabling condensed matter physicists to manipulate and visualise some of the large datasets that they generate from neutron scattering experiments. Simulations and data analysis can all be done using a customised suite of web- and Grid- based applications and visualisation services.

Currently, the program is concentrating on four main areas: data storage and management, scientific computing (running clusters and supporting computing facilities) and Grid development and exploitation. By making Grid technology accessible, reliable and straightforward to use, the e-Science program aims to make it a part of everyday scientific activity.

Contact: Neil Geddes
Email: n.i.geddes@rl.ac.uk

…making Grid technology a part of everyday scientific activity

Dr Matthias Gutmann (ISIS) using SCARF (Scientific Computing Application Resource for Facilities). SCARF offers large scale computing with rapid access and turn round for CCLRC users, its facilities and Diamond Light Source.

www.e-science.clrc.ac.uk/web

Why matter matters

Why are we made of matter and not antimatter? In the Big Bang matter and antimatter were created in equal amounts, but somehow almost all of the antimatter disappeared and our Universe formed from the matter that remained. CCLRC scientists are involved in two major experiments that hope to find out where all the antimatter went.

The first – Cryo-EDM (Cryogenic neutron Electric Dipole Moment) – is looking for answers at the small scale by probing the structure of neutrons. Some of the asymmetries in the laws of physics that led to a matter-dominated Universe may also cause tiny distortions in the shape of a neutron. By measuring the Electric Dipole Moment physicists hope to find those distortions and shape the theories of physics beyond the Standard Model.

Neutrons will be produced using a new technique involving down scattering of a cold neutron beam in liquid Helium at 0.5K. Currently the experiment is being constructed at the Institute Laue-Langevin (ILL) in France and the first major results are expected in 2009.

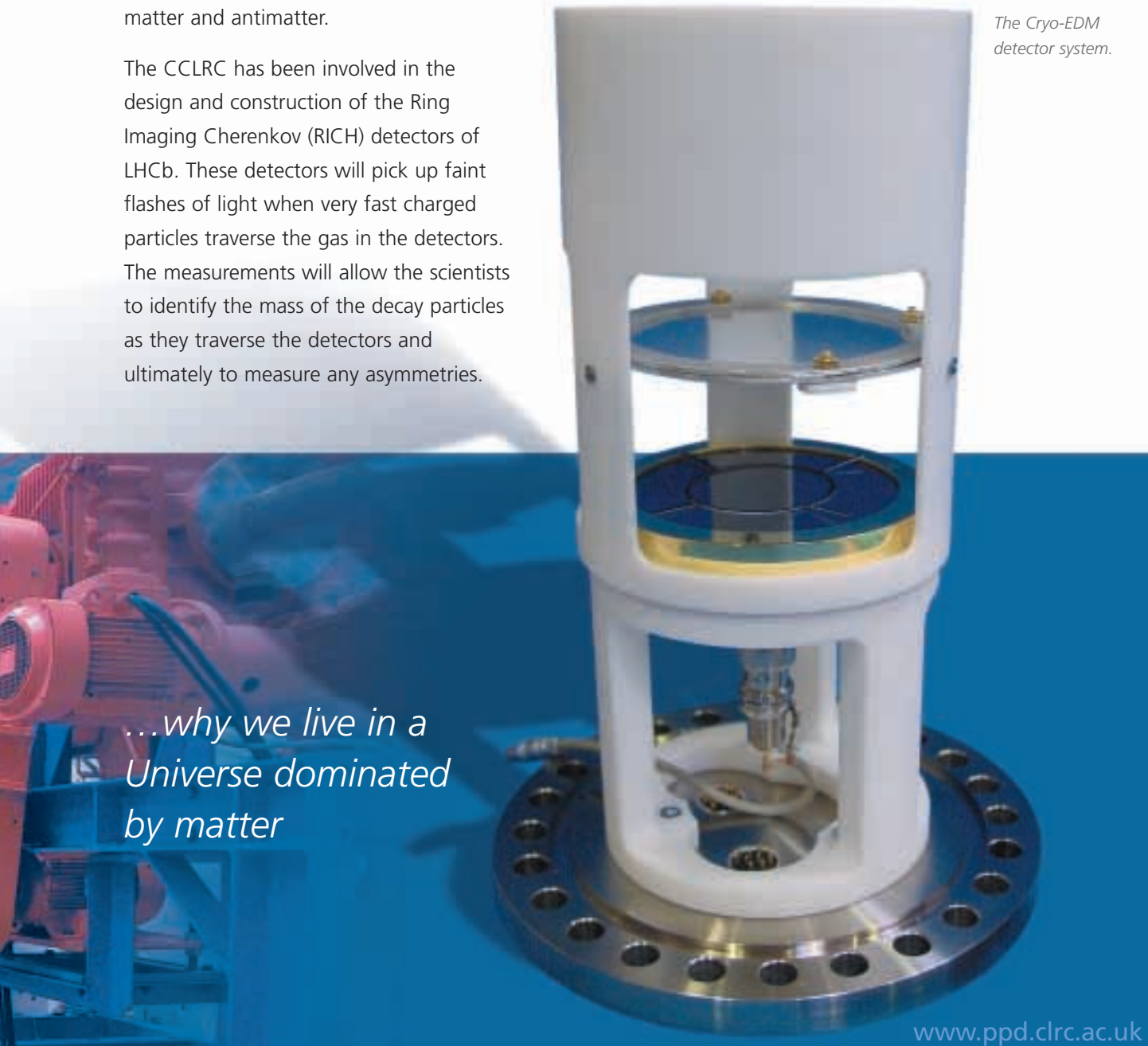
The second experiment – LHCb – also aims to understand why matter dominated over antimatter soon after the Big Bang but using equipment at a much larger scale. Using the 27km long Large Hadron Collider at CERN, physicists will be studying the decay of the B meson and looking for tiny asymmetries between matter and antimatter.

The CCLRC has been involved in the design and construction of the Ring Imaging Cherenkov (RICH) detectors of LHCb. These detectors will pick up faint flashes of light when very fast charged particles traverse the gas in the detectors. The measurements will allow the scientists to identify the mass of the decay particles as they traverse the detectors and ultimately to measure any asymmetries.

With data gathering expected to begin in 2007 for LHCb and results from Cryo-EDM not far behind, we could soon have some exciting answers about the fundamental question of why we live in a Universe dominated by matter.

Cryo-EDM
Contact: Keith Green
Email: k.green@rl.ac.uk

RICH2
Contact: Paul Soler
Email: p.soler@rl.ac.uk



The Cryo-EDM detector system.

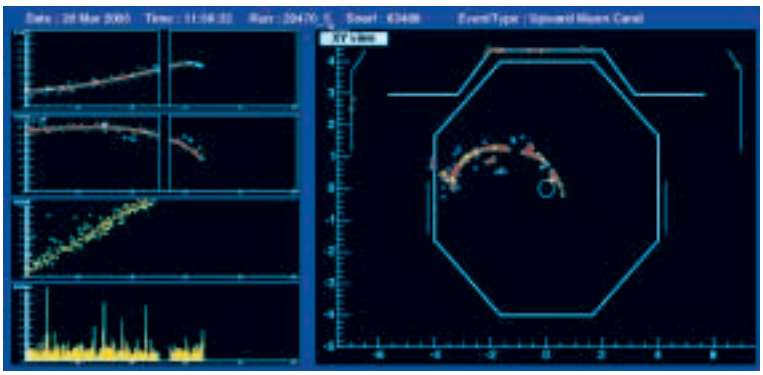
…why we live in a Universe dominated by matter

www.ppd.clrc.ac.uk

Revealing neutrino secrets

How much does a neutrino weigh, where does it come from and how does it change from one kind to another? These are all questions that CCLRC scientists are hoping to answer with an experiment called MINOS (Main Injector Neutrino Oscillation Search).

Over 200 scientists from six countries are involved in the MINOS experiment to uncover the secrets of this ghostly particle. In March 2005 the first neutrinos were fired out of the newly constructed beamline at Fermilab, near Chicago, USA. 450 miles away, and half a mile underground in the historic Soudan iron mine in Minnesota, a 6000 ton particle detector waits to detect just some of the neutrinos coming from the Fermilab beamline.



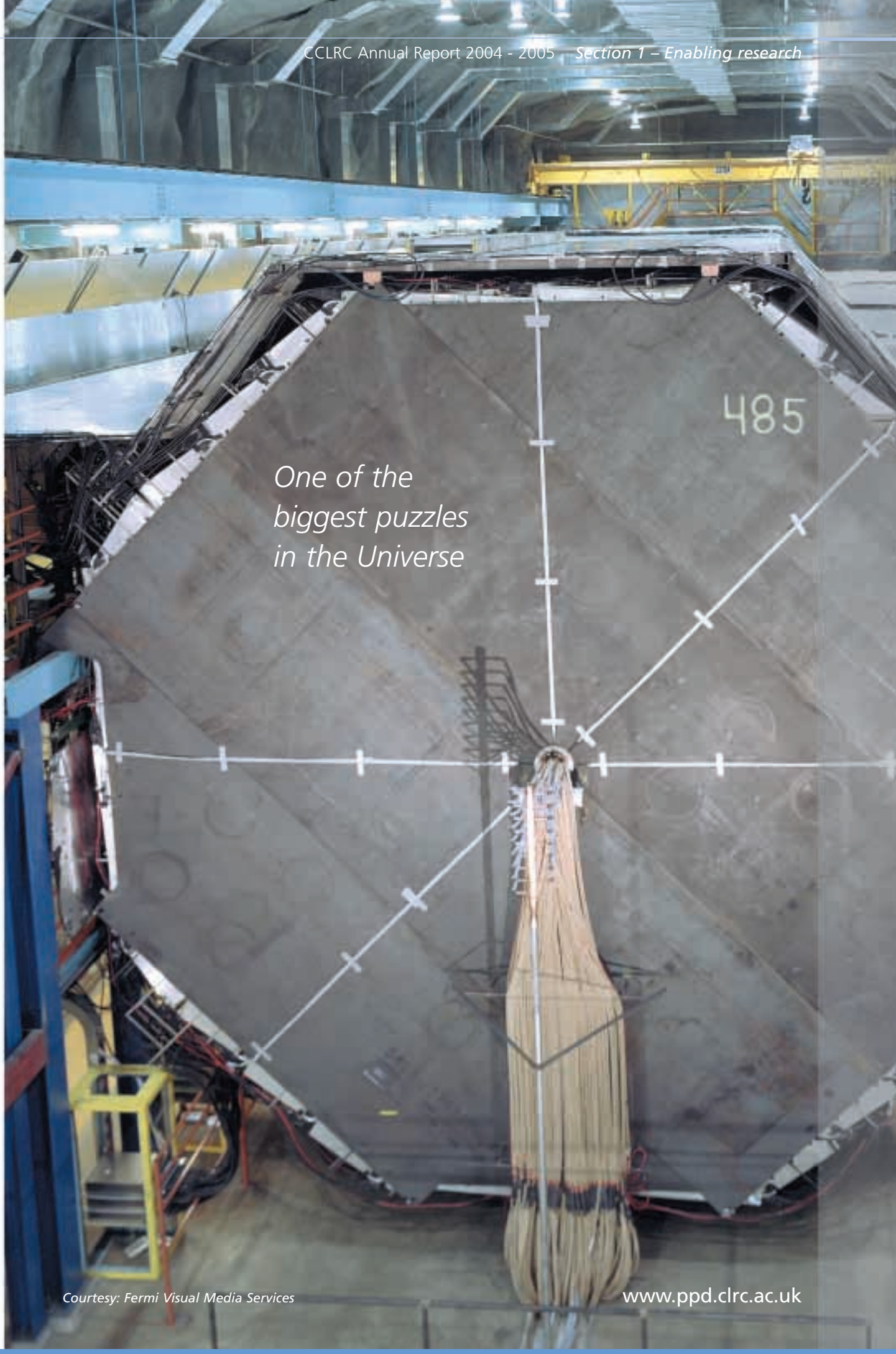
This is one of the first beam neutrino events that was seen in the MINOS far detector after the neutrino beam was turned on at Fermilab. The neutrino interacted in the rock of the underground cavern just in front of the detector and produced a negatively charged muon which then entered the detector. The front view shows the track bending in the magnetic field. It travelled through the detector losing energy in the iron plates as it went, until finally stopping after traversing about 2/3 of the detector length. The range (distance it travelled before stopping) and the curvature in the magnetic field identify it as a negatively charged muon and provide a measurement of its energy.

Although neutrinos are hard to spot, this does not mean that they are unimportant. These tiny particles are thought to account for as much mass in the universe as the stars, and they play a crucial role in the production of chemical elements in the explosion of stars. The Standard Model assumes that the neutrino has zero mass, but particle physicists now know that this cannot be true. They hope that MINOS will bring them a few steps closer to solving one of the biggest puzzles in the Universe.

The particle detector in the Soudan mine will only detect around 1500 particles per year, but physicists have ambitious ideas for much more powerful neutrino beams, from decays of stored muons, called a 'neutrino factory'. A key technology for the neutrino factory is the ability to produce intense bunches of muons, and with £9.7million funding, a new project called MICE (the Muon Ionisation Cooling Experiment) will be carried out on ISIS, the pulsed neutron and muon spallation source at the CCLRC Rutherford Appleton Laboratory to demonstrate that this can be done.

MINOS
Contact: Geoff Pearce
Email: g.f.pearce@rl.ac.uk

MICE
Contact: Paul Drumm
Email: p.v.drumm@rl.ac.uk



One of the biggest puzzles in the Universe

Courtesy: Fermi Visual Media Services

www.ppd.clrc.ac.uk

RAPID results

Five years ago instrument engineers at the CCLRC Daresbury Laboratory developed the RAPID (Refined ADC Per Input Detector) X-ray detector system – the world's fastest and most efficient photon counting X-ray movie camera. It has been a huge success, enabling scientists to study dynamic changes in their samples in very short time slices.

Interest from the international scientific community has been significant and a second RAPID X-ray detector was built and loaned to the ESRF (European Synchrotron Radiation Facility at Grenoble, in France). Most recently, Spring 8, the world's largest third generation synchrotron radiation facility, based in Himeji, Japan has taken delivery of a specially commissioned RAPID X-ray detector.

Compared to a conventional X-ray detector which integrates the photon data it receives, RAPID is able to take images in the photon counting mode. The engineers achieved this feat by developing wire MicroGap detector technology – an array of 10μm wires stretched over, but separated by a few hundred microns from, a cathode. The resulting detector can count approximately 106 photons mm^{-2} sec^{-1}, more than two orders of magnitude greater than traditional multi-wire detectors.

This kind of resolution has proved to be invaluable for watching high-speed processes and reactions. Already the RAPID X-ray detector has been used to observe how the structure of a muscle changes over time, by watching muscle fibre movements in 10 microsecond time slices. It has also been used to look at polymer processing, for example what happens to a plastic when it is quenched quickly.

With two detectors at the CCLRC Daresbury Laboratory and one soon to be installed in Japan, it is an exciting time for X-ray analysis with the potential for many new discoveries over the coming years. In the meantime, the CCLRC RAPID designers are thinking about further improvements for the next generation of RAPID X-ray detectors.

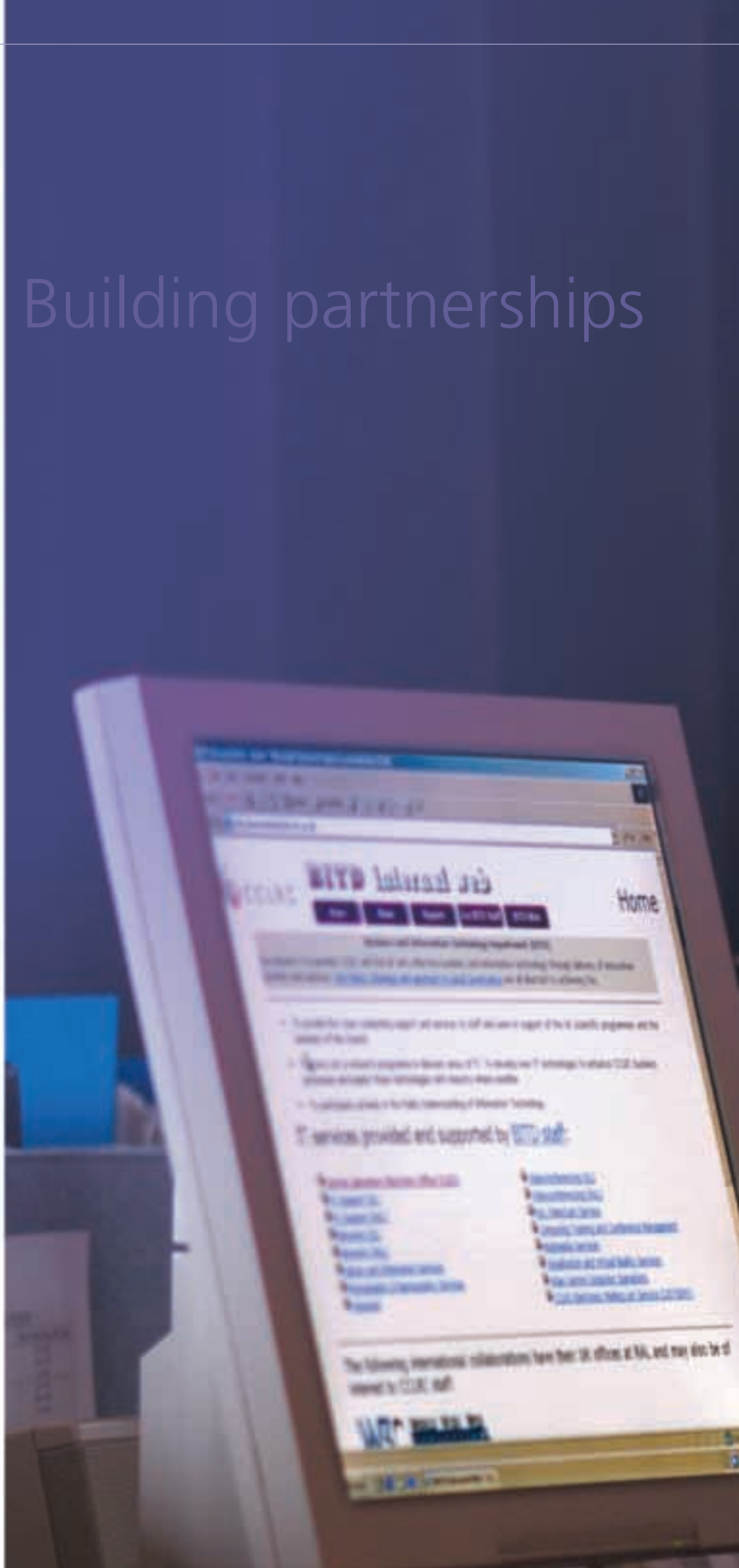
Contact: *Tim Nicholls*
Email: *t.c.nicholls@rl.ac.uk*

Paul Clifford checking the gas flowing through the new Rapid 2-dimensional detector

Interest from the international scientific community has been significant.

www.eng.rl.ac.uk
www.ins.rl.ac.uk

Section 2 Building partnerships



Ben Parry (BITD) and Ceri Owen developing intranet pages to keep CCLRC staff informed.

Building partnerships

Few science facilities are used by the researchers of just one country. International collaborations to undertake individual projects or to build new science facilities are commonplace. The CCLRC continues to work globally to ensure that UK scientists are at the forefront of international facility development as well as having research access to leading laboratories and experimental facilities around the world.

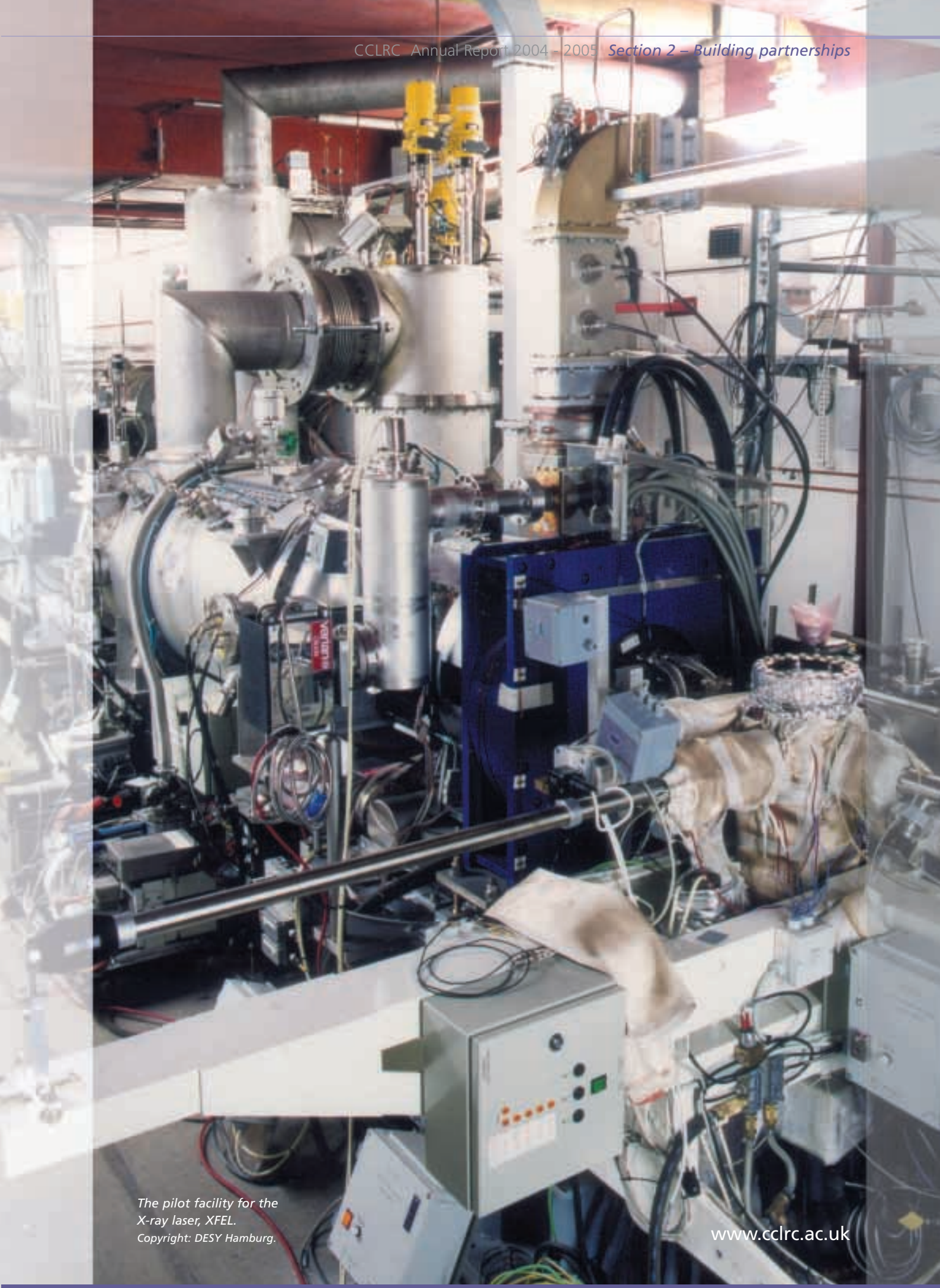
Along with scientists from other European countries, CCLRC staff are key participants in the preparatory R&D activities for the X-ray Free Electron Laser (XFEL), which is to be built at DESY in Germany. XFEL will be a source of high brilliance coherent X-rays (below 1nm) with high repetition rates and pulse lengths in the femtosecond region. It will open up new areas of research in a broad range of scientific disciplines, including femtochemistry, structural biology, materials research, cluster physics and plasma physics. The international facility is due to become operational during 2012.

The Facility for Anti-proton and Ion Research (FAIR) will be an international facility based at GSI, Germany. It will produce high energy, high brilliance beams of particles ranging from anti-protons through all chemical elements, up to and including fully stripped uranium ions. These beams will be used to research ranging from the nuclear astrophysical origins of chemical elements to the manipulation of nuclear decay rates by controlling their atomic medium. The CCLRC is contributing to plans for the central facility, the superconducting magnet design study and pump-priming R&D on new instrumentation.

The UK is one of three Associate Members and six scientific partner countries that support the Institut Laue-Langevin, France. The CCLRC provides stewardship of the UK interests and funds the annual subscription which provides access to this high intensity neutron flux reactor for UK scientists to undertake research into particle physics, nuclear physics, chemistry, the life sciences, and materials science.

The CCLRC also holds the stewardship of the UK interests in the European Synchrotron Radiation Source (ESRF). The ESRF is the most powerful synchrotron radiation source in Europe and is a collaboration of 18 nations working together.

At both the Daresbury and Rutherford Appleton Laboratories, the CCLRC is developing close links with its campus neighbours. The involvement of the North West Development Agency (NWDA) and local universities is ensuring a positive



The pilot facility for the X-ray laser, XFEL.
Copyright: DESY Hamburg.

The CCLRC has continued to increase the number of organisations with which it interacts. In 2004/5 it had relationships with over 1600 higher education institutes, government research bodies, industry and other organisations.

Relationships often exist between a number of CCLRC departments and different groups at the same university or laboratory and these interactions can be on several levels:

Research Collaborator – CCLRC scientists and engineers have worked alongside colleagues from external organisations and the research has led to co-authored papers.

Facility/Service User – organisations use CCLRC facilities/services but no co-authored papers arise.

Facility/Technology development – CCLRC scientists and engineers are participating in developing new facilities/ technologies both at the CCLRC and at outside organisations.

Training – the CCLRC has provided knowledge transfer in the form of a recognised training course such as summer schools, visiting lecture programmes or user training workshops.

	RC	FSU	FTD	T
UK				
University	264	250	25	91
Government	58	50	24	26
Ind/Other	53	35	23	6
EU				
University	351	667	10	1
Government	172	190	63	8
Ind/Other	52	18	1	0
Rest of the world				
University	328	82	10	0
Government	152	130	32	0
Ind/Other	33	25	0	0

Total number of organisations			
	UK	EU	Rest of the world
University	107	524	367
Government	64	229	162
Ind/Other	63	54	33
Total			**1603**

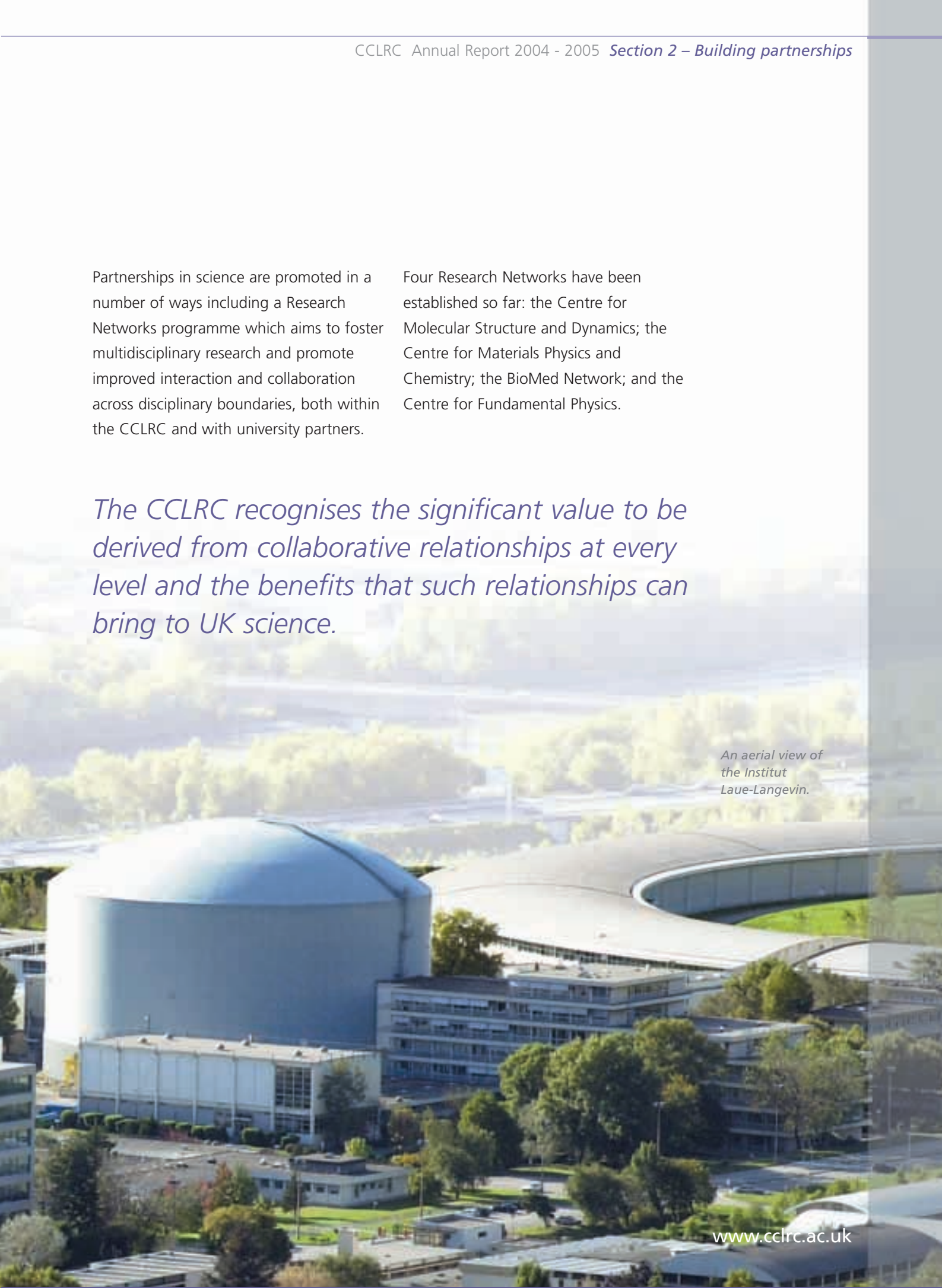
future not only for the Daresbury Laboratory but for science throughout the region. The NWDA have already invested in a new science park adjacent to the laboratory which is specifically aimed at nurturing commercial applications of science and technology for the benefit of the local economy.

The CCLRC Rutherford Appleton Laboratory is working with UK Atomic Energy Authority and Health Protection Agency to develop the Chilton/Harwell campus into an international centre for science, technology and innovation. The proposal is being developed as a joint venture with the support of the Department for Trade and Industry, and builds on recent government investment in the campus.

Partnerships in science are promoted in a number of ways including a Research Networks programme which aims to foster multidisciplinary research and promote improved interaction and collaboration across disciplinary boundaries, both within the CCLRC and with university partners.

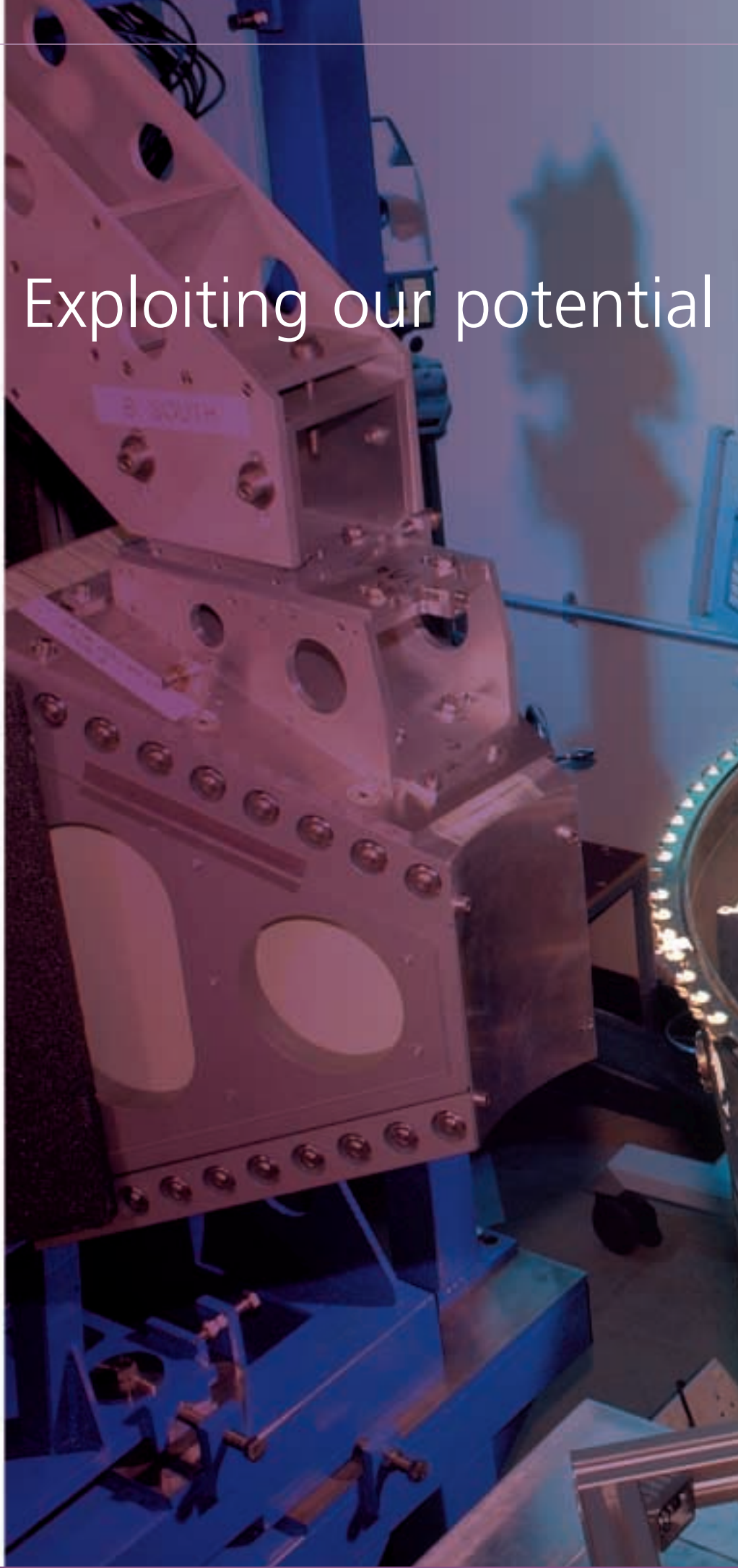
Four Research Networks have been established so far: the Centre for Molecular Structure and Dynamics; the Centre for Materials Physics and Chemistry; the BioMed Network; and the Centre for Fundamental Physics.

The CCLRC recognises the significant value to be derived from collaborative relationships at every level and the benefits that such relationships can bring to UK science.

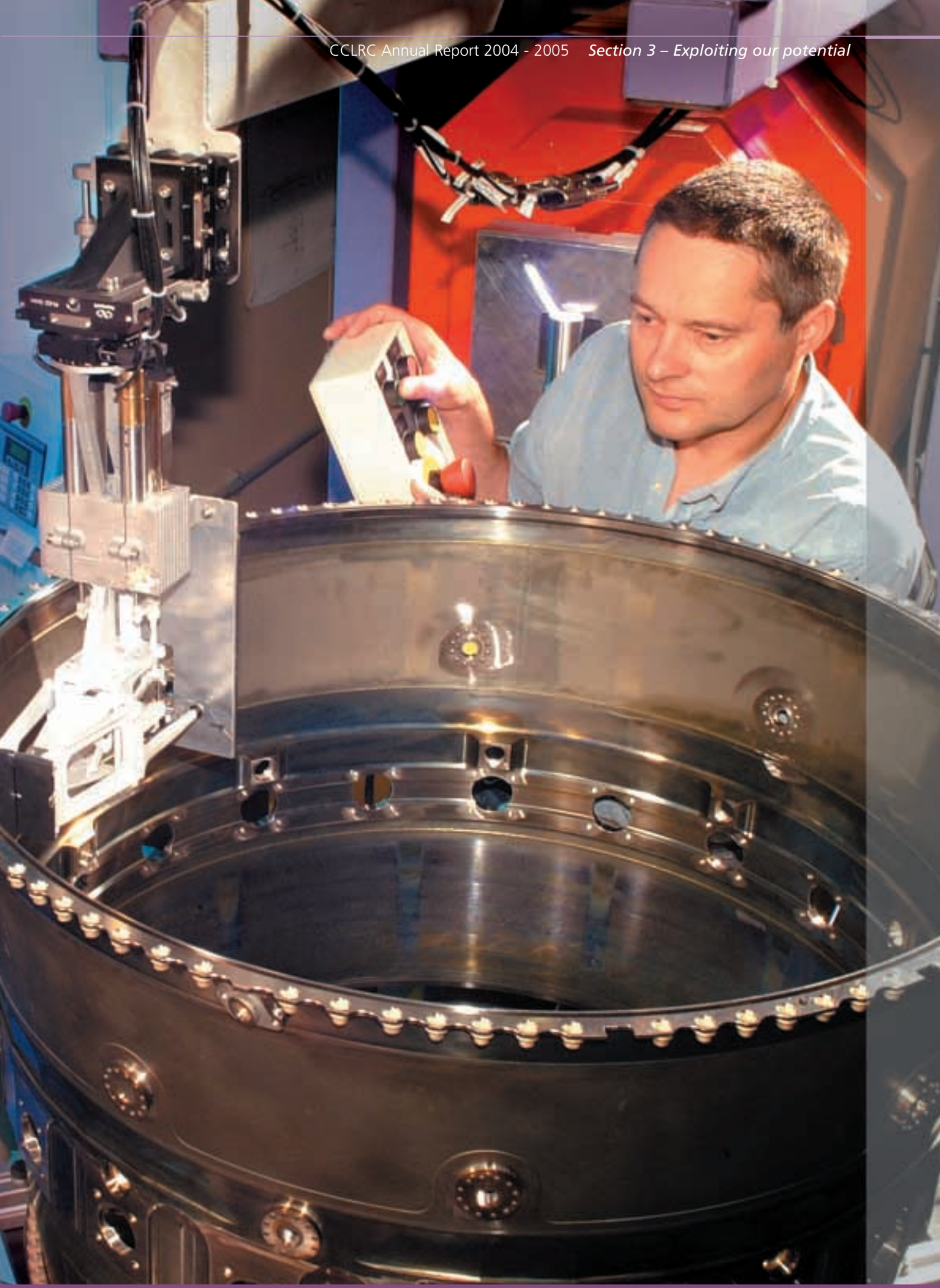


An aerial view of the Institut Laue-Langevin.

Section 3 Exploiting our potential



Jon James of the Open University positioning a large engineering sample on the ENGIN-X beamline at ISIS.



Knowledge Transfer

The CCLRC has a unique combination of science facilities and underpinning technologies that provide a great 'melting pot' for innovative multidisciplinary research. This scientific heritage and pedigree has positioned the CCLRC to make a significant contribution to the UK's knowledge transfer (KT) agenda.

Directed by its Royal Charter to promote and support the exploitation of research outcomes, the CCLRC has engaged in KT for more than 20 years and has a strong track record of technology transfer to the private sector. Historically, such activities were driven by the entrepreneurial spirit of a few key individuals. However, in 2002, Central Laboratory Innovation & Knowledge Transfer Ltd (CLIK) was established to professionally manage the commercialisation of CCLRC intellectual property.

In 2004-5, CLIK continued to address opportunities in a large variety of potential markets; including the renewable energy sectors, high accuracy detectors, software, novel medical diagnostics, consumer products, and many others.

Appleton Space Technology has been set up to market CCLRC Space Science and Technology products and services, including novel space cameras. ARES Research Technology Ltd has been set up to design, build and supply low temperature and high vacuum

Appleton
Space Technology

Appleton Space Technology has an exclusive responsibility to manage and exploit the rich intellectual property base of the CCLRC Space Science and Technology Department.

Ares™
Research Technology

Dave Teehan, managing director, is confident that Ares will become the world's leading supplier for research instruments working at ultra and extremely high vacuum.

components for scientific experimentation. ARES will continue to work closely with the CCLRC.

Some of these ventures have been assisted by the new 'Proof of Concept' fund, designed to support work on commercially interesting opportunities in the CCLRC. This fund has made a number of awards, supporting work as diverse as vacuum pump design, measurement of bone density and the study of proteins.

The CCLRC knowledge transfer agenda is more than just the commercialisation of its intellectual property. Prompted by recent government policy, the CCLRC has considered how it can contribute to establishing the UK as a great place in which to undertake R&D - and 'a hub in the global knowledge economy'.

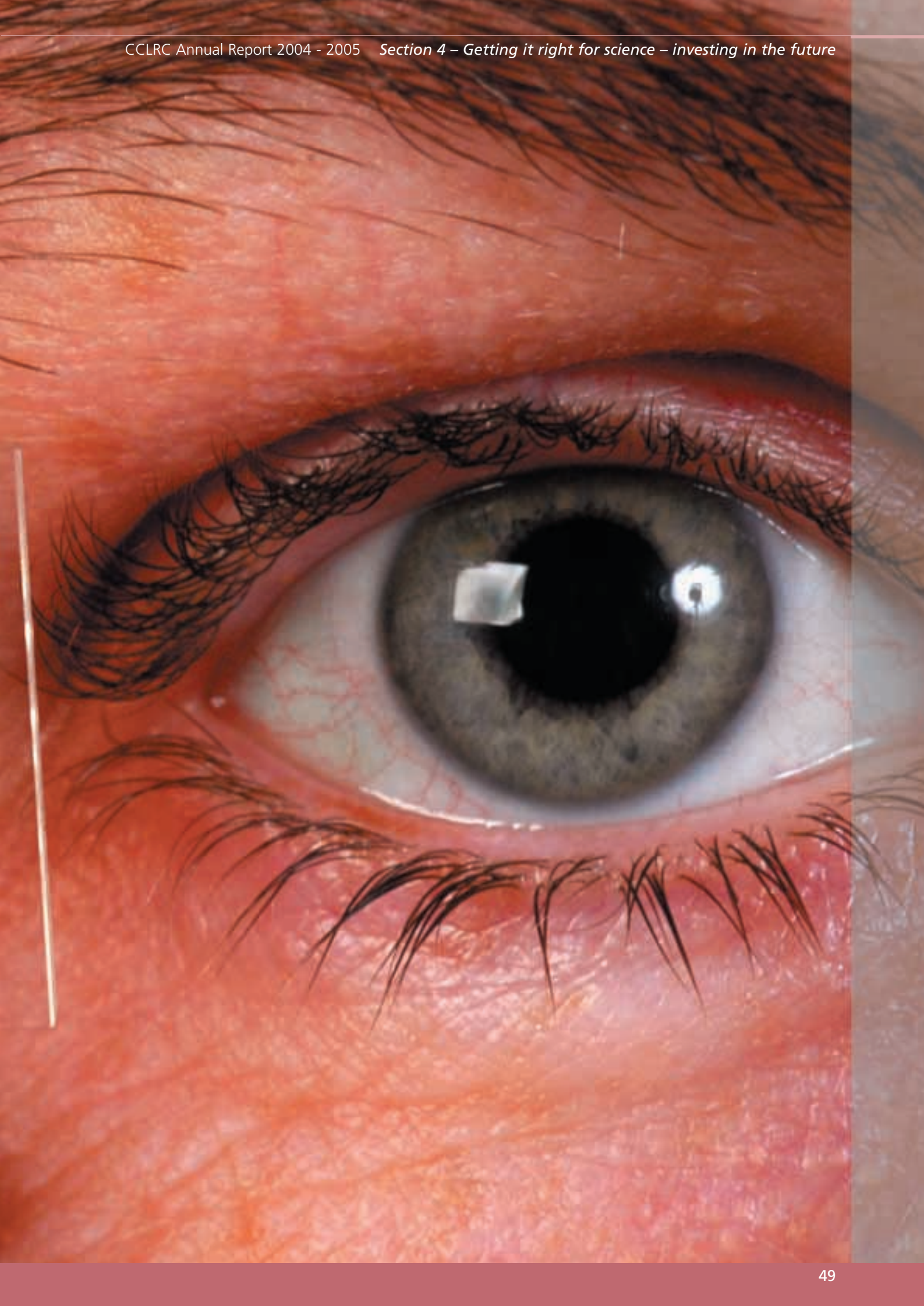
Such activities already include sharing CCLRC technology plans with the private sector to identify and grow opportunities for early stage collaborative development with businesses which can use and exploit our technologies; pro-actively encouraging industry to use CCLRC advanced research facilities to solve its R&D challenges; developing international science and business centres adjacent to the CCLRC laboratories in which KT would be a prime focus; and establishing a distinct culture within CCLRC laboratories that supports and fosters KT.

The CCLRC is a major element of the UK's science infrastructure and is playing a leading role in the government's KT agenda.

www.cclrc.ac.uk

Section 4 Getting it right for science – investing in the future

A minute scaffolding manufactured by the CCLRC Central Microstructure Facility as part of a project, with teams from the universities of Nottingham and Leeds, to create an artificial liver. The structure simulates the complex tubes that occur naturally and which carry the blood around the liver.



Investing in the future

Evidence of infrastructure investment is obvious at the CCLRC Daresbury and Rutherford Appleton Laboratories. Over the last year, cranes have dominated the skyline as the construction of new buildings takes the laboratories into the future.

Entering the CCLRC Rutherford Appleton Laboratory, visitors pass the Diamond Light Source construction site, an impressive example of the government's commitment to UK science. At the other end of the Rutherford Appleton Laboratory site, and less obvious to visitors, the construction of the ISIS Second Target Station is rapidly taking shape. Collectively these two projects represent government investment of over £500 M. The ISIS Second Target Station will provide a suite of instruments specifically designed to meet the needs of researchers interested in soft condensed matter and bio-materials. Many of the techniques used at ISIS will complement those at Diamond, leading to a significant increase in the amount of biomedical research carried out on the campus.

At the CCLRC Daresbury Laboratory, visitors are now welcomed by a new reception building which demonstrates the CCLRC's ongoing commitment to the future of the laboratory. The new

Diamond Light Source construction site.

building provides a modern and dynamic working environment for many of the Laboratory's support staff as well as providing a flexible exhibition space and informal meeting areas. This is just one example of the projects that will be undertaken with new funding received from the Office of Science and Technology to be spent on laboratories and facilities over the next three years.

But the future of the CCLRC depends on more than the physical environment of its laboratories. The development of its staff is also vital and there is a vibrant programme for learning and development available to all staff. The CCLRC has a well-established management training scheme which underpins the efficient and effective running of the operational and strategic functions of the organisation. It is committed to promoting diversity in its workforce, with awareness embedded throughout the organisation. The CCLRC also runs a highly successful Engineering Apprentice training scheme alongside local training providers as well as offering placements to undergraduate and postgraduate students. The CCLRC supports a 'Women in SET' network and actively works with the Daphne Jackson Trust to offer fellowships to enable scientists, engineers and IT specialists to return to work after career breaks.

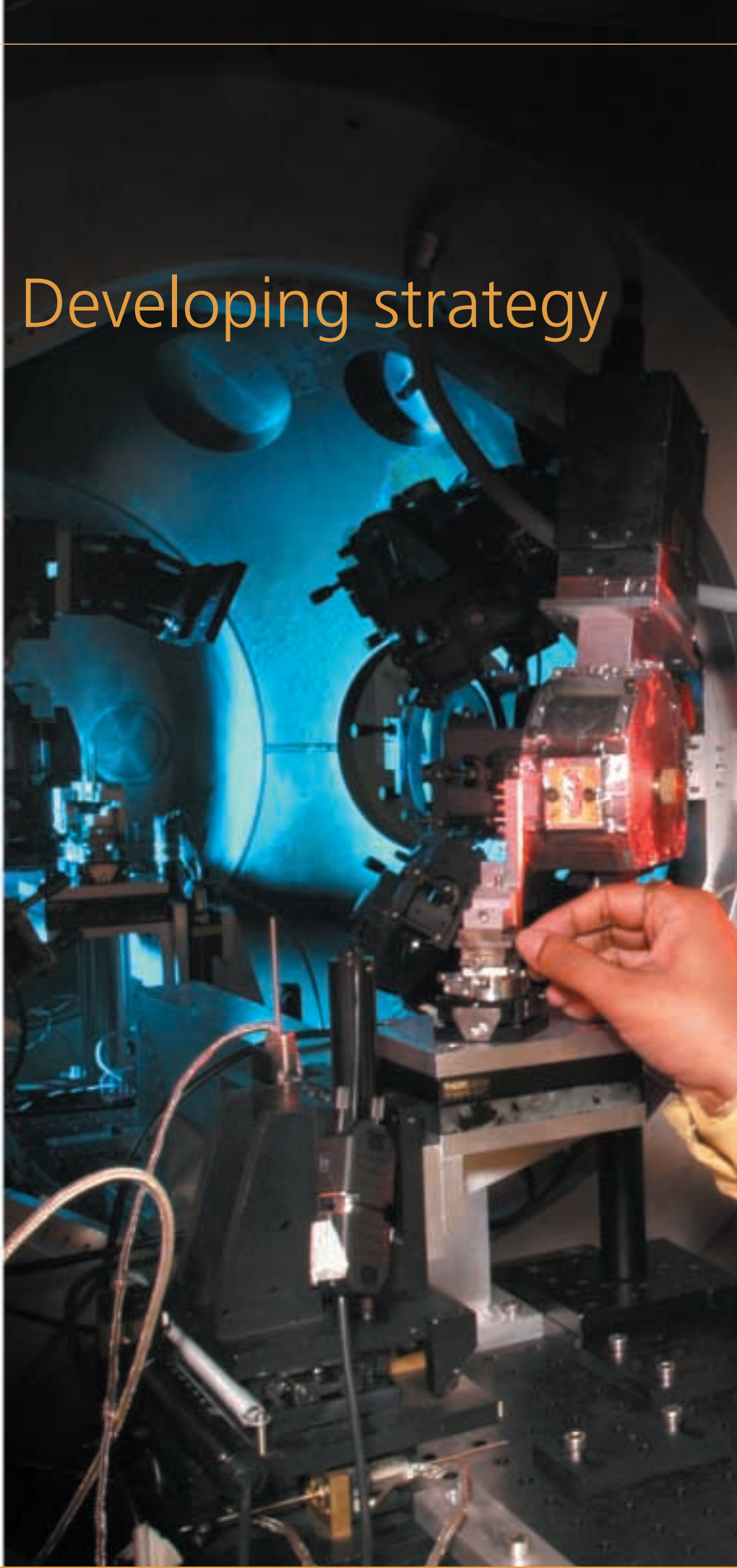
Work experience continues to provide a stimulating opportunity for young people to gain an insight into a career in science or engineering. Many return as vacation students whilst at university and some as graduate trainees.

The ISIS Second Target Station takes shape.

Daresbury Laboratory's new reception building.

Investing in the future continues to be a priority for the CCLRC. Providing a safe, modern working environment in which highly skilled staff are developed and supported to deliver excellence is a key to the CCLRC's ongoing success.

Section 5 Developing strategy



Pritesh Mistry (University of York) adjusting an opacity target in the Vulcan Target Area East.


R.A.L.
LASER DIVISION
112cm

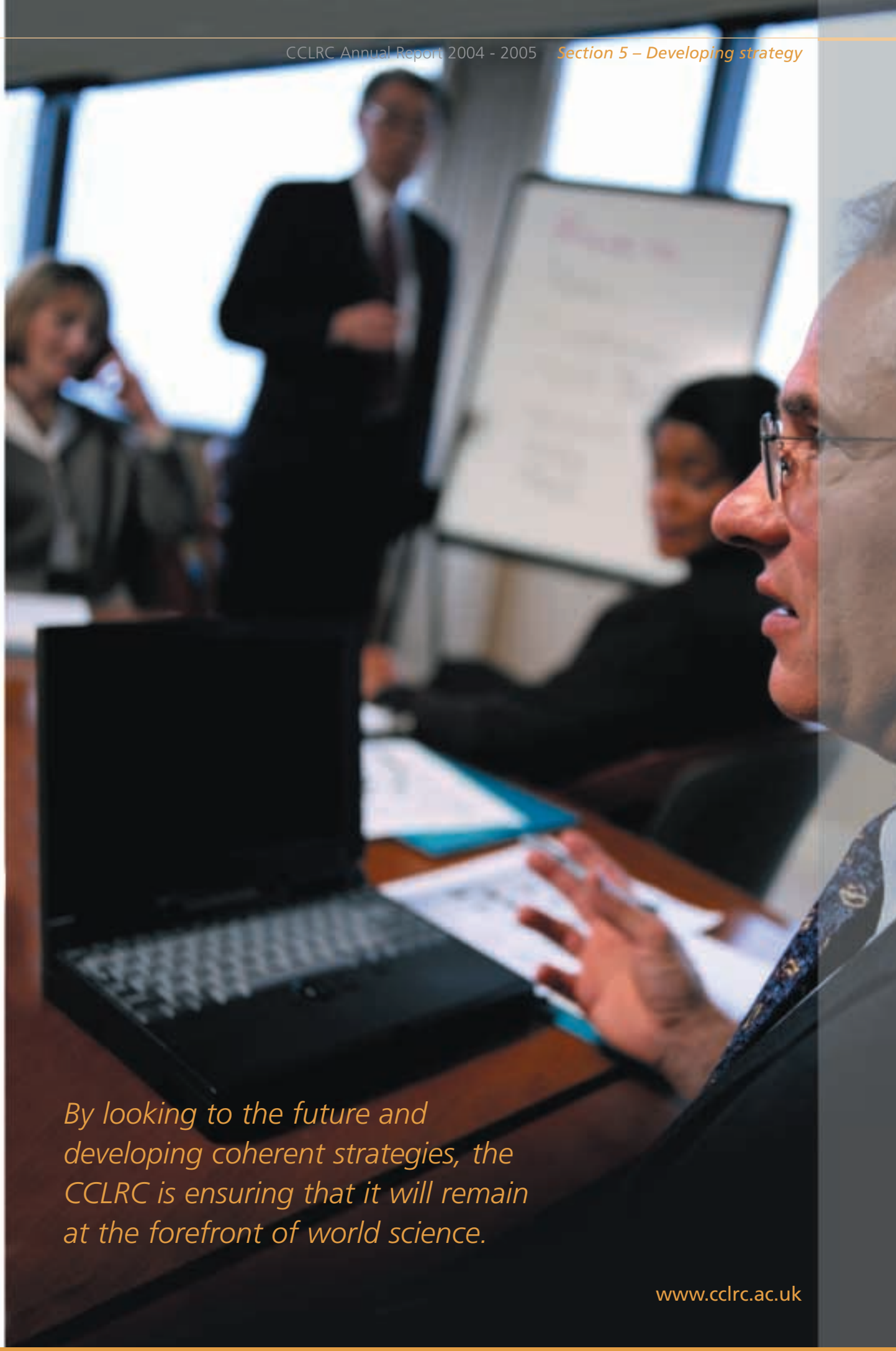
Developing strategy

The boundaries of science and technology are constantly moving and current experimental facilities will not keep pace with the requirements of researchers. To maintain the UK's place as a world leader in science, the CCLRC needs to stay ahead by planning the next generation of scientific facilities and ensuring that there will be high quality scientists and engineers to design and operate them.

The CCLRC Strategic Plan 2003 - 2008 sets out the broad strategic direction for the CCLRC and will be reviewed within the next three years with the outcomes informing the further development of its capital investment plan and estates strategy. These strategies will, in turn, inform priorities for programme development and international partnership, together with development of the science and innovation campuses around the two principal laboratories at Chilton and Daresbury.

During 2004-5 the CCLRC has developed its role as a strategic adviser to the UK government, creating a new structure that separates strategic planning from laboratory operations to enable the CCLRC to provide transparent and impartial advice to government. In view of its considerable experience in neutron science at both the ISIS pulsed neutron and muon facility at the CCLRC Rutherford Appleton Laboratory and the Institut Laue-Langevin, the Minister for Science and Innovation commissioned the CCLRC to produce a strategy for ensuring continued access for the UK research community to world-class neutron facilities. Following a wide consultation to explore the scientific and technological opportunities for a next generation neutron source for Europe, within an international context, the CCLRC will present its strategy in 2005/6.

Input into development of large facility roadmaps in the UK and Europe will be a major activity for the CCLRC in the coming year. More locally, the CCLRC is assessing the technology road maps for its Advanced Technology Centres - in accelerator science and technology, instrumentation, and e-Science and Grid developments. The CCLRC will explore opportunities to build UK capacity in anticipation of establishing an accelerator science test facility. Such a capability would provide the UK with resources to accurately model and experimentally test the performance of potential new facilities, train staff and students in the use of new technologies and integrate test systems with real accelerated particle beams, currently not possible in laboratory based test systems. The CCLRC is also participating in a UK-led international panel to undertake a feasibility study for a capability in inertial fusion energy. The outcome of this review may require a successor for the Vulcan laser to ensure the UK maintains its international position in high intensity laser science.



By looking to the future and developing coherent strategies, the CCLRC is ensuring that it will remain at the forefront of world science.

www.cclrc.ac.uk

Section 6 Engaging with society

As part of the Talking Science programme of public and schools lectures, Dr David James (centre) showed how the latest advances in science and technology are helping athletes push the boundaries of human performance.


PRO STAFF
KING

Science in Society

Dr Simon Singh explained the Big Bang theory.

Talking science

The highly successful programme of schools and public lectures has continued at the CCLRC Daresbury and Rutherford Appleton Laboratories. Topics have ranged from forensic pathology to the chemistry of sexual attraction, the search for dark matter and the physics of sport. Younger visitors have been excited and inspired by insects from the rainforests, fun chemistry and optical illusions.

Dr Graeme Jones of Keele University demonstrated the power of chemical communications.

Seeing Science CD-rom

CCLRC scientists and communicators have worked with teachers to develop a well-received teaching resource called 'Seeing Science with CCLRC'.

The CD-rom is the first national project in the CCLRC's Science and Society programme and is aimed at Key Stage 3 teachers and students (11-14yrs). It includes topics as diverse as planning a mission to Pluto, finding out what makes chocolate taste so good and tracking the spread of disease. The lessons are based on real CCLRC science and include teaching notes, video clips, animations and games.

This initiative is designed to show pupils that science is fun and can offer an exciting career - and to encourage UK school pupils to take more interest in science. However, requests for Seeing Science are coming from much further afield - teachers and students in more than 20 countries will be learning about CCLRC science. Over 8500 copies of the CD-rom have already been despatched.

The CD-rom is supported by a web site www.seeingscience.cclrc.ac.uk. Copies can be obtained by emailing seeingscience@cclrc.ac.uk

Teacher Placement Day

Science teachers from 13 schools throughout the NW spent a day at the CCLRC Daresbury Laboratory experiencing live science. The event was part of the continuing professional development programme offered by Education Business Plus to allow teachers to keep abreast of the latest scientific research.

After hearing about the Synchrotron Radiation Source, 4GLS and touring the facility, the teachers became pupils for a few hours as they used the Seeing Science CD-rom.

NW BA Mini Science Festival

How do forensic scientists analyse blood and DNA? How big can bubbles get? These questions and many more were answered at a mini science festival held at the CCLRC Daresbury Laboratory. The NW branch of the British Association for the Advancement of Science arranged lectures, workshops and hands-on science activities for more than 300 members of the public.

Open Afternoons

Enabling members of the public to visit scientists in their laboratories and see their research at close quarters remains a key feature of the CCLRC Science and Society strategy.

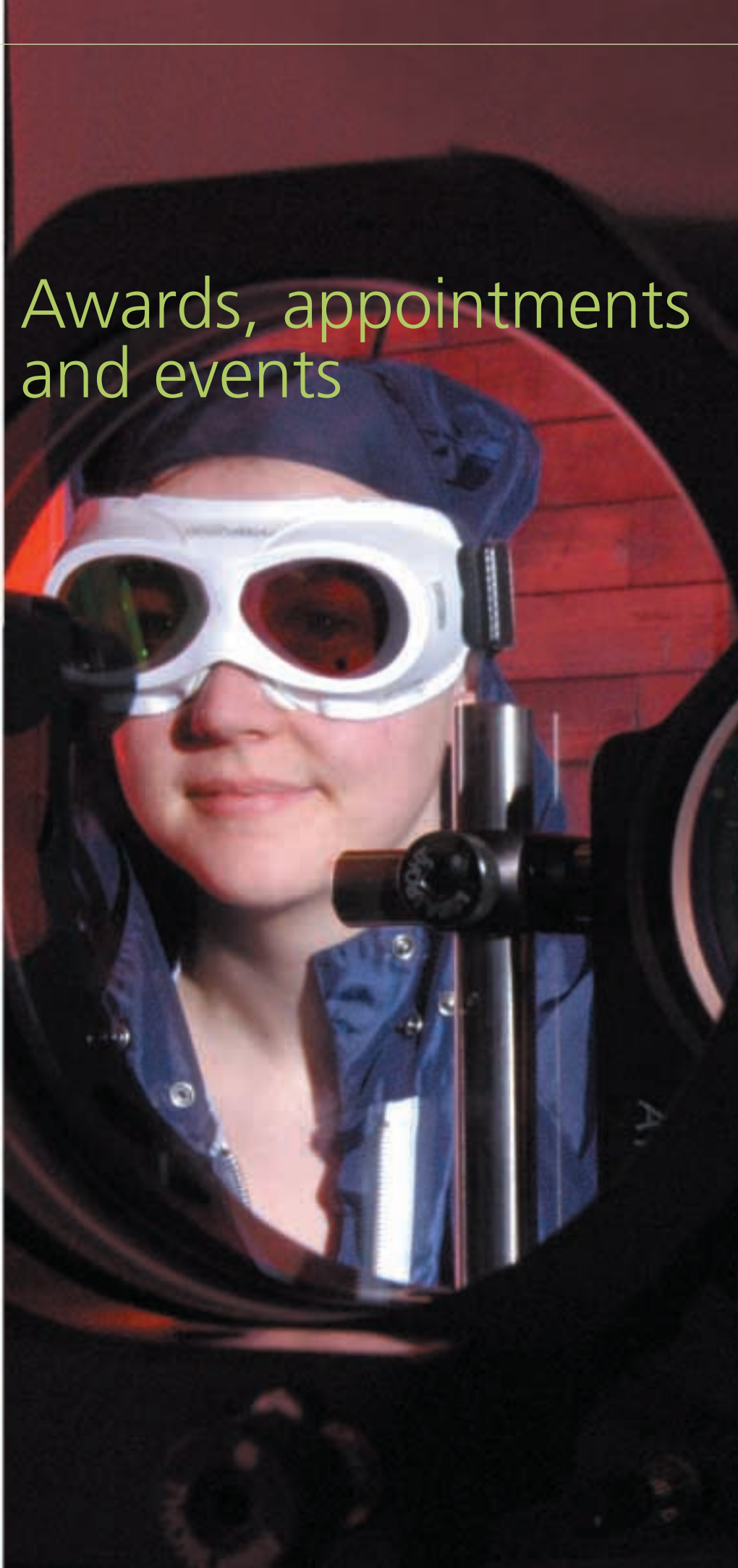
Celebrating the unusual

For the second year running, the CCLRC Daresbury Laboratory was one of only four UK venues to host the IgNobel Awards. The awards are intended to celebrate the unusual, honour the imaginative and spur public interest in science, medicine and technology. The audience enjoyed witty presentations from Ig prizewinners and Marc Abrahams, editor of the Annals of Improbable Research.

Science and Engineering Ambassadors (SEAs)

The DTI-sponsored SEA scheme has taken off over the last year with 62 members of staff now registered at the CCLRC Rutherford Appleton Laboratory and 19 at the CCLRC Daresbury Laboratory. Most of the SEAs have taken part in schools and public events within the laboratories and an increasing number are also taking science outside by offering talks, presentations and hands-on demonstrations. SEAs have also offered advice at school careers conventions.

Section 7 Awards, appointments and events



Kate Lancaster, a post-doctoral research assistant in the CLF, adjusting alignment optics for plasma diagnostics on the Vulcan Petawatt laser. The purpose of the experiment was to investigate aspects of the Fast Ignition Fusion program.

Appointments and awards

Professor Keith Jeffery

CCLRC Director Business Information Technology, Professor Keith Jeffery has been appointed President of ERCIM, the European Research Consortium for Informatics and Mathematics. The organisation is made up of leading research institutes from 18 countries and aims to encourage collaborative work within the European research community and increase co-operation with European industry.

Keith is keen to use his two-year presidency to foster strategic relationships with other international organisations such as the European Science Foundation and the National Science Foundation in the USA. His appointment gives the CCLRC a key role in orchestrating the creation of the European Research Area for the ICT developments that will be required to support science and also the emerging e-Economy.

Professor John Wood

CCLRC Chief Executive, Professor John Wood is one of the first scientists to be awarded honorary Chartered Scientist (CSci) status which hopes to improve public trust in science. As well as being educated and trained to a high level, Chartered Scientists will be able to communicate complex issues to non-specialist audiences and be bound by a code of conduct which includes the need to be objective when giving public opinion on scientific issues. John was nominated by the Institute of Materials, Minerals and Mining. Speaking about the award, he said "It is an honour to be proposed by my peers. I welcome this scheme which will identify scientists who are considered professional and represent their area of science in a trustworthy way."

Honours

Rick Mason

Rick Mason, Head of the CCLRC Building Projects Group, has been awarded an MBE for 'services to science'.

Rick has worked at the CCLRC Rutherford Appleton Laboratory for 26 years designing and project managing the alteration and construction of new buildings for the CCLRC and other scientific institutions. His projects have been varied including a telescope building on a volcano in Hawaii, the Royal Greenwich Observatory building in Cambridge and a laboratory building at the Royal Observatory Edinburgh. More recently, Rick has headed the team designing and constructing the buildings for Diamond Light Source Ltd.

John Bradford, Dr Jon Eastment and John Goddard of the CCLRC Radio Communications Research Unit of the SSTD have been awarded the Institution of Electrical Engineers' prestigious Sir Charles Wheatstone Measurement Prize. It recognises outstanding work in measurement science and technology. The team were cited for a world-leading body of work, spanning a 10-year period, in the field of 'Radar measurements of cloud, precipitation and related atmospheric processes'.

Professor Richard Harrison

Professor Richard Harrison has been awarded an MBE for 'services to solar research'. Richard is head of the Solar Physics division at the CCLRC. His research looks at the ejection of matter from the Sun and its influence on the Earth. He has pioneered research into how the Sun ejects mass into space and has also led a number of projects for space instruments aboard spacecraft including the European Space Agency's Solar and Heliospheric Observatory (SOHO). The SOHO mission has made major strides in revealing the dramatic nature of our star over the last eight years, and Richard has led the operation of the UK's instrument on SOHO from a dedicated facility at the CCLRC Rutherford Appleton Laboratory.

Events

Chilbolton celebrates Einstein

2005 is Einstein Year, marking the centenary of the physicist's greatest year when he published three influential papers. One of the first events of the year was launched at the CCLRC Chilbolton Observatory. Poems by Alexander Pope and J C Squire were projected onto the 25m radar dish to launch the British Association for the Advancement of Science (BA) Universe poetry competition. Chilbolton's dish was selected for its iconic status!

Royal visitor

His Royal Highness Prince Michael of Kent visited the CCLRC Rutherford Appleton Laboratory in May 2004. Prince Michael, a Fellow of the Royal Astronomical Society, visited the Space Science and Technology Department where he received briefings on missions including SMART-1.

Transit of Venus

A rare astronomical phenomenon was witnessed at the CCLRC Rutherford Appleton and Daresbury Laboratories on 8 June 2004. Transits of Venus occur in pairs with a separation of eight years between each of the pair and 120 years between pairs.

Seen as a small black disk against the bright Sun, Venus took almost six hours to complete its transit of the Sun's face. CCLRC staff and children from local schools were able to view the transit through filtered telescopes and projection instruments.

Appleton Laboratory reunion

In 1979, the Appleton Laboratory moved from Ditton Park to Chilton and merged with the Rutherford High Energy Laboratory. 25 years later, 70 former members of staff from the Ditton Park days visited the CCLRC Rutherford Appleton Laboratory to hear about current space research and have a tour of the Diamond Light Source. The visitors had travelled from as far away as Australia and some had worked at the Appleton Laboratory in the 1950s. A smaller group also visited the CCLRC Chilbolton Observatory where they were able to see inside the dish antenna.

Events

Dave Kelsh (front right) with the SSTD ISO team

Quality assured in Space

CCLRC Space Science and Technology staff have celebrated after being awarded the prestigious ISO 9001:2000 quality assurance certificate for design, manufacture and testing of their space hardware and Tick-IT accreditation for their software. The efforts of staff to implement the necessary procedures have already resulted in new contracts as some organisations require these specific certificates from potential partners.

Getting wet for a good cause

To raise awareness of the CCLRC Rutherford Appleton Laboratory in the local community, a team of 25 staff representing every department took part in Dragon Boat 2004, a fundraising event organised by Abingdon Vesper Rotary Club. The RAL Rowers demonstrated greater success off the water, raising over £3900 for their nominated charities and setting a new team fundraising record for the event.

(L to R) Ian Gardner (ISIS), David Hawksett (Guiness World Records) and Colin Danson (CLF)

Guinness World Records

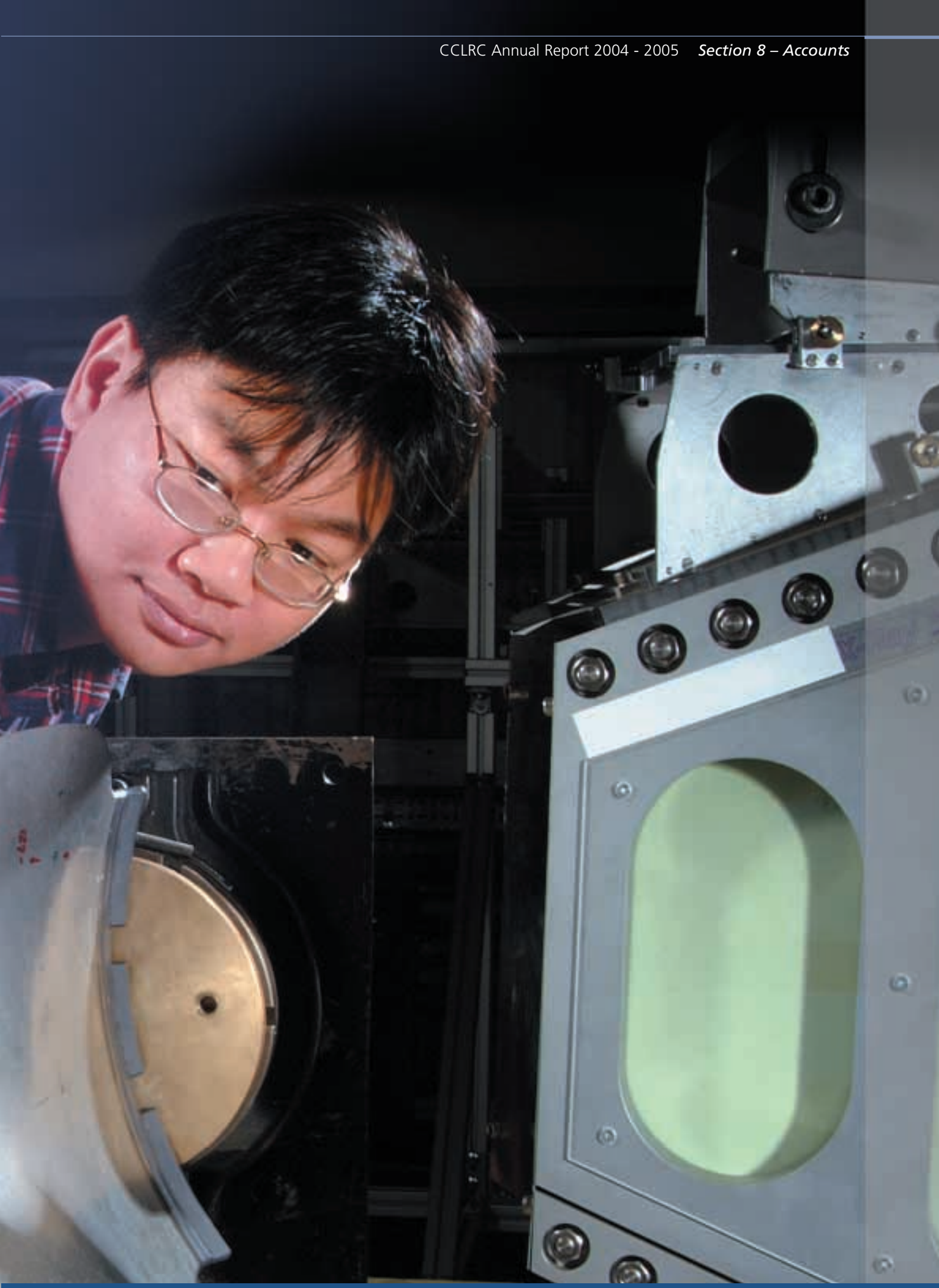
It's official - Vulcan is the world's highest intensity focused laser and ISIS is the world's most powerful pulsed neutron spallation source. Representatives of both facilities received certificates from David Hawksett, Science Editor of Guinness World Records at a presentation in April 2004.

50th Anniversary concert

The CCLRC Rutherford Appleton Laboratory hosted a concert by Jack Liebeck and Charles Owen to celebrate the 50th anniversary of CERN.

Section 8 Accounts 2004-2005

Kevin Tan of the University of Manchester aligning a turbine blade on the ENGIN-X instrument on ISIS.



Foreword and Council Members' Report

The accounts have been produced in conformance with a Direction given by the Secretary of State for Trade and Industry on 27 November 2001 in pursuance of section 2(2) of the Science and Technology Act 1965.

History and statutory basis of the Council

The Council for the Central Laboratory of the Research Councils (the Council) was established on 1 April 1995 as an independent Research Council under the Science and Technology Act 1965. Its Royal Charter was granted by Her Majesty the Queen on 14 December 1994 and amended by Privy Council on 17 July 2003. Its activities during 2004-05 have been in accordance with the objects set out in its Charter which are reproduced in the Council's Annual Report.

Principal activity of the Council

In 2004-05 the Council's principal activity continued to be the management of the Rutherford Appleton Laboratory, the Daresbury Laboratory and the Chilbolton Observatory in accordance with its Charter mission. In addition, following the implementation of the Quinquennial Review recommendations, the CCLRC now also fulfils a strategic role and acts, on behalf of Research Councils UK, as the national focus for large-scale facilities for neutron scattering, synchrotron radiation and high power lasers. This responsibility encompasses the management of the UK interests in the Institut Laue Langevin (ILL) and European Synchrotron Radiation Facility (ESRF).

Financial performance

Introduction

Throughout 2004-05, the Council has continued to trade as a corporate Group (CCLRC Group). As well as continuing to operate as a single corporate entity, the Council (CCLRC), has operated its own wholly-owned trading subsidiary, Central Laboratory Innovation and Knowledge Transfer Limited (CLIK). In addition, throughout the year, CCLRC continued to be the major shareholder in Diamond Light Source Limited (DLSL), a Joint Venture established with the Wellcome Trust Limited for the construction and operation of the Diamond facility, a third generation, medium energy, synchrotron radiation source.

Group financial performance

As a consequence of the need to provide for two exceptional items this year, the CCLRC Group accounts for 2004-05 show a deficit of £27.5 million, (2003-04, deficit of £2.2 million). In addition, there was a small surplus of £0.3 million, reflecting the CCLRC Group's share of its investment in DLSL. Including the 2004-05 results, the Group moved into substantial cumulative deficit, £29.5 million, (2003-04 £2.0 million deficit).

Exceptional Provisions

On 7 March 2005, as part of the publication of H.M. Government's Spending Review 2004, the Secretary of State for Trade and Industry formally announced the closure, at the end of 2008, of the Council's synchrotron radiation source at Daresbury. As a consequence of this announcement, based on a thorough estimate of the foreseen costs, the Council has therefore, in accordance with and with Financial Reporting Standard 12 made full provision for the exceptional costs of this closure, £23 million.

In addition, the Council has instituted a full review of its administrative operations and put in place a programme for their implementation which is expected to yield substantial cost savings over the next three years. A sum of £6 million has thus been set aside to meet consequential restructuring costs linked to this programme.

Both these provisions have been made with the full knowledge and agreement of its parent government Department who, through the Office of Science and Technology (OST), have provided formal assurance of the Council's continuing financial viability.

CCLRC Group

Income from operating activities was £67.9 million, an increase of £5.3 million on the previous year (2003-04, £62.6 million). Grant-in-Aid income also increased to £66.4 million compared with £62.6 million in 2003-04. Deferred Income released to the Income and Expenditure account fell by £3.8 million to £20.9 million (2003-04, £24.7 million). Overall therefore, income increased to £155.1 million from £149.9 million in 2003-04.

Income from other Research Councils was £42 million (£38.3 million in 2003-04). Total income from other Government bodies was £3.8 million (2003-04, £4.7 million). Income from external bodies showed a growth in all areas and rose to £22.1 million (£19.6 million in 2003-04).

Operating expenditure increased from £158.5 million in 2003-04 to £167.9 million in 2004-05, chiefly as a result of the Council's expanded international role reflected in the payment of the UK's subscriptions to ILL and ESRF, £19.7 million (2003-04, £16.9 million). Staff costs also rose, by 4.1%, to £58.0 million from £55.7 million in 2003-04 chiefly because of increased Council pay levels but also because average staff numbers increased from 1740 in 2003-04 to 1794 in 2004-05. Elsewhere, under Expenditure, the sum calculated for Notional cost of Capital increased from £11.6 million in 2003-04 to £13.9 million in 2004-05 due, primarily, to the current significant growth of its asset base.

Excluding the exceptional provisions noted above, £29.0 million (2003-04, zero), the decommissioning discount unwinding of £0.2 million (£3.4 million in 2003-04) and the notional cost of capital, £13.9 million (£11.6 million in 2003-04), the Council recorded a net surplus on operations after interest of £1.1 million (2003-04, £2.9 million surplus).

Total Government Funds at 31 March 2005 amounted to £440.2 million (£356.3 million at 31 March 2004). The major cause of this substantial increase was the sum attributable to the investment in DLSL, £129.8 million (2003-04, £49.3 million).

With regard to its cash flow requirements, with the major change in funding arrangements from 1 April 2003, brought about as one of the outcomes of the CCLRC's Quinquennial Review, a substantial amount of the CCLRC's funding now comes direct from OST and, as a consequence, the latter has formally undertaken to provide for advance funding of the Council's operations if so required. At the end of 2004-05, given the Council's cash position, no such advance was required (2003-04, zero).

Excluding the exceptional provisions noted above, both for 2004-05 and cumulatively, the Council has also remained within its specific budgeted limits agreed with the OST, under the governance of Resource Accounting and Budgeting, the regime by which H.M. Treasury, on behalf of central government, ensures public sector spending is satisfactorily controlled.

Central Laboratory Innovation and Knowledge Transfer Limited

This company, a wholly owned subsidiary of CCLRC, was established at the start of 2002-03 to manage and exploit, commercially, the intellectual property owned by its parent and, to ensure the optimum exploitation of such property in the United Kingdom economy in accordance with H.M.Government policy. Throughout 2004-05, CLIK continued to develop new trading opportunities via the establishment of specific technology spin-out companies and the licensing of it's intellectual property. As is to be expected with a venture of this nature and within its planned budgeted financing, fully underwritten by its parent, the company incurred a trading deficit of £299,000 (2003-04, £147,000 deficit).

Diamond Light Source Limited

Throughout the year, CCLRC continued to be the major shareholder in the Diamond Light Source Limited, a Joint Venture established with the Wellcome Trust Limited for the construction and operation of the Diamond facility, a third generation, medium energy, synchrotron radiation source. The CCLRC shareholding, (86%), is treated as an investment in the CCLRC's accounts. Since it is DLS's policy to capitalise all expenditure during the construction phase, this investment is reflected in the balance sheet of the CCLRC and of the CCLRC Group with the exception of interest receivable, net of a provision for Corporation tax, of which there is a surplus of £285,000 in 2004-05 (2003-04, £112,000) attributable to the CCLRC.

Future developments and events since the end of the financial year

The CCLRC has initiated a number of new strategic and operational initiatives during 2004-05 and implementation and execution of these will continue over the coming year.

Strategic Initiatives:

- Following recommendations arising from the CCLRC QQR Implementation Review and the House of Commons Science and Technology Select Committee, a new organisational structure has been established which will enable the CCLRC to fulfil its strategic and operational roles effectively and without conflict of interest. A Head Office and Laboratory Business Unit structure was announced in January 2005. Issues relating to policy, planning, resource allocation and the provision of strategic advice are the responsibility of the Head Office. Delivery of core operational, research and development outputs are the responsibility of facility, science and technology programmes within the Business Units of the CCLRC laboratories. CCLRC will continue to refine the governance and reporting relationships of the new structure throughout the coming year.

- Strategic Partnership Agreements (SPA) are under development between the CCLRC and five other Research Councils. Initial discussions commenced in September 2004 and building on these, formal agreements and action plans will be signed during 2005. It is anticipated that the benefits arising from implementation of the SPAs will be improvements in high level strategic planning together with improvements in programme-level planning and management. In addition, a wider appreciation of the capabilities of the CCLRC and its laboratories to contribute to achievement of the Government's public sector targets for the Science Budget is foreseen over time.

- CCLRC will continue to progress its participation in campus developments at both the Chilton and Daresbury sites. Discussions with the North West Development Agency and the region's major universities continue, with the strategic aim of improving the effectiveness of CCLRC operations at Daresbury and a fuller integration into the scientific and industrial community in the North West. Similarly, the CCLRC will continue its discussions with the United Kingdom Atomic Energy Authority and other occupants of the adjacent wider Chilton site with a view to the long-term

development and implementation of a science strategy and closer integration of relevant operations and property management for the overall campus.

- During the latter half of 2004, a CCLRC Performance Management System (PMS) was developed. The need to raise the CCLRC capability in this area was highlighted by the Quinquennial Review, the Operational Cost Base Review and the Research Council Internal Audit Service. Implementation of the new PMS commenced in 2004-05 and a phased approach has been adopted to take account of the other organisational changes planned for the same period. The CCLRC will continue to embed the new PMS process during 2005.
- CCLRC will continue to provide strategic advice to government and the RCUK regarding the provision of next generation large research facilities for the UK research community, within its fields of competence. In 2004, the CCLRC was commissioned by the Minister for Science and Innovation to produce a strategy for ensuring continued access for the UK research community to world-class neutron facilities. Scientists from around the UK have been invited to input their views and a report will be produced for submission to the Minister during 2005.

Operational Initiatives:

- Following approvals announced by the Office of Science and Technology in April 2003 and the RCUK, CCLRC will continue with a major project on its Chilton site to enhance the ISIS neutron source through construction of a second target station. Detailed planning and construction of the facility is well underway and will continue throughout 2005 06. The project is due for completion in 2008.
- At its Daresbury site in Cheshire, CCLRC has continued with a research and development programme for the design of a Fourth Generation Light Source (4GLS). An Energy Recovery Linac Project, funded jointly by OST and CCLRC is under construction in order to evaluate the feasibility of this technology for the proposed 4GLS research facility.
- CCLRC has established an SRS Closure Project Management Board to oversee the migration of science programmes between the SRS and Diamond and to manage the phased run-down and closure of the SRS. This is an ongoing programme of work until the SRS closes in December 2008 and will require effective management support for the CCLRC staff involved and planning for the future of the Daresbury Laboratory.
- Following extensive review and preparation, further changes in working practices are intended to reduce administrative costs and focus more resources on to front line science and engineering programmes over the next three years. During 2004, the Chief Executive announced the establishment of a task group to implement changes arising from the CCLRC Operational Cost-Base Review – to enable CCLRC to become 'Fit For The Future' (FFTF). The FFTF task force completed its programme of work in November 2004 and a series of cross cutting teams in the areas of Engineering, Human Resources, Information Technology, Finance and Business Process Re-engineering have been established to take forward actions.

Creditor payment policy

The Council observes the Confederation of British Industry's Code of Practice. The Council adheres to the principles of the Prompt Payers Code and makes every effort to comply with the agreed terms of payment of creditors' invoices, endeavouring to pay them within 30 days of receipt of a valid invoice for goods and services received. During 2004-05 the percentage of all invoices received by the Council which were paid within 30 days was 95% (2003-04 95%). The Council makes purchases using the Government Procurement Card (GPC) and the percentage of invoices paid within 30 days, includes purchases made using the GPC. Three payments totalling £400 were made under the Late Payment Act.

Council Members

The following were members of the Council during the year 2004-05. Their attendance record is also shown:

Chairman		Attendance
Sir Graeme Davies FREng	University of London	5/5
Chief Executive		
Professor John Wood FREng		5/5
Members		
Professor Colin Blakemore to 30 September 2004	Chief Executive, MRC	0/3
Mr John Burrows from 1 April 2004	Business Growth and Development Ltd	3/4
Dr Derek Chadwick	Novartis Foundation	5/5
Professor Mike Cruise	University of Birmingham	3/5
Professor Graham Davies FREng	University of Birmingham	5/5
Mr Stephen Dexter FCA	Grant Thornton	5/5
Professor Robert Donovan from 1 April 2004	University of Edinburgh	4/4
Professor John Durell	University of Manchester	4/5
Professor Julia Goodfellow CBE to 30 September 2004	Chief Executive, BBSRC	0/3
Professor Peter Gregson	Queen's University, Belfast	3/5
Professor Ian Halliday to 30 September 2004	Chief Executive, PPARC	2/3
Ms Anne Kensall	Business Advisor	5/5
Professor John Lawton CBE FRS to 30 September 2004	Chief Executive, NERC	0/3
Professor John O'Reilly FREng to 30 September 2004	Chief Executive, EPSRC	1/3

In accordance with the Council's Royal Charter, members are appointed by the Secretary of State for a term of office not exceeding four years. Members (other than members who are employees of the Council, including the Chief Executive) who are re-appointed for a second term are not again eligible for reappointment until a year has elapsed.

Audit Committee

The Council has an established Audit Committee to review internal and external audit matters, internal control and risk management, and the Council's accounts. The Committee met five times during the year.

The following are members of the Audit Committee, and were in place throughout the financial year. Their attendance record is also shown:

Members of the Audit Committee

		Attendance
Mr Stephen Dexter FCA (Chairman)*	Grant Thornton	5/5
Dr Derek Chadwick	Novartis Foundation	5/5
Mr Marshall Davies	Royal Pharmaceutical Society	4/5
Mrs Gillian Macpherson FCA	Research Machines plc	4/5

*Mr Stephen Dexter retires as Chairman on 31 March 2005 and will be succeeded by Dr Derek Chadwick.

Register of Members' interests

A register of Members' interests is maintained by the Council and held at the Rutherford Appleton Laboratory where it is open to inspection during normal working hours. Copies may be obtained, free of charge, on written request to the Chief Executive at the Laboratory.

Political and charitable gifts

The Council made no political or charitable gifts during the year.

Employee relations and communications

Joint consultation with employee representatives, and formal negotiation on pay and terms and conditions took place through the Whitley Council and its subcommittees, supported by local Committees at the Daresbury Laboratory and Rutherford Appleton Laboratory sites.

The Council's management recognises and appreciates the time and effort which was given by the Trades Union representatives to the consultative processes that aim to ensure a framework of partnership in achieving the objectives of the Council.

Notices and Circulars are distributed regularly to all employees and are accessible on the Council's internal web along with much other information of interest. The Chief Executive gave talks to staff on a regular basis to keep them informed. Similarly, Directors of Departments address their staff and have in place a variety of other arrangements for communicating regularly. An internal newsletter gives news of activities on all the Council's sites.

Equality of opportunity

The Council is committed to equality of opportunity in the workplace and has policies and procedures in place to ensure that employment and advancement are judged solely on the basis of ability, qualifications and suitability for the work available. Regular monitoring is carried out to ensure that these procedures are operating effectively. Recruitment by the Council is undertaken on the basis of fair and open competition, and the Council has adopted the policy statements on equal opportunities and on race relations issued by the Cabinet Office.

The Council pays particular attention to supporting those with family or other caring responsibilities by means of flexible working arrangements and other forms of support including part-time working, job sharing and career breaks. The workplace nursery provided by the Council at the Rutherford Appleton Laboratory continues to operate at full capacity.

The Council's policy is that disablement is no bar to recruitment or to advancement within its workforce. Applicants with disabilities are given full and fair consideration for any vacancy. The Council has carried out detailed reviews on both its sites in order to ensure that, wherever possible, physical barriers to mobility are removed which is felt to be in full compliance with the Disability Discrimination Act 1995. The Council has long-standing links with groups and organisations which promote the employment of people with disabilities.

Investors in People

CCLRC was first recognised as an Investor in People in May 2001 and this was renewed following external assessment in December 2004. The next reassessment is due in June 2006.

Health and Safety

The CCLRC continues to provide and maintain safe and healthy working conditions, equipment and systems of work for all its employees, contractors, tenants and visitors. Whilst the CCLRC carries out induction, refresher and fire safety training for all of the individuals who are present on the site in one capacity or another, they are required to comply with site rules, CCLRC Codes, Notices and Procedures in the same manner as though they were all employees. For this purpose the CCLRC maintains a list of local accident reports, near misses, dangerous occurrences, information sheets and appropriate statistics which are reported to the Council and to the Operations Board.

The principal sites of CCLRC i.e. Daresbury (DL) and Rutherford Appleton Laboratories (RAL), both received Gold Medal Awards which were presented by the Royal Society for the Prevention of Accidents (ROSPA), for their outstanding records concerning accident statistics and health and safety performance levels.

Safety Committees, including representatives of the workforce meet on a regular basis for each department and collectively for each site. They consider accident reports, statistics and draft copies of proposed codes, notices and procedures as well as anything which the safety representatives consider appropriate. The Safety Health & Environment (SHE) Group and the Radiation Protection Advisers (RPA) monitor safety performance levels and report such matters to the Directors and to the Departmental Safety Committees as well as to the Daresbury and Rutherford Appleton Laboratory Site Safety Committees.

One of the key safety performance indicators which is also reportable to the Health and Safety Executive in the form of RIDDORS (serious accidents), is the number of such accidents to employees which includes those involving more than three days absence from work*. In 2004-5 there was one such reportable incident which gave rise to an employee incidence rate of 0.56 per 1,000 employees. The RIDDOR accident occurred as a result of the person having more than 3 days off work. The rate compares favourably with 2003-04 when there were 9 serious accidents. It also compares favourably with other Research Councils. In 2004-05 there were a total of 84 accidents on the sites.

Statistics	1999-00	2000-01	2001-02	2002-03	2003-04	2004-05
Total accidents to employees	85	109	78	94	89	84
Accidents to contractors	13	12	14	16	18	15
Accidents to users/visitors/tenants	3	11	6	10	9	8
Reportable accidents to employees*	5	9	3	6	9	1
Reportable accidents to contractors/users/visitors/tenants	0	0	2	2	0	0
Reportable lost time accidents per 1,000 employees	2.80	5.04	1.68	3.36	5.04	0.56

Both of the RPAs for the main sites gained the legally required Certificate of Competence this year from the recognised assessing body of the Health & Safety Executive (HSE). Landauer continued to provide an approved HSE, dosimetry service for both DL and RAL. The highest occupational radiation dose levels received by individuals at the DL and the RAL were a small fraction of the dose limit and complied easily with the ALARP1 figures. From an occupational health point of view, the RPA for DL was actively involved with the Synchrotron Radiation Source (SRS) and the Energy Recovery Linac Prototype (ERLP). A similar officer at RAL was involved with the ISIS facility and the ISIS Target 2 station.

(1. **ALARP** is an approach to occupational, public and environmental protection measures by which radiation exposures and releases of radioactive material to the environment are managed and controlled to levels 'as low as reasonably practicable'. They must be below applicable regulatory limits. The annual occupational doses will not exceed 1 millisievert. For members of the public, who are beyond the boundaries of CCLRC sites where contributions from non-CCLRC controlled radiation sources is possible, the annual effective dose from CCLRC premises will not exceed 0.3 millisievert.)

The in-hutch radiation monitoring arrangements in the SRS were considered to be unreliable and, following discussions with the SR Department Safety Committee, they were removed. Safety documentation for the operation of the ERLP project, continues to be produced. Two Radiation Protection Supervisors have been appointed by CCLRC and 11 radiation monitors have been purchased for the ERLP. The radiation monitors are similar in design to the Diamond Project in Oxfordshire.

The Environment

The CCLRC is subject to the same regulatory requirements as that which applies to industry. The Environmental Audit Committee (EAC) for Central Government stated in 1999 that it expects each Non-Departmental Public Body to have an environmental policy and to have environmental targets. CCLRC complies with that statement.

CCLRC is developing an Environment Management System in accordance with the ISO 14001 Standard which will combine with health and safety to form a Safety, Health & Environmental Management System. The CCLRC has an environmental policy which it is due to review at the end of 2005. The CCLRC has established a target to avoid any leakages or spillages of oil or chemicals into the canal which delineates the western boundary of the Daresbury facility. It has also avoided any complaints from members of the public or the Environment Agency (EA).

The recycling of materials at both of the main sites included printer cartridges, fluorescent tubes, monitors, re-issued furniture, drink cans, scrap metal and other office and workshop wastes. At RAL, the recycled waste materials included 25 tonnes of waste paper, 50 tonnes of cardboard (Sita Recycling make a charge for the disposal of cardboard), 6.5 tonnes of monitors and approximately 420 printer cartridges (user departments will now be recycling their own). It was anticipated that re-issued furniture saved over £20,000 for the site. In addition over 417 tonnes of ferrous metals, 6.56 tonnes of cable and 9.3 tonnes of non ferrous metals were recycled, providing a total of over £14,000 for recycled metals on the site. The provision of 'Care and Custody' raised separately over £62,000.

The ISIS Facility at RAL produces small quantities of radioactive gas, mainly tritium, which is discharged into the atmosphere via monitored ventilation stacks. The EA authorises the airborne emissions of the radioactive gas and sets allowable limits. Measured levels were well within the authorised limits of 2,500 GBq for tritium and 200 TBq for other nuclides. Quantities of low to medium level radioactive solid and liquid wastes are routinely generated as an unavoidable consequence of ISIS operations at RAL. Authorisation was also given at RAL for trade effluents to be discharged to the foul sewer by Southern Water. Annual Pollution Inventory returns submitted to the Environment Agency showed that no returns under DL's Radioactive Substances Act 1993 were completed this year.

All of the disposals to the atmosphere, sewers, streams/canals and to landfill sites were completed in compliance with the requirements of the Environment Agency.

Remuneration Committee

The Council has established a Remuneration Committee to review the remuneration of senior staff. The membership is:

Sir Graeme Davies, Chairman and Chairman of Council
Mr Stephen Dexter, Council Member
Ms Anne Kensall, Council Member
Professor John Wood, Chief Executive
Mr Paul Hartley, Secretary

The Committee met twice during the year.

The Committee works to agreed terms of reference which, following a review in mid-2003, are deemed to be in accordance with the Higgs Review of the role and effectiveness of Non-Executive Directors.

Risk management

In accordance with the best practice requirements of the Turnbull Report (the Combined Code), HM Treasury has established a Risk Management Standard that all Government Bodies are required to maintain. The Standard is incorporated within Chapter 21 of 'Government Accounting'. CCLRC is deemed to be in full compliance with this Standard, and has been throughout the period of these Accounts. This requirement remains under regular review by both the Audit Committee and the Operating Board.

Auditors

The accounts of the Council are audited by the Comptroller and Auditor General under the terms of section 2(2) of the Science and Technology Act 1965.

Signed: **J V Wood**,
Accounting Officer.
Date: 7 June 2005

Statement of the system of internal control

Scope of responsibilities

As Accounting Officer, I have responsibility for maintaining a sound system of internal control that supports the achievement of policies, aims and objectives set by the Council for the Central Laboratory of the Research Councils (CCLRC), whilst safeguarding the public funds and assets for which I am personally responsible, which is in accordance with the responsibilities assigned to me in 'Government Accounting' and my letter of appointment from the Accounting Officer of the Department of Trade and Industry.

The purpose of the system of internal control

The system of internal control is designed to manage risk to a reasonable level rather than to eliminate all risk of failure to achieve policies, aims and objectives; it can therefore only provide reasonable and not absolute assurance of effectiveness.

The system of internal control at CCLRC is based on an ongoing process designed to identify and prioritise the principal risks to the achievement of the Council's policies, aims and objectives, to evaluate the likelihood of those risks being realised and the impact should they be realised, and to manage them efficiently, effectively and economically. The system of internal control has been in place throughout CCLRC for the year ended 31 March 2005 and up to the date of approval of the annual report and accounts, and accords with Treasury guidance.

Capacity to handle risk

As Accounting Officer, I accept full responsibility for the identification, management and treatment of risk across CCLRC. I discharge this responsibility through a series of reviews, at both departmental and corporate level, conducted by Departmental Directors and a Risk Committee chaired by a Science Director. A programme of general risk management training has been made available to all staff, and specific training is available where required, especially in the key areas of Project Management and Health & Safety. The culture continues to move on from risk avoidance to one of well managed risk-taking, derived from experience and the sharing of good practice, both within CCLRC and with the other Research Councils who have similar practices in place.

The risk and control framework

The management of risk is embedded in policymaking, planning and delivery through the awareness of staff at all levels, supported and encouraged by the Council, its Audit Committee and the Operations Board, who have recorded their ongoing interest in the development of this culture. The original CCLRC Risk Policy, devised in October 2000, determined an acceptable level of risk ('risk appetite') for the organisation as a whole, although individual functions are encouraged to define their own risk appetites relevant to their own operations and customer base.

I would particularly wish to highlight the key importance of Health and Safety issues to the work of CCLRC, which continues to have a high profile. RoSPA Gold Medal Awards, representing the award of Gold Medals for five consecutive years, were made to both of the Council's key sites during 2004/2005. The level of reportable accidents, and liability claims made against the Council, are now Standing Items for consideration at each meeting of the Audit Committee.

Review of effectiveness

As Accounting Officer, I also have responsibility for reviewing the effectiveness of the system of internal control at CCLRC. My review of the effectiveness of the system of internal control is informed by the work of the internal auditors and the executive managers throughout CCLRC who have responsibility for the development and maintenance of the internal control framework, and comments made by the external auditors in their management letter and other reports. I have been advised on the implications of the result of my review of the effectiveness of the system of internal control by the Operations Board and the Audit Committee, and a plan to address weaknesses and ensure continuous improvement of the system is in place.

I place reliance on a framework of regular management information, sound and documented administrative procedures including the segregation of duties, and a system of delegation and accountability from myself to Directors, which is currently under review in light of the 'Fit for the Future' reorganisation. This management culture is enhanced by the involvement of a respected independent Chairman and Non-Executive Members on a number of key Committees, notably the Audit Committee. Particular strengths of the system of internal control are seen as:

a) comprehensive budgeting systems with an Operating Plan (annual budget) which is reviewed and agreed by the Programme Board (replaced by the Head Office Board from December 2004), as well as the Full Council;

b) regular reviews by the Finance Operations Committee and the Operations Board of monthly and annual financial reports, which measure financial performance as well as rolling outturn forecasts and cash flow projections;

c) clear objective setting (in accordance with the Strategic Plan), monitored both by the Boards and Committees referred to above, as well as down to the level of individual officers;

d) formal project management disciplines, to International Standards, covering both capital spend and CCLRC's involvement in significant joint working initiatives with other scientific organisations, which are regularly reviewed by the Operations Board and the Audit Committee.

CCLRC benefits from the services of an independent Internal Audit provided by the Research Councils' Internal Audit Service (RCIAS), which operates to the Government Internal Audit Standards (GIAS). The work of internal audit is informed by an analysis of the risks to which CCLRC is exposed, and annual internal audit plans are drawn up on this basis. The analysis of risk and the internal audit plans are endorsed by CCLRC's Audit Committee and approved by me. On an annual basis, the Director of Internal Audit (DIA) of the RCIAS provides me with a report on internal audit activity within CCLRC. The report includes the DIA's independent opinion on the adequacy and effectiveness of CCLRC's system of internal control, which also provides an independent view on the validity of this Statement on the system of Internal Control. I am pleased to note that the Council's internal controls for the current year have received positive reasonable assurance from Internal Audit.

All the above procedures and controls are regularly considered by the Audit Committee, composed of Non-Executive Members but with myself, the Finance Director, and representatives of both External and Internal Audit in attendance. The Committee met on five occasions during 2004/2005. The Committee undertakes a number of duties on behalf of the Council, the most notable of which is the full consideration of the Annual Accounts. The structure and work of this Committee has been recommended to Government as an example of best practice.

Since 2002/2003 I have highlighted the Diamond Light Source (DLS) as a significant internal control issue, and I still believe this to be the case. This, the largest investment in UK Science for 30 years, is being built adjacent to the CCLRC's Rutherford Appleton site under the management of a Limited Company established for that specific purpose. CCLRC acts, on behalf of the Office of Science and Technology, as Primary Shareholder in the Company, with the remaining shares being held by the Wellcome Trust. There are significant challenges in bringing this project to fruition within the budget and timescale identified, while fully meeting the expectations of the international scientific community. This process continues to be closely managed through ongoing consultation with the various parties involved, and with the oversight of the Audit Committee on behalf of the Council.

However, in the light of improvements in financial and project management reporting instituted by DLS during 2004/2005, I do not believe that this issue is prejudicial to this Statement.

During 2004/2005, I launched a reorganisation of CCLRC called 'Fit for the Future', both to achieve operational efficiencies and to establish independence between the strategic advice and operational functions of CCLRC, as required by the Parliamentary Science and Technology Committee. This reorganisation will require significant revision to the internal control environment of CCLRC, and also its governance and reporting processes. These will be put in place during 2005/2006, and completed by 1 April 2006. Until that process is completed to the satisfaction of Council (through its Audit Committee) and external stakeholders such as the Office of Science and Technology and the National Audit Office, I deem it appropriate to regard this reorganisation as a significant internal control issue.

Signed: **J V Wood**,
Accounting Officer.
Date: 7 June 2005

Statement of the Council's and Chief Executive's responsibilities with respect to financial statements

Under Section 2(2) of the Science and Technology Act 1965 the Council is required to prepare a statement of accounts for each financial year in the form and on the basis directed by the Secretary of State for Trade and Industry, with the consent of the Treasury. The accounts are prepared on an accruals basis and must show a true and fair view of the Council's state of affairs at the year end and of its income, expenditure and cash flows for the financial year.

In preparing the accounts the Council is required to:

- observe the accounts Direction issued by the Secretary of State for Trade and Industry, including the relevant accounting and disclosure requirements, and apply suitable accounting policies on a consistent basis;
- make judgements and estimates on a reasonable basis;
- state whether applicable accounting standards have been followed, and disclose and explain any material departures in the financial statements;
- prepare the financial statements on the going concern basis, unless it is inappropriate to presume that the Council will continue in operation.

The Accounting Officer for the Department of Trade and Industry has designated the Chief Executive of the Council for the Central Laboratory of the Research Councils as the Accounting Officer for the Council. His relevant responsibilities as Accounting Officer, including his responsibility for the propriety and regularity of the public finances for which he is answerable and for the keeping of proper records, are set out in the 'Non-Departmental Public Bodies' Accounting Officers' Memorandum', issued by the Treasury and published in 'Government Accounting'.

The Council's Accounting Officer is also responsible for maintaining the integrity of the financial statements posted on its website.

The certificate and report of the Comptroller and Auditor General to the Houses of Parliament

I certify that I have audited the financial statements on pages 87 to 119 under the Science and Technology Act 1965. These financial statements have been prepared under the historical cost convention as modified by the revaluation of certain fixed assets and the accounting policies set out on pages 91 to 94

Respective responsibilities of the Council, the Chief Executive and Auditor

As described on page 84, the Council and Chief Executive are responsible for the preparation of the financial statements in accordance with the Science and Technology Act 1965 and Secretary of State for Trade and Industry directions made thereunder, and for ensuring the regularity of financial transactions. The Council and Chief Executive are also responsible for the preparation of the other contents of the Annual Report. My responsibilities, as independent auditor, are established by statute and I have regard to the standards and guidance issued by the Auditing Practices Board and the ethical guidance applicable to the auditing profession.

I report my opinion as to whether the financial statements give a true and fair view and are properly prepared in accordance with the Science and Technology Act 1965 and Secretary of State for Trade and Industry directions made thereunder, and whether in all material respects the expenditure and income have been applied to the purposes intended by Parliament and the financial transactions conform to the authorities which govern them. I also report if, in my opinion, the Foreword is not consistent with the financial statements, if the Council has not kept proper accounting records, or if I have not received all the information and explanations I require for my audit.

I read the other information contained in the Annual Report and consider whether it is consistent with the audited financial statements. I consider the implications for my certificate if I become aware of any apparent misstatements or material inconsistencies with the financial statements.

I review whether the statement on pages 81, 82 and 83 reflects the Council's compliance with Treasury's guidance on the Statement on Internal Control. I report if it does not meet the requirements specified by Treasury, or if the statement is misleading or inconsistent with other information I am aware of from my audit of the financial statements. I am not required to consider, nor have I considered whether the Accounting Officer's Statement on Internal Control covers all risks and controls. I am also not required to form an opinion on the effectiveness of the Council's corporate governance procedures or its risk and control procedures.

Basis of audit opinion

I conducted my audit in accordance with United Kingdom Auditing Standards issued by the Auditing Practices Board. An audit includes examination, on a test basis, of evidence relevant to the amounts, disclosures and regularity of financial transactions included in the financial statements. It also includes an assessment of the significant estimates and judgements made by the Council and Chief Executive in the preparation of the financial statements, and of whether the accounting policies are appropriate to the Council's circumstances, consistently applied and adequately disclosed.

I planned and performed my audit so as to obtain all the information and explanations which I considered necessary in order to provide me with sufficient evidence to give reasonable assurance that the financial statements are free from material misstatement, whether caused by error, or by fraud or other irregularity and that, in all material respects, the expenditure and income have been applied to the purposes intended by Parliament and the financial transactions conform

to the authorities which govern them. In forming my opinion I have also evaluated the overall adequacy of the presentation of information in the financial statements.

Opinion

In my opinion:

- the financial statements give a true and fair view of the state of affairs of the Council for the Central Laboratory of the Research Councils and the consolidated state of affairs at 31 March 2005 and of the consolidated deficit, total recognised gains and losses and cash flows of the group for the year then ended and have been properly prepared in accordance with the Science and Technology Act 1965 and directions made thereunder by Secretary of State for Trade and Industry; and
- in all material respects the expenditure and income have been applied to the purposes intended by Parliament and the financial transactions conform to the authorities which govern them.

I have no observations to make on these financial statements.

John Bourn
Comptroller and Auditor General
20 June 2005

National Audit Office
157-197 Buckingham Palace Road
Victoria
London SW1W 9SP

Consolidated income and expenditure account for year ended 31 March 2005

	Notes	CCLRC GROUP 2004-05 £'000	INTEREST IN DLS JOINT VENTURE 2004-05 £'000	CONSOLI-DATED TOTAL 2004-05 £'000	CONSOLI-DATED TOTAL 2003-04 £'000
Income					
Income from operating activities	2	67,865	0	67,865	62,587
Grant in Aid	3	66,382	0	66,382	62,557
Release of deferred income	13	20,864	0	20,864	24,748
Total income		**155,111**	**0**	**155,111**	**149,892**
Expenditure					
Staff costs	5	58,008	0	58,008	55,744
Restructuring	6	527	0	527	1,576
International subscriptions		19,668	0	19,668	16,897
Equipment and supplies		20,643	0	20,643	18,808
Services		18,496	0	18,496	17,140
Depreciation	8	21,285	0	21,285	22,577
Notional cost of capital		13,872	0	13,872	11,573
Other operating costs	7	15,406	0	15,406	14,202
Total expenditure		**167,905**	**0**	**167,905**	**158,517**
Operating deficit for the year		(12,794)	0	(12,794)	(8,625)
Provisions made in year		(28,954)	0	(28,954)	0
Operating deficit for the year before interest		(41,748)	0	(41,748)	(8,625)
Interest receiveable	4	0	407	407	174
Unwinding of discount on decommisssioning	12	(226)	0	(226)	(3,371)
Operating (deficit)/surplus for the year after interest receivable and interest charges		(41,974)	407	(41,567)	(11,822)
Tax on operating (deficit)/surplus		0	(122)	(122)	(62)
Operating (deficit)/surplus for the year after tax		**(41,974)**	**285**	**(41,689)**	**(11,884)**
Loss on disposal of assets		(319)	0	(319)	(2,673)
Reversal of notional cost of capital		13,872	0	13,872	11,573
Transfer from reserves	14	951	0	951	852
		14,504	**0**	**14,504**	**9,752**
(Deficit)/surplus for the year		**(27,470)**	**285**	**(27,185)**	**(2,132)**
Accumulated surplus/(deficit) brought forward		(1,996)	187	(1,809)	323
Accumulated surplus/(deficit) carried forward		**(29,466)**	**472**	**(28,994)**	**(1,809)**

All activities are continuing
The notes on pages 91 to 119 form part of these accounts.

Consolidated balance sheet as at 31 March 2005

	Notes	CCLRC GROUP 31/03/05 £'000	INTEREST IN DLS JOINT VENTURE 31/03/05 £'000	CONSOLIDATED TOTAL 31/03/05 £'000	CONSOLIDATED TOTAL 31/03/04 £'000
Fixed assets					
Tangible assets	8	339,932	143,196	483,128	360,133
Investment in joint venture	9	129,759	(129,759)	0	0
		469,691	**13,437**	**483,128**	**360,133**
Current assets					
Stocks		195	0	195	264
Debtors and prepayments					
– amounts falling due after one year	10	1,960	0	1,960	2,498
– amounts falling due within one year	10	21,391	2,526	23,917	17,515
Cash at bank and in hand	17	5,505	7,471	12,976	12,302
		29,051	**9,997**	**39,048**	**32,579**
Creditors					
Amounts falling due within one year	11	(21,381)	(9,649)	(31,030)	(24,464)
Net current assets		7,670	348	8,018	8,115
Total assets less current liabilities		**477,361**	**13,785**	**491,146**	**368,248**
Accrued liabilities and charges					
Creditors (amounts falling due after more than one year)	11	(1,508)	(1,270)	(2,778)	(1,892)
Provisions	12	(35,628)	(12,043)	(47,671)	(9,891)
Total assets less liabilities		**440,225**	**472**	**440,697**	**356,465**
Financed by:					
Capital and Reserves					
Deferred income	13	375,275	0	375,275	273,580
Revaluation reserve	14	94,416	0	94,416	84,694
Accumulated surplus/(deficit)	14	(29,466)	472	(28,994)	(1,809)
Government funds	15	**440,225**	**472**	**440,697**	**356,465**

Signed: J V Wood Date: 7 June 2005
Accounting Officer

The notes on pages 91 to 119 form part of these accounts.

CCLRC balance sheet as at 31 March 2005

	Notes	31/03/05 £'000	31/03/04 £'000
Fixed assets			
Tangible assets	8	339,932	308,925
Investments in joint ventures	9	129,759	49,349
		469,691	**358,274**
Current assets			
Stocks		195	264
Debtors and prepayments			
– amounts falling due after one year	10	1,960	2,498
– amounts falling due within one year	10	21,915	15,257
Cash at bank and in hand	17	5,142	5,898
		29,212	**23,917**
Creditors			
Amounts falling due within one year	11	(21,069)	(17,399)
Net current assets		8,143	6,518
Total assets less current liabilities		**477,834**	**364,792**
Accrued liabilities and charges			
Creditors (amounts falling due after more than one year)	11	(1,508)	(1,892)
Provisions	12	(35,628)	(6,448)
Total accrued liabilities and charges		**(37,136)**	**(8,340)**
Total assets less liabilities		**440,698**	**356,452**
Financed by:			
Capital and Reserves			
Deferred income	13	375,275	273,580
Revaluation reserve	14	94,416	84,694
Accumulated (deficit)	14	(28,993)	(1,822)
Government funds	15	**440,698**	**356,452**

Signed: J V Wood Date: 7 June 2005
Accounting Officer

The notes on pages 91 to 119 form part of these accounts

Consolidated cash flow statement for the year ended 31 March 2005

	Notes	2005 £'000	2004 £'000
Net cash (outflow) from operating activities	16	(617)	(1,111)
Capital expenditure			
Payments to acquire tangible fixed assets		(42,149)	(27,458)
Cash proceeds from disposal of fixed assets		211	348
Payments to acquire investment in joint venture		(80,410)	(34,400)
Financing			
Capital grant received		122,559	61,859
(Decrease) in cash		**(406)**	**(762)**
Reconciliation of net cash flow to movement in net funds	17		
(Decrease) in cash in the period		(406)	(762)
Change in net funds		(406)	(762)
Net funds at 1 April		**5,911**	**6,673**
Net funds at 31 March		**5,505**	**5,911**

Consolidated statement of total recognised gains and losses for the year ended 31 March 2005

	CCLRC GROUP	INTEREST IN DLS JOINT VENTURE	CONSOLI-DATED TOTAL	CONSOLI-DATED TOTAL
	2004-05 £'000	2004-05 £'000	2004-05 £'000	2003-04 £'000
Surplus/(deficit) for the year	(27,470)	285	(27,185)	(2,132)
Net surplus on revaluation of fixed assets	9,722	0	9,722	8,538
Total recognised (losses)/gains for the year	**(17,748)**	**285**	**(17,463)**	**6,406**

The notes on pages 91 to 119 form part of these accounts

Notes to the Accounts

1 Accounting policies

1.1 Basis of accounting

The accounts have been prepared in accordance with a Direction issued by the Secretary of State for Trade and Industry in pursuance of Section 2(2) of the Science and Technology Act 1965.

The accounts have been prepared under the historical cost convention, modified to include the revaluation of fixed assets. Without limiting the information given, the accounts meet the accounting and disclosure requirements of the Companies Act 1985 and the accounting and financial reporting standards issued or adopted by the Accounting Standards Board in so far as these requirements are appropriate. The accounting policies have been applied consistently in dealing with items considered material in relation to the accounts.

1.2 Basis of consolidation

Interests in subsidiary undertakings and joint ventures are accounted for in accordance with the principles of gross equity accounting as required under Financial Reporting Standard 9.

The Council holds the majority shareholding in the joint venture company DLS Limited. Under the terms of the joint venture agreement, control is shared jointly with the minority shareholder, the Wellcome Trust. The results of DLS Limited are therefore accounted for as a joint venture rather than a subsidiary.

1.3 Fixed assets

Land and buildings are included in the balance sheet at open market value for existing use, or depreciated replacement cost in the case of specialised buildings. Professional valuations are obtained every five years and are revised in the intervening years by use of appropriate indices.

Items of plant and equipment costing over £3,000 are included at current replacement cost less an allowance for depreciation. Professional valuations are obtained every five years and are revised in the intervening years by use of appropriate indices.

Assets under construction are valued at cost, including directly attributable in house costs required to bring the asset into working condition for its intended use. In house costs include directly attributable overheads. Abnormal costs are not capitalised. Once brought into use, any variation between the actual value of the asset and the carrying value of the asset under construction is adjusted through the Income and Expenditure Account.

Surpluses or deficits on revaluation are taken to the revaluation reserve except that any permanent diminution in value is charged to the Income and Expenditure Account when recognised. The revaluation reserve was set at zero on 1 April 1996.

1.4 Depreciation

Freehold land is not depreciated. Depreciation is charged on all other tangible fixed assets at rates calculated to write down the valuation of each asset to its estimated residual value evenly over its expected useful life. Average estimated useful lives are as follows:

Freehold buildings	60 years
Plant and machinery	20 years
Scientific equipment	15 years
Electronic scientific equipment	10 years
Computers and information technology	5 years
Vehicles	4 years
Personal computers	3 years
Leased assets	Term of lease

Fixed assets are depreciated as soon as they are brought into use. Assets under construction are not depreciated until they are brought into use.

1.5 Stocks and long term contract balances

Stocks are valued at the lower of current replacement cost and net realisable value.

Long term contracts, comprising individual pieces of research undertaken for private companies, are valued at the lower of cost, including appropriate overheads, and net realisable value. Full provision is made for all known and expected losses to completion immediately such losses are forecast on each contract.

1.6 Grant in Aid

Grant in Aid is provided by the Department of Trade and Industry (Science) and is credited to the Income and Expenditure Account when earned, or applied to the purchase and construction of capital equipment when expenditure occurs.

1.7 Income from operating activities

Amounts due annually from other Research Councils under general service level agreements are credited to the Income and Expenditure Account when due, except that amounts applied to the purchase of fixed assets are credited to the deferred income account and released to the Income and Expenditure Account over the working lives of the assets concerned. Income received in advance is treated as a creditor.

Grants receivable for specific research projects from other Research Councils, higher education institutions, government departments and the European Commission are credited to the Income and Expenditure Account except that amounts applied to the purchase of fixed assets are credited to the deferred income account and released to the Income and Expenditure Account over the working lives of the assets concerned.

Amounts receivable from the European Commission and foreign governments for general or specific use of the Council's research facilities are credited to the Income and Expenditure Account when due under the terms of the agreement or

when specific use is made of the facilities as appropriate, except that amounts applied to the purchase of fixed assets are credited to the deferred income account and released to the Income and Expenditure Account over the working lives of the assets concerned.

For construction or design contracts with companies and other organisations, income is calculated as the value of work carried out during the year, including amounts not invoiced.

1.8 Deferred income

Deferred income consists of deferred Grant in Aid and deferred capital.

The deferred Grant in Aid reserve was set up at 1 April 1996 representing the sums invested in fixed assets by the Council and its predecessor bodies from their annual Grant in Aid.

Grant in Aid received for the purchase and construction of fixed assets is credited when expenditure is incurred.

Amounts received from customers for the purchase and construction of fixed assets are credited when expenditure is incurred.

Amounts are released to the Income and Expenditure Account over the lifetime of the assets.

1.9 Research and development

The Council's expenditure on research and development is charged to the Income and Expenditure Account when incurred.

1.10 Decommissioning costs

Decommissioning costs are recognised in full as soon as the obligation exists i.e. when the technical facility has been commissioned. An asset is set up with depreciation being charged to the Income and Expenditure Account over its estimated useful life.

A provision is established, representing the current value of the expected future costs of decommissioning the Council's technical facilities and the interest due is charged to the Income and Expenditure Account over the estimated working lives of the related assets and credited to a provision for liabilities and charges.

1.11 Pensions

Contributions to the United Kingdom Atomic Energy Authority (UKAEA) Pension Scheme and the Research Councils Pension Scheme are charged to the Income and Expenditure Account in accordance with actuarial recommendations so as to spread the cost of the pensions over the employees' expected working lives.

Liability for the payment of future benefits is a charge on the UKAEA Pension Scheme and the Research Councils Pension Scheme.

1.12 Early departure costs

The costs of early retirement or severance up to 31 March 2005 are charged to the Income and Expenditure Account when the early departures are agreed. The costs are net of the lump sums recoverable from the pension schemes when the individual reaches normal retirement age.

A provision has been established for the costs of early retirement or severance from 1 April 2005 onwards.

1.13 Value Added Tax

The Council is registered for VAT jointly with five other Research Councils. Expenditure and fixed asset additions are stated net of recoverable VAT. Irrecoverable VAT is charged to the most appropriate expenditure or fixed asset heading. Non-attributable VAT recovered through the group arrangement is credited to income when received.

1.14 Foreign currency

Transactions denominated in foreign currency are translated at the rate of exchange ruling on the date of the transaction unless covered by a forward contract. Assets and liabilities denominated in foreign currency are translated at the rate of exchange ruling at the balance sheet date.

Transaction and translation gains and losses are credited or charged to the Income and Expenditure Account.

1.15 Insurance

As a public body, the Council does not generally insure. However, the Council has decided, with the agreement of the Office of Science and Technology, that risks relating to certain commercial contracts entered into by the Council should be commercially insured. Insurance premiums are charged to the Income and Expenditure Account.

1.16 Capital charge

As directed by the Secretary of State for Trade and Industry, a capital charge reflecting the cost of capital employed is calculated at 3.5% of average net assets employed during the year and included in operating costs. In accordance with Treasury guidance the notional charge is credited back to the Income and Expenditure Account before taking the result for the year to the general reserve.

2 Income from operating activities

	CCLRC GROUP	INTEREST IN DLS JOINT VENTURE	CONSOLI-DATED TOTAL	CONSOLI-DATED TOTAL
	2004-05 £'000	**2004-05** £'000	**2004-05** £'000	**2003-04** £'000
UK Research Councils				
Biotechnology and Biological Sciences Research Council	335	0	335	781
Engineering and Physical Sciences Research Council	8,323	0	8,323	8,760
Medical Research Council	36	0	36	387
Natural Environment Research Council	3,099	0	3,099	2,673
Particle Physics and Astronomy Research Council	30,164	0	30,164	25,735
	41,957	**0**	**41,957**	**38,336**
Government departments				
Department of Trade and Industry	1,438	0	1,438	3,168
Other	2,398	0	2,398	1,522
	3,836	**0**	**3,836**	**4,690**
External bodies				
Universities	2,885	0	2,885	2,636
European Commission	3,865	0	3,865	3,567
Other overseas	9,774	0	9,774	9,347
Private sector	3,844	0	3,844	2,179
Domestic	1,704	0	1,704	1,832
	22,072	**0**	**22,072**	**19,561**
Total	**67,865**	**0**	**67,865**	**62,587**

3 Grant in Aid

	CCLRC GROUP	INTEREST IN DLS JOINT VENTURE	CONSOLI-DATED TOTAL	CONSOLI-DATED TOTAL
	2004-05 £'000	**2004-05** £'000	**2004-05** £'000	**2003-04** £'000
Grant in Aid (DTI Science)	101,000	0	101,000	76,659
DLS Grant in Aid (DTI Science)	80,410	0	80,410	33,620
Grant in Aid brought forward	(2,829)	0	(2,829)	6,909
DLS Grant in Aid brought forward	45	0	45	619
Less capital expenditure	(38,064)	0	(38,064)	(24,346)
Less DLS capital expenditure	(80,410)	0	(80,410)	(33,688)
	60,152	**0**	**60,152**	**59,773**
Grant in Aid carried forward	6,275	0	6,275	2,829
DLS Grant in Aid carried forward	(45)	0	(45)	(45)
Grant in Aid income for year	**66,382**	**0**	**66,382**	**62,557**

4 Interest receivable

	CCLRC GROUP	INTEREST IN DLS JOINT VENTURE	CONSOLI-DATED TOTAL	CONSOLI-DATED TOTAL
	2004-05 £'000	**2004-05** £'000	**2004-05** £'000	**2003-04** £'000
Interest receivable	0	407	407	216
Less interest payable	0	1	1	(3)
Less foreign exchange losses	0	(1)	(1)	(39)
	0	**407**	**407**	**174**

5 Staffing

Staff costs	CCLRC GROUP 2004-05 £'000	INTEREST IN DLS JOINT VENTURE 2004-05 £'000	CONSOLI-DATED TOTAL 2004-05 £'000	CONSOLI-DATED TOTAL 2003-04 £'000
Salaries and wages	53,937	0	53,937	51,705
Social security costs	4,380	0	4,380	4,185
Superannuation	4,691	0	4,691	4,423
Total payroll costs	**63,008**	**0**	**63,008**	**60,313**
Capitalised pay costs*	(3,992)	0	(3,992)	(3,146)
Pay costs capitalised by DLS**	(1,008)	0	(1,008)	(1,423)
Staff costs charged to the income and expenditure account	**58,008**	**0**	**58,008**	**55,744**

* *The capitalised pay costs are accounted for in the group balance sheet as part of assets under construction (note 8).*

** *The pay costs capitalised by DLS are accounted for in the consolidated balance sheet as part of the DLS investment (note 9)*

Superannuation

The employees of the Council are members of either the Principal Non-Industrial Superannuation Scheme of the United Kingdom Atomic Energy Authority (the PNISS) or the Research Councils' Pensions Scheme (the RCPS).

The PNISS is a notionally funded, contributory scheme. Employees who are members of the PNISS make pensions contributions at the rate of 7.5% of pensionable pay. The Council makes employer's contributions at a rate determined from time to time after actuarial assessment of assets and liabilities. In 2004-05 no employer's contributions were required from the Council, but following the Government Actuary's Department's (GAD's) assessment this year, an employer contribution of 14% will be required from 1 April 2006.

The PNISS is a defined benefit scheme and a separate PNISS Scheme account is produced by the United Kingdom Atomic Energy Authority that recognises the scheme liability in accordance with FRS 17 as interpreted by FRAB for use in the public sector.

The RCPS is in all respects 'by-analogy' with the Principal Civil Service Pension Scheme, except that the employer's contribution is determined separately on the recommendation of the GAD. It is a notionally funded, contributory, defined benefit scheme, and is administered by the Research Councils' Joint Superannuation Services. The Scheme's accounts are prepared by the Biotechnology and Biological Sciences Research Council (BBSRC) on behalf of the Chief Executive of BBSRC as Accounting Officer for the RCPS, and contain the further disclosure information required under FRS17 as interpreted by FRAB for use in the public sector. The employer's contribution is agreed by the RCPS Board of Management on the recommendation of the GAD's and in 2004-05 was 10.1% of pensionable pay. This rate increases to 21.3% with effect from 1 April 2005, following GAD's assessment this year.

With effect from 1 October 2002, in line with arrangements throughout the Civil Service, a new RCPS sub-scheme was introduced. Employees were given the option of remaining in the existing 'Classic' scheme with an employee contribution of 1.5% of pensionable pay; joining the new 'Premium' scheme with their existing pension entitlement converted into the new scheme with an employee contribution of 3.5%; or joining the 'Classic Plus' scheme for future service only, with an employee contribution of 3.5% of pensionable pay, with existing pension benefits prior to 1 October 2002 being broadly calculated on the 'Classic' scheme.

All new employees with effect from 1 October 2002 were given the option of joining the Premium Scheme or alternatively a Partnership Pension Account. This is a stakeholder-type defined contributions scheme where the employer pays a basic contribution of between 3% and 12.5% (depending on the age of the member) into a stakeholder pension product. The employee does not have to contribute but where they do make contributions, these will be matched by the employer up to a limit of 3% (in addition to the employer's basic contribution). CCLRC also contributes a further 0.8% of pensionable salary to cover the cost of risk benefit cover (death in service and ill health retirement).

Both the PNISS and RCPS Schemes are multi-employer schemes and the Council are unable to identify their share of the underlying assets and liabilities.

There were no retirements on ill-health grounds during the year.

At 31 March 2005, 118 employees were PNISS members and 1,651 employees were RCPS members.

Staff numbers

The Council counts the number of staff in post to include all permanent, fixed term and temporary staff of all types who are paid as employees through the payroll. On this basis the average number of whole-time equivalent persons (including senior management) employed during the year was 1,794 (2003-04:1,740).

Remuneration of senior employees

Professor J. V. Wood, the Chief Executive, was the highest paid member of staff in 2004-05.
Professor Wood's emoluments, including taxable benefits, were:

	2004-05 £	**2003-04** £
Salary	95,880	86,402
Superannuation	9,684	8,727
Performance related bonus	14,256	13,520
Total	**119,820**	**108,649**

Professor Wood is a Classic scheme member of the Research Councils' Pension Scheme and the employer's contribution represents 10.1% of pensionable pay. The performance related bonus is non-consolidated and non-pensionable.

Excluding senior employees who are members of Head Office, the following number of Directors received salary falling within the following ranges:

Range	2004-05 Number	2003-04 Number
£60,000 - £69,999	0	1
£70,000 - £79,999	7	8
£80,000 - £89,999	3	1

The salary and pension entitlements of senior employees who are members of the executive Head Office Board and Head Office senior management at 31 March 2005 were as follows:

	Salary, including performance pay £'000	Real increase in pension at 60 and related lump sum £'000	Total accrued pension at 60 at 31 March 2005 and related lump sum £'000	CETV at 31 March 2004 £'000	CETV at 31 March 2005 £'000	Real increase in CETV after adjustment for inflation and changes in market investment factors £'000	Employer contribution to partnership pension account including risk benefit cover £
Prof J V Wood Chief Executive	115 - 120	1.0 - 1.5 plus 4.0 - 4.5 lump sum	4.5 - 5.0 plus 10 - 15 lump sum	56	84	23	0
Mr S J Hopley Director Finance	75 - 80	0.5 - 1.0 plus 2.0 - 2.5 lump sum	4.5 - 5.0 plus 14.5 - 15.0 lump sum	64	80	12	0
Prof M H R Hutchinson Director Central Laser Facility and Chief Scientist	85 - 90	1.5 - 2.0 plus 5.0 - 5.5 lump sum	28.5 - 29.0 plus 86.0 - 86.5 lump sum	483	536	30	0
Mr David Schildt Executive Director	75 - 80	0.5 - 1.0 plus 0 lump sum	24.0 - 24.5 plus 64.5 - 65.0 lump sum	378	407	11	0
Prof C R Whitehouse Director Daresbury Laboratory and Chief Technologist	80 - 85	1.0 - 1.5 plus 0 lump sum	2.0 - 2.5 plus 0 lump sum	13	29	12	0

'Salary' includes gross salary; performance pay or bonuses; overtime; reserved rights to London weighting or London allowances; recruitment and retention allowances and any other allowance to the extent that it is subject to UK taxation. No other benefits in kind were received by these individual's.

As noted above under superannuation, pension benefits are provided through the Research Councils' Pensions Scheme or the Principal Non-Industrial Superannuation Scheme of the United Kingdom Atomic Energy Authority. Both schemes provide benefits on a 'final salary' basis at a normal retirement age of 60, except that certain PNISS members have reserved rights to a retirement age of 65. Employees in a Partnership Pension Account may retire at any time between 50 and 75 and use the accumulated fund to purchase a pension. Employees may also choose to take 25% of the fund as a lump sum.

Benefits under the RCPS 'Classic' scheme accrue at the rate of 1/80th of pensionable salary for each year of service. In addition, a lump sum equivalent to 3 years' pension is payable on retirement. Pensions increase in payment in line with the Retail Price Index. On death, pensions are payable to the surviving spouse at a rate of half the member's pension. On death in service, the scheme pays a lump sum benefit of twice pensionable pay and also provides a service enhancement on computing the spouse's pension. The enhancement depends on length of service and cannot exceed 10 years. Medical retirement is possible in the event of serious ill-health. In this case pensions are brought into payment immediately without actuarial reduction and with service enhanced as for widow(er) pensions.

Benefits in the RCPS 'Premium' scheme accrue at the rate of 1/60th of final pensionable earnings for each year of service. There is no automatic lump sum, but employees may commute some of their pension to provide a lump sum. On death, pensions are payable to the surviving spouse or eligible partner at a rate of 3/8ths the member's pension. On death in service, the scheme pays a lump-sum benefit of three times pensionable earnings and also provides a service enhancement on computing the spouse's pension. The enhancement depends on length of service and cannot exceed 10 years. Medical retirement is possible in the event of serious ill health. In this case, pensions are brought into payment immediately without actuarial reduction. Where the member's ill health is such that it permanently prevents them undertaking any gainful employment, service is enhanced to what they would have accrued at age 60.

The salaries of the Directors and Senior Management are gross of employee's pension contributions of 1.5% made by them in respect of their RCPS 'Classic' scheme membership of the Research Councils' Pension Scheme, or 3.5% for those who opted to join the 'Premium' scheme, or 7.5% for those who are members of the PNISS.

Remuneration of Council and Committee Members

The Council comprises both senior management and external appointees. The remuneration of senior management is included above. The total cost of external Council appointments in the period was £76,358 and external Council appointees' remuneration excluding pension contributions was in the following ranges:

Range	2004-05 Number	2003-04 Number
£0 - £4,999	0	6
£5,000 - £9,999	8	5
£10,000 - £14,999	0	0
£25,000 - £29,999	1	1

The Council reimburses travel and subsistence expenses necessarily incurred by Council members attending meetings or undertaking other tasks arising from their membership, in accordance with the conditions and at the rates applying to the Council's employees. The amount reimbursed for 2004-05 was £395 (2003-04 £622). Council members do not become members of a pension scheme and there are no superannuation payments relating to the fees paid to them.

6 Restructuring costs

During the year 6 staff retired early. The total costs of these early retirements and the additional costs arising from an underestimate of continuing annual payments for those who were granted early retirement prior to 31 March 2004, have been charged to the Income and Expenditure Account.

7 Other operating costs

	CCLRC GROUP	INTEREST IN DLS JOINT VENTURE	CONSOLI-DATED TOTAL	CONSOLI-DATED TOTAL
	2004-05 £'000	2004-05 £'000	2004-05 £'000	2003-04 £'000
Travel, subsistence and allowances	6,593	0	6,593	6,292
Utilities	3,757	0	3,757	3,511
Rent, rates and maintenance	3,988	0	3,988	3,566
Administration expenses	712	0	712	462
Auditors remuneration*	69	0	69	67
Insurance premiums	287	0	287	304
Total	**15,406**	**0**	**15,406**	**14,202**

*There was no auditor remuneration for non-audit work.

8 Tangible fixed assets

CCLRC	Freehold land and buildings	Leased land	Plant and equipment	Assets under construction	CCLRC Group Total	Interest in DLS Joint Venture	Consolid-ated Total
	£'000	£'000	£'000	£'000	£'000	£'000	£'000
Cost or valuation							
At 1 April 2004	163,997	4,095	428,261	33,713	630,066	51,208	681,274
Additions	14	0	9,378	32,757	42,149	91,988	134,137
Reclassification	6,359	0	15,143	(21,502)	0	0	0
Disposals	(301)	0	(4,873)	0	(5,174)	0	(5,174)
Revaluation	7,153	0	5,242	0	12,395	0	12,395
At 31 March 2005	**177,222**	**4,095**	**453,151**	**44,968**	**679,436**	**143,196**	**822,632**
Depreciation							
At 1 April 2004	0	102	321,039	0	321,141	0	321,141
Charged in year	2,718	82	18,485	0	21,285	0	21,285
Disposals	0	0	(4,377)	0	(4,377)	0	(4,377)
Revaluation	(2,468)	0	3,923	0	1,455	0	1,455
At 31 March 2005	**250**	**184**	**339,070**	**0**	**339,504**	**0**	**339,504**
Net book value							
At 1 April 2004	**163,997**	**3,993**	**107,222**	**33,713**	**308,925**	**51,208**	**360,133**
At 31 March 2005	**176,972**	**3,911**	**114,081**	**44,968**	**339,932**	**143,196**	**483,128**

The Council's land and buildings were valued by Ridge Property and Construction Consultants as at 31 March 2003. Plant and equipment were valued by Rushton International, members of the Incorporated Society of Valuers and Auctioneers, as at 1 April 2001. Both valuations were performed in accordance with guidance notes issued by the Royal Institute of Chartered Surveyors.

In consideration of a one-off payment of £4,095,000, the Council has leased land from the United Kingdom Atomic Energy Authority (UKAEA) for a period of 50 years from 31 January 2003. This land has been capitalised and is being depreciated over the term of the lease.

The Council has granted an operating lease to Diamond Light Source Limited, the joint venture company in which it holds the majority (86%) shareholding. This lease is for a peppercorn rent for a period of 40 years from 31 January 2003. The lease covers part of the land leased to the Council from the UKAEA and part of the Council's own land.

9 Investment in joint venture

	CCLRC	CCLRC Group	Interest in DLS Joint Venture	Consolidated Total
	£'000	£'000	£'000	£'000
Cost				
At 1 April 2004	49,349	49,349	(49,349)	0
Additions	80,410	80,410	(80,410)	0
At 31 March 2005	129,759	129,759	(129,759)	0
Depreciation				
At 1 April 2004	0	0	0	0
Charged in year	0	0	0	0
At 31 March 2005	0	0	0	0
Net book value				
At 1 April 2004	49,349	49,349	(49,349)	0
At 31 March 2005	**129,759**	**129,759**	**(129,759)**	**0**

On 27 March 2002, the Office of Science and Technology (OST) transferred their 86% interest in the Joint Venture company known as Diamond Light Source Limited (DLS) to the Council. The remaining 14% is held by Wellcome Trust Limited.

The appropriate share of the operating results, assets and liabilities of DLS are reflected in the Council's consolidated Accounts in accordance with generally accepted accounting standards.

The Council's shareholding in DLS at 31 March 2005 is 129,494,500 ordinary shares of £1 each and 264,000 redeemable preference shares of £1 each.

10 Debtors and prepayment

	CCLRC	CCLRC Group	Interest in DLS Joint Venture	Consolidated Total	Consolidated Total
	2005	**2005**	**2005**	**2005**	**2004**
	£'000	£'000	£'000	£'000	£'000
Amounts falling due within one year					
Trade debtors	7,289	6,765	0	6,765	6,275
Other debtors and accruals	306	306	2,489	2,795	3,574
Prepayments	1,437	1,437	37	1,474	1,525
Amounts recoverable on long term contracts	5,693	5,693	0	5,693	5,541
Grant in aid not drawn down	6,275	6,275	0	6,275	0
Early retirements – amounts recoverable	915	915	0	915	600
Total	**21,915**	**21,391**	**2,526**	**23,917**	**17,515**
Amounts falling due after one year					
Early retirements – amounts recoverable	1,960	1,960	0	1,960	2,498
Total	**1,960**	**1,960**	**0**	**1,960**	**2,498**

11 Creditors

	CCLRC	CCLRC Group	Interest in DLS Joint Venture	Consolidated Total	Consolidated Total
	2005	**2005**	**2005**	**2005**	**2004**
	£'000	£'000	£'000	£'000	£'000
Amounts falling due within one year					
Trade creditors	7,770	7,770	8,769	16,539	16,038
Other creditors	3,679	3,721	829	4,550	1,609
Income received in advance	8,702	8,972	0	8,972	5,756
Corporation tax	0	0	51	51	15
Early retirement costs	918	918	0	918	1,046
Total	**21,069**	**21,381**	**9,649**	**31,030**	**24,464**
Amounts falling due after one year					
Building retention	0	0	1,270	1,270	0
Early retirement costs	1,508	1,508	0	1,508	1,892
Total	**1,508**	**1,508**	**1,270**	**2,778**	**1,892**

12 Provisions

	CCLRC	CCLRC Group	Interest in DLS Joint Venture	Consolidated Total	Consolidated Total
	2005	2005	2005	2005	2004
Decommissioning	£'000	£'000	£'000	£'000	£'000
Balance at 1 April	6,448	6,448	3,443	9,891	3,077
Provision made in year	0	0	8,600	8,600	3,443
Unwinding of discount	226	226	0	226	3,371
Balance at 31 March	**6,674**	**6,674**	**12,043**	**18,717**	**9,891**
Restructuring					
Balance at 1 April	0	0	0	0	0
Provision made in year	6,100	6,100	0	6,100	0
Unwinding of discount	0	0	0	0	0
Balance at 31 March	**6,100**	**6,100**	**0**	**6,100**	**0**
SRS closure					
Balance at 1 April	0	0	0	0	0
Provision made in year	22,854	22,854	0	22,854	0
Unwinding of discount	0	0	0	0	0
Balance at 31 March	**22,854**	**22,854**	**0**	**22,854**	**0**
Total provisions	**35,628**	**35,628**	**12,043**	**47,671**	**9,891**

Decommissioning of technical facilities

In accordance with FRS 12: Provisions, Contingent Liabilities and Contingent Assets decommissioning costs are recognised in full as soon as the obligation exists. A corresponding asset is set up in the balance sheet at the same time with depreciation being charged to the income and expenditure account over its useful life.

CCLRC

The Council has in place plans for the decommissioning of the ISIS pulsed neutron source at the Rutherford Appleton Laboratory at the end of its anticipated operating life in 2020, and for minor decommissioning work related to the Synchrotron Radiation Source at the Daresbury Laboratory. A provision has been established for this purpose. The estimated cost of decommissioning the facilities commencing in 2020 for ISIS and 2007 for SRS is currently £19 million, after allowing for inflation at 3.5%. This amount is discounted at the Council's notional cost of capital to arrive at a current provision of £6.674 million.

DLS Joint Venture

Diamond Light Source Ltd is required under the terms of the joint venture agreement to decommission the Synchrotron at the end of its anticipated operating life in 2030. A provision has been established for this purpose using the estimated cost for decommissioning the facility based on the current status of construction and after allowing for notional inflation. This amount is discounted at 3.5% which represents the company's notional cost of capital to arrive at the current provision of £14 million of which CCLRC's share is £12.043 million.

Restructuring

In April 2004, the Chief Executive announced the establishment of a small task and finish group to implement change and enable CCLRC to become 'Fit For The Future' (FFTF). Implementation of the FFTF recommendations and other efficiency savings are expected to result in a reduction in staff posts and a provision of £6.1 million has been established for this purpose. CCLRC has assurances from DTI that it will meet the cash costs of this provision as they arise.

SRS Closure

On 7 March 2005, Lord Sainsbury, DTI Minister for Science and Innovation, announced that the Daresbury Synchrotron Radiation Source (SRS) would cease operations on 31 December 2008. CCLRC has estimated the costs of discontinuing the operation of this facility as £27.6 million after allowing for inflation. This amount is discounted at the Council's notional cost of capital to arrive at the current provision of £22.854 million. CCLRC has assurances from DTI that it will meet the cash costs of this provision as they arise.

13 Deferred income

	CCLRC	CCLRC Group	Interest in DLS Joint Venture	Consolidated Total	Consolidated Total
	2005	**2005**	**2005**	**2005**	**2004**
	£'000	£'000	£'000	£'000	£'000
Balance at 1 April	273,580	273,580	0	273,580	231,410
Capital received in year	122,559	122,559	0	122,559	66,918
Released to income	(20,864)	(20,864)	0	(20,864)	(24,748)
Balance at 31 March	**375,275**	**375,275**	**0**	**375,275**	**273,580**

14 Reserves

	CCLRC	CCLRC Group	Interest in DLS Joint Venture	Consolidated Total	Consolidated Total
	2005	**2005**	**2005**	**2005**	**2004**
	£'000	£'000	£'000	£'000	£'000
Accumulated surplus/(deficit)					
Balance at 1 April	(1,822)	(1,996)	187	(1,809)	323
Surplus/(deficit) for the year	(27,171)	(27,470)	285	(27,185)	(2,132)
Balance at 31 March	**(28,993)**	**(29,466)**	**472**	**(28,994)**	**(1,809)**
Revaluation reserve					
Balance at 1 April	84,694	84,694	0	84,694	76,157
Surplus on revaluation	10,940	10,940	0	10,940	10,048
Disposals	(267)	(267)	0	(267)	(659)
Transfer to income and expenditure account	(951)	(951)	0	(951)	(852)
Balance at 31 March	**94,416**	**94,416**	**0**	**94,416**	**84,694**

15 Reconciliation of movements in government funds

	CCLRC	CCLRC Group	Interest in DLS Joint Venture	Consolidated Total	Consolidated Total
	2004-05	**2004-05**	**2004-05**	**2004-05**	**2003-04**
	£'000	£'000	£'000	£'000	£'000
Surplus for the year	(27,171)	(27,470)	285	(27,185)	(2,132)
Movement in deferred income account	101,695	101,695	0	101,695	42,169
Net surplus on revaluation	9,722	9,722	0	9,722	8,538
Movement in government funds in the year	84,246	83,947	285	84,232	48,575
Government funds at 1 April	356,452	356,278	187	356,465	307,890
Government funds at 31 March	**440,698**	**440,225**	**472**	**440,697**	**356,465**

16 Reconciliation of the operating deficit to net cash (outflow) from operating activities

	CCLRC Group 2004-05 £'000	CCLRC Group 2003-04 £'000
Operating deficit	(41,974)	(11,996)
Depreciation charges	21,285	22,577
Transfer from deferred income	(20,864)	(24,748)
Increase in provisions	29,180	3,371
(Decrease) in stocks	69	79
(Increase)/decrease in debtors and prepayments	(5,780)	2,350
Increase/(decrease) in creditors	3,595	(4,317)
Cost of capital charge	13,872	11,573
Net cash (outflow) from operating activities	**(617)**	**(1,111)**

17 Analysis of changes in net funds

	CCLRC 2004-05 £'000	CCLRC Group 2004-05 £'000	Interest in DLS Joint Venture 2004-05 £'000	Consolidated Total 2004-05 £'000	Consolidated Total 2003-04 £'000
Balance at 1 April	5,898	5,911	6,391	12,302	8,254
Increase/(decrease) in cash	(756)	(406)	1,080	674	4,048
Balance at 31 March	**5,142**	**5,505**	**7,471**	**12,976**	**12,302**

18 CCLRC Group net operating surplus/(deficit) by activity

Central Laser facility	2004-05 £'000	2003-04 £'000
Income from operating activities		
UK Research Councils	407	557
Government Departments	567	65
Universities	111	170
European Commission	152	288
Other overseas	142	20
Private sector and Domestic	148	35
Total operating income	1,527	1,135
Grant in Aid	4,776	4,579
Release of deferred income	878	1,050
Total income	**7,181**	**6,764**
Expenditure excluding cost of capital		
Depreciation	878	1,050
Other operating expenditure	6,301	5,720
Total expenditure excluding cost of capital	7,179	6,770
Operating surplus/(deficit) for the year	**2**	**(6)**

ISIS facility	**2004-005** £'000	**2003-04** £'000
Income from operating activities		
UK Research Councils	122	1,443
Government Departments	6	4
Universities	42	294
European Commission	205	564
Other overseas	2,463	2,812
Private sector and Domestic	116	160
Total operating income	2,954	5,277
Grant in Aid	19,207	17,029
Release of deferred income	8,879	9,311
Total income	**31,040**	**31,617**
Expenditure excluding cost of capital		
Depreciation	8,879	9,311
Other operating expenditure	22,479	22,339
Total expenditure excluding cost of capital	**31,358**	**31,650**
Operating deficit for the year	**(318)**	**(33)**

Synchrotron Radiation facility	2004-05 £'000	2003-04 £'000
Income from operating activities		
UK Research Councils	417	1,124
Government Departments	3	25
Universities	77	74
European Commission	1,364	559
Other Overseas	688	678
Private sector and Domestic	726	496
Total operating income	3,275	2,956
Grant in Aid	15,900	16,059
Release of deferred income	4,923	5,230
Total income	**24,098**	**24,245**
Expenditure excluding cost of capital		
Depreciation	4,923	5,230
Other operating expenditure	19,175	19,002
Total expenditure excluding cost of capital	**24,098**	**24,232**
Operating surplus for the year	**0**	**13**

Particle Physics	**2004-05** £'000	**2003-04** £'000
Income from operating activities		
UK Research Councils	19,698	18,301
Government Departments	5	0
Universities	180	369
European Commission	299	0
Other overseas	33	22
Private sector and Domestic	7	1
Total operating income	20,222	18,693
Grant in Aid	0	0
Release of deferred income	435	367
Total income	**20,657**	**19,060**
Expenditure excluding cost of capital		
Depreciation	435	367
Other operating expenditure	20,203	18,952
Total expenditure excluding cost of capital	**20,638**	**19,319**
Operating surplus/(deficit) for the year	**19**	**(259)**

Space Science	2004-05 £'000	2003-04 £'000
Income from operating activities		
UK Research Councils	11,426	10,850
Government Departments	426	1,142
Universities	145	271
European Commission	36	367
Other Overseas	4,163	3,217
Private sector and Domestic	833	672
Total operating income	17,029	16,519
Grant in Aid	13	4
Release of deferred income	503	741
Total income	**17,545**	**17,264**
Expenditure excluding cost of capital		
Depreciation	503	741
Other operating expenditure	17,333	16,827
Total expenditure excluding cost of capital	**17,836**	**17,568**
Operating deficit for the year	**(291)**	**(304)**

Other activities*	**2004-05** £'000	**2003-04** £'000
Income from operating activities		
UK Research Councils	9,887	6,061
Government Departments	2,829	3,454
Universities	2,330	1,458
European Commission	1,809	1,789
Other overseas	2,285	2,598
Private sector and Domestic	3,718	2,647
Total operating income	22,858	18,007
Grant in Aid	26,486	24,886
Release of deferred income	5,246	8,049
Total income	**54,590**	**50,942**
Expenditure excluding cost of capital		
Depreciation	5,667	5,878
Other operating expenditure	47,257	41,527
Total expenditure excluding cost of capital	**52,924**	**47,405**
Operating surplus for the year	**1,666**	**3,537**

*Other activities covers all other areas including CLIK Knowledge Transfer Limited

CCLRC Group totals	2004-05 £'000	2003-04 £'000
Income from operating activities		
UK Research Councils	41,957	38,336
Government Departments	3,836	4,690
Universities	2,885	2,636
European Commission	3,865	3,567
Other overseas	9,774	9,347
Private sector and Domestic	5,548	4,011
Total operating income	67,865	62,587
Grant in Aid	66,382	62,557
Total release of deferred income	20,864	24,748
Total income	**155,111**	**149,892**
Total CCLRC group expenditure		
Total CCLRC Depreciation	21,285	22,577
Total CCLRC other operating expenditure	132,748	124,367
Total CCLRC group expenditure	**154,033**	**146,944**
Operating surplus for the year	**1,078**	**2,948**
Cost of capital	(13,872)	(11,573)
Operating deficit for the year	**(12,794)**	**(8,625)**

19 Contingent liabilities

From 1 April 2003, the CCLRC took over responsibility for the United Kingdom's (UK's) subscriptions to the Institut Laue Langevin (ILL) and the European Synchrotron Radiation Facility (ESRF) from the Engineering and Physical Sciences Research Council (EPSRC). As a consequence of this, the CCLRC inherited the UK's share of the likely decommissioning costs of these facilities to be met in future years. As there has been no past obligating event, as CCLRC does not have singular control over the decommissioning of these facilities and as the timing and amount of the decommissioning costs cannot be known with any certainty and therefore, in accordance with FRS12, these decommissioning costs have been treated as a contingent liability. The estimated value of the contingent liability at 31 March 2005 is £51.9 million (ILL £45.3 million and ESRF £6.6 million). (2003-04 £48.7 million (ILL £42.1 million and ESRF £6.6 million).)

20 Derivatives and other financial instruments

FRS 13, Derivatives and Other Financial Instruments, requires disclosure of the role which financial instruments have had during the period in creating or changing the risks an entity faces in undertaking its activities. Because of the largely non-trading nature of its activities and the way in which government bodies are financed, CCLRC is not exposed to the degree of financial risk faced by business entities. Moreover, financial instruments play a much more limited role in creating or changing risk than would be typical of the listed companies to which FRS 13 mainly applies. CCLRC has very limited powers to borrow or invest surplus funds and except for relatively insignificant forward purchases of foreign currency, financial assets and liabilities are generated by day-to-day operational activities and are not held to change the risks facing the Council in undertaking its activities.

Liquidity risk

CCLRC's net revenue resource requirements are financed by resources voted annually by Parliament, and administered as grant-in-aid through the Office of Science and Technology, just as its capital expenditure largely is. CCLRC is not therefore exposed to significant liquidity risks.

Interest-rate risk

All of CCLRC's financial assets and liabilities carry nil or fixed rates of interest and CCLRC is not therefore exposed to interest-rate risk.

Foreign currency risk

CCLRC's exposure to foreign currency risk is not significant. Foreign currency income is less than 10.0% of total income and foreign currency expenditure, excluding international subscriptions, is less than 10.0% of total expenditure. CCLRC's greatest exposure to foreign currency risk relates to the Euro and, with the agreement of the Office of Science and Technology and Treasury, CCLRC operates its own Euro bank accounts to minimise its exposure to risk in this currency. In addition, forward currency contracts eliminate currency exposure on international subscriptions where payments are due on fixed dates in each financial year. CCLRC had three such hedging contracts in place at the balance sheet date amounting to £14 million.

21 Capital expenditure commitments

The Council had the following capital commitments at the balance sheet date:

	2005	2004
	£'000	£'000
Contracted	36,689	11,117

The large increase in capital commitments arises mainly from contracts placed for work relating to the construction of the ISIS second target station.

22 Investments

Central Laboratory Innovation and Knowledge Transfer Limited (registration number 4361684)

On 4 April 2002, the Council established its own wholly owned subsidiary company known as Central Laboratory Innovation and Knowledge Transfer Limited (CLIK). The Council's current shareholding in CLIK is 1 ordinary share of £1.

The operating results, assets and liabilities of CLIK are reflected in the Council's group accounts in accordance with generally accepted accounting standards.

Spectrum (General Partner) Limited (registration number 4409886)

The Council holds 690 ordinary shares of 0.01p (23.1% interest) in Spectrum (General Partner) Limited. This company was set up to act as the Advisory Board for the Rainbow Seed Fund (RSF) and its purpose is to ensure that the RSF operates within the parameters set out by the Office of Science and Technology and to monitor the performance of the Fund and the Fund Manager. The Council's shareholding and value of shares in Spectrum was diluted on 17 September 2004 when the Biotechnology and Biological Sciences Research Council (BBSRC) joined the RSF as a fourth core partner.

The RSF is a limited partnership comprised of four core partners (the Council for the Central Laboratory of the Research Councils, the BBSRC, the Natural Environment Research Council and the Defence Science and Technology Laboratory) and two associate partners (the United Kingdom Atomic Energy Authority and the Particle Physics and Astronomy Research Council).

The Fund provides seed capital investment to commercialise the outcomes of science research in the publicly funded partner organisations' Government facilities. Midven Limited manages the Fund under contract.

No entry is made in the Balance Sheet as the value of the holdings and the trading position of these companies, is not material to the accounts.

Other investments

The Council also holds minority shareholdings in the following companies all of whom have registered offices in England:

Name of Company	Registration Number	Percentage Shareholding
Neos Interactive Limited	3564252	<1
LaserThor Limited	3869946	8.61
MRBP Reaserch Limited	4113380	5
PETRRA Limited	3563949	36.25

No entry is made in the Balance Sheet as the value of the holdings and the trading position of these companies, is not material to the accounts.

23 Balances over £1 million with other Central Government Account bodies were:

Name of organisation	Debtor Balance at 31 March 2005	Creditor Balance at 31 March 2005
	£'000	£'000
Central Government bodies:		
Engineering and Physical Sciences Research Council	1,150	1,673
Particle Physics and Astronomy Research Council	0	1,698
Department of Trade and Industry	6,275	0

24 Related party transactions

The Council for the Central Laboratory of the Research Councils (the Council) is a Non-Departmental Public Body (NDPB) sponsored by the Department of Trade and Industry (DTI).

DTI is regarded as a related party. During the year, the Council had various material transactions with DTI and with other entities for which DTI is the sponsoring or parent body, viz: Biotechnology and Biological Sciences Research Council, Engineering and Physical Sciences Research Council, Economic and Social Research Council, Medical Research Council, Natural Environment Research Council, Particle Physics and Astronomy Research Council, Ofcom and the income generated from these bodies is set out in Note 2.

In addition the Council had various material transactions with other Government Departments and other central government bodies and the income generated from these bodies is set out in Note 2.

As set out in Note 9 above, the Council holds the major interest in Diamond Light Source Limited (DLSL). Related party transactions with DLSL for the period ending 31 March 2005 were as follows:

	£'000
Provision of technical and scientific manpower and other services	3,269
Costs collected on behalf of DLSL	284
DLSL invoices to CCLRC	16
Total	**3,569**

During the year, the Council entered into contracts for goods and services with institutions or other bodies where Council members hold senior positions and where employees of the Council hold honorary or part-time teaching positions or undertake work in a private consultancy capacity. The numbers and aggregate values of such contracts were as follows:

Name	Related Party	Number of contracts	Aggregate Value £'000
Council members			
Sir Graeme Davies	Foundation for Science and Technology	1	4
Prof J V Wood*	University of Oxford	28	330
	University of Leeds	3	95
	University of Nottingham	7	109
Prof A M Cruise	University of Birmingam	9	207
Prof G Davies	Biotechnology & Biological Sciences Research Council	3	127
	Engineering & Physical Sciences Research Council	2	49
	University of Birmingham	9	207
Prof J Durell	University of Manchester	8	92
Prof P Gregson	Queen's University, Belfast	1	1
**Also member of staff*			
Members of staff			
Prof R Holdaway	University of Southampton	4	338
	University of Kent	1	1
Prof K J Jeffery	Heriot-Watt University	2	28
	University of Wales	4	49

None of the above named persons was involved in the placing of contracts with the institutions or bodies where they hold senior positions or, in the case of employees of the Council, hold honorary or part-time teaching positions.

The Council also provided time on its scientific facilities, either paid for directly by users, or funded by grant-giving bodies (principally the other UK Research Councils), to researchers at institutions where Council members hold senior positions and where employees of the Council hold honorary or part-time teaching positions. The related parties using the Council's facilities were as follows:

Name	Related Party
Council members	
Sir Graeme Davies	University of London
Prof J V Wood	University of Nottingham University of Leeds University of Oxford
Prof A M Cruise	University of Birmingham
Prof G Davies	University of Wales, Swansea University of Birmingham
Prof J Durell	University of Manchester
Prof P Gregson	Queen's University, Belfast
Members of staff	
Prof R Holdaway	University of Southampton University of Kent
Prof K G Jeffery	University College of Wales, Cardiff Heriot Watt University Oxensis

None of the above named persons was involved in the award of facility time to the institutions or bodies where they hold senior positions or, in the case of employees of the Council, hold honorary or part-time teaching positions.

25 Post balance sheet events

There have been no events since the end of the financial year which would affect the understanding of the accounts.

Further information

Further details of the CCLRC's research programme are available from the following contacts:

Engineering and Instrumentation	01235 445566
Finance	01235 445658
Head Office	01235 445644
Information Technology	01235 445634
ISIS	01235 445610
Lasers	01235 445090
Particle Physics	01235 445448
Space Science and Technology	01235 445552
Synchrotron Radiation	01925 603346

More general enquiries should be directed to the following:

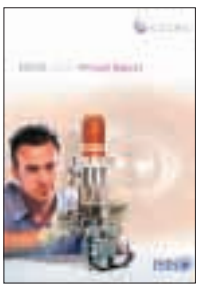
Rutherford Appleton Laboratory	01235 445000
Daresbury Laboratory	01925 603000
Chilbolton Observatory	01264 860391
Communications	
Daresbury Laboratory	01925 603272
Rutherford Appleton Laboratory	01235 445553
CLIK	
Daresbury Laboratory	01925 603148
Rutherford Appleton Laboratory	01235 446015
Research Services	
Daresbury Laboratory	01925 603329
Rutherford Appleton Laboratory	01235 446732
Libraries	
Daresbury Laboratory	01925 603397
Rutherford Appleton Laboratory	01235 445384
Enquiries	
E-mail	enquiries@cclrc.ac.uk

More details are available online at www.cclrc.ac.uk

Publications

A range of publications is available, online or from Communications including:

- **Portal** – the newsletter of the Council for the Central Laboratory of the Research Councils
- Specialised reports including those from the Central Laser Facility, Engineering and Instrumentation, ISIS, Space Science and the SRS.



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