



Fusion Business

tomorrow's technology for today

OXFORD UNIVERSITY LINK TO TAKE THE HEAT

The UKAEA Fusion and Industry Programme is working with Oxford University's Engineering Department on two projects to 'take the heat out of fusion'. The projects are part of an initiative by the Fusion and Industry Programme to support early-stage development of new technological approaches to overcoming fusion research problems.

One project involves Branko Babic, an inventor, who is developing the concept of a direct impact heat exchanger that could potentially be used in a fusion power plant. When Branko presented his ideas to the Fusion and Industry team he didn't have the scientific results needed to allow an objective evaluation of the heat exchanger idea.

Fusion and Industry business-manager, Dr Cleve Forty, says: "We agreed to help Branko Babic in undertaking heat transfer tests by producing a steam heated plate, using the UKAEA Special Techniques Group's complex brazing technology skills. The plate could be mounted in an Oxford University experimental rig, and in this way we were able to gain a clear understanding of the science involved."

So far the results have been very promising. A doubling of the expected heat transfer rate has been observed, although this has been partly offset by a high pressure loss.

"Fusion and Industry support for the research has been decisive in taking the project forward to the point where

we can now begin planning the next round of experiments with some clear commercial applications in mind," says Branko Babic.

In another related project Garry Voss, New Concepts Group Leader at UKAEA Culham Division, is sponsoring a final year project for a student in the University's Engineering Department. The project will look at how efficiently a fluidised bed heat exchanger might operate as a cooling system for the fusion exhaust system in a power plant.

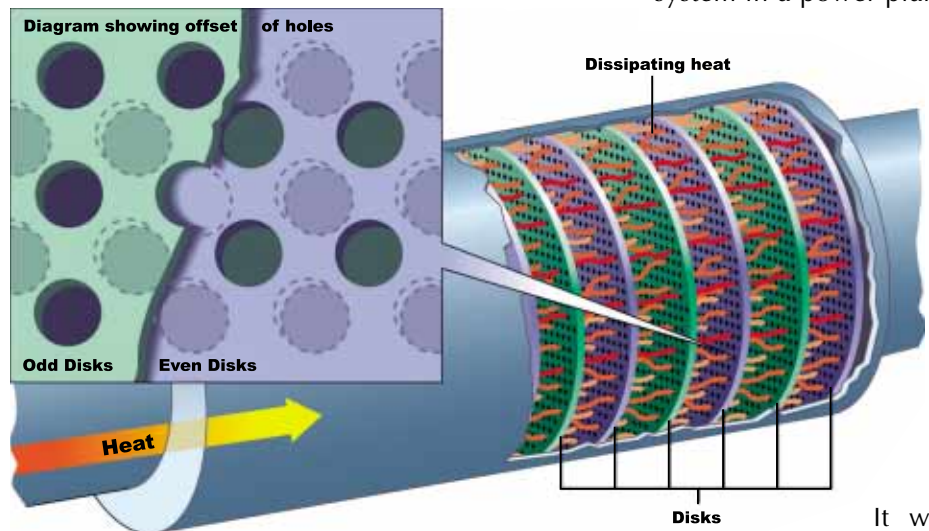


Diagram showing layout of disks and offset holes of 'novel auto catalyst'

It will try to evaluate the proposition that divertors, which are at the top and bottom of the tokamak, and subject to huge power fluxes, can be cooled by silicon carbide balls. These would cascade through the divertors and be fed into a fluidised bed where they would be cooled down by helium gas flowing through the bed, before being recycled back into the tokamak. The cooling process is then repeated.

For further details visit www.fusion.org.uk/industry.

ADVANCING TECHNOLOGY

The Fusion and Industry Programme recently hosted a meeting of The Advanced Technology Awareness Club (TCCL) at the Culham Science Centre. TCCL members, including major engineering and aerospace companies, process industries and Government laboratories, met to consider all aspects of advanced software control technology, including neural networks, knowledge based systems, simulation, optimisation and condition monitoring.

The way software control techniques are used in fusion research featured strongly in the Culham programme. Presentations ranged from data systems and data mining in Culham experiments, through to controlling instabilities in fusion devices using neural networks. Outside fusion, Stuart Watson of ALSTOM Power revealed the latest developments in their EDEN project. This remote data collection, storage and analysis system forms an integral part of maintenance and support services provided by ALSTOM Power for their small industrial gas turbine users.



Process control was the subject of two presentations. Geoff Jones of BASF reported their experience of implementing Multivariate Statistical Process Control. Robin Brooks of Curvaceous Software presented a new type of visualisation software based on n-dimensional geometry - a major attraction to operating sites and practising engineers as it avoids the need to formulate a problem in equation form.

To find out more about TCCL visit www.tccl.org or www.fusion.org.uk/industry

Your view: Are there topics you would like to see covered in Fusion Business; do you have comments on this edition?

If so, please contact deniese.willis@ukaea.org.uk or call **01235 466608**.

PEOPLE SPIN OFF:

Part Seven: Stewart Scott

Profiling people who started their careers in fusion and are now using the skills they developed in other areas.

After six years as a mechanical engineer at UKAEA Harwell, Stewart Scott joined JET at Culham as a member of the First Wall Division, with responsibility for the organisation of maintenance and repair activities within the machine's vacuum vessel. He later became Group Leader, Diagnostic Engineering Group, before joining Foster Wheeler as a project engineer.



In 1999, Stewart set up his own company, XMI Engineering Services Ltd, which provides testing and design services to medical equipment manufacturers. This year, the company won a government SMART Award grant for innovation, to develop a radical new wheelchair (see photo).

Stewart says: "My time at JET was very memorable and stimulating. It encouraged me to develop new techniques and processes and engendered a lot of confidence in my ability to work in a rigorously professional environment, to break new ground and to look at different processes and different materials." He now employs a number of ex-fusion people at XMI, partly, he says, because of their broad engineering experience, but also because they are very pragmatic, practical people, good at finding solutions and working to deadlines.

SPARKING RESEARCH

As members of the UK Science Parks Association (UKSPA), UKAEA Fusion and Industry will be contributing to a nationwide research project. The aims of the project include gathering data on the technology needs and capabilities of member science parks. UKAEA Industry Liaison Co-ordinator, Miriam Mason, will be joining the project team tasked with driving this initiative forward. Miriam says: "Our involvement will help us promote technology transfer and awareness of the excellent facilities and expertise we can offer."

Culham Science Centre will host the September 2003 UKSPA conference — more details in future issues.



CULHAM POWERS EXPANSION

A company developing a radical ultra low power technology with applications ranging from medical implants (see photo) and monitors, through handheld terminals to underwater surveillance systems, has expanded its operations at the Culham Innovation Centre.

Toumaz Technology has raised £1.5m in funding from private and venture capital investors, as well as project work for leading electronics companies, to take on eight new employees at its Culham HQ.



Professor Chris Toumazou (back row third from left) and Keith Errey (back row second from right) pictured with new members of the Toumaz Technology team

Founded by local entrepreneur Keith Errey and Professor Chris Toumazou, the company is exploiting technology from Imperial College, London, and is recognised as a leader in low power analogue/digital communications. CEO, Keith Errey, says the company is filling the gap created by battery technology lagging behind advances in digital technology: "Users are demanding a whole range of new functions to be delivered by digital devices such as mobile phones. The processing for these functions consumes large amounts of power, resulting in unacceptably short battery lifetimes. Our technology will reduce the power requirements enabling the devices to operate for much longer and be reduced in size, even incorporated into bio implants."

The low power Toumaz technology is currently being used in cochlea implants and for a new consumer product in conjunction with a major international brand leader.

Toumaz Technology was one of the first companies to move into the Culham Innovation Centre in February 2001. "The Innovation Centre is ideal for access to London as well as easy travelling distance to electronics companies in the Thames Valley and Swindon. It's also a good deal easier to find accommodation for our employees, many of whom are relocating from London to work at Culham," says Keith Errey.

ITER NEWS UPDATE

Delegations from Canada, the European Union, Japan and the Russian Federation met in Toronto in September for further negotiations on implementation of the ITER fusion project. Significant progress was made on defining arrangements for the ITER organisation structure and in beginning the site assessment procedure. Assessment of Canada's proposed site at Clarington and Japan's site at Rokkasho-mura has been completed by a group of international experts. The two European sites at Cadarache in France and Vandellós in Spain will be assessed in December.

More than 130 delegates recently attended the UKAEA Fusion and Industry Programme's one day ITER Awareness Workshop. The workshop, at Baylis Conference Centre in Slough, featured experts from the ITER project, the European Fusion Programme, the European Commission and UKAEA. The aim of the presentations was to update leading UK industry representatives on the scope, technology and likely contract opportunities that will arise during the building and future operation of ITER.

A full report on the workshop will feature in the February 2003 edition of Fusion Business.

INNOVATION CENTRE VIRTUAL OFFICES



Engineers and physicists with new business ideas took advantage of the first Culham Innovation Centre open day, to talk to advisers from Oxford Innovation. Centre Manager Barbara Allsworth says: "We had a good deal of interest, particularly in our OxiFlex virtual office service. OxiFlex is attractive to people who prefer to 'test the water' before committing to office space in the Centre. It gives companies a business address here, together with a telephone answering service and other benefits. Of course UKAEA's Technical Support Package for qualifying companies is also a great incentive."

CULHAM EXHIBITION DIARY



17th July — CVI Technical Optics

Many CVI Technical Optics products are already in use at UKAEA. Their exhibition gave existing and potential customers an insight into the company's product spectrum, which comprises high-energy laser optics, large optical windows and spectral instruments such as spectrum analysers and monochromators.

Contact: **Helmut Kessler** on **01624 647000** or e-mail hkessler@tol-cvi.com or via www.cvilaser.com

17th September — IGUS UK



The day enabled IGUS UK to demonstrate their self-lubricating and maintenance free polymer bearings, combining the Energy Chain and Cables product.

Contact: **Mark Redding** on **01494 438439** or e-mail mredding@igus-uk.co.uk or via www.igus-uk.co.uk

25th September — Nor-Cal UK



Wiltshire based Nor-Cal UK exhibited examples of their range of components for high and ultra high vacuum applications.

Contact **John Judson** on **01666 826822** or e-mail jjudson1@aol.com or visit www.norcaluk.com

If your company would like to stage an exhibition at Culham, contact deniese.willis@ukaea.org.uk or call 01235 466608.

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Visitors Book

"Taking place on a site where a large number of scientists and engineers work, the one-day exhibition is an excellent opportunity to show existing and new customers the whole range of products in reality rather than just in a catalogue."

Helmut Kessler,
Sales Manager, CVI Technical Optics

"We were extremely pleased with the interest shown in our products and look forward to arranging another exhibition at Culham Science Centre next year."

Mark Redding,
Sales Manager, IGUS UK

"We've been involved with several areas on the Culham site for many years, but the exhibition has helped us reach more potential users of our equipment and given them the chance to see what we do, than any other way I can think of."

John Judson,
Sales Director, Nor-Cal UK

9th October — UHV Design



UHV Design rated their debut exhibition at Culham "a resounding success". The display ranged from vacuum components such as bellows, rotary drives

and Z shifts, through to full deposition manipulators, and the new series of 'PowerProbe' linear and linear rotary transfer arms. Of particular interest was UHV Design's capacity to provide customised designs for vacuum motion and heating applications.

Contact **Lee Howell** on **01825 760090** or e-mail sales@uhvdesign.com or visit www.uhvdesign.com

FUSION TEAM MEANS BUSINESS

It was time for a double celebration when two members of the Fusion and Industry team attended their graduation ceremony at Oxford Brookes University.



*From left to right:
Miriam Mason and Deniese Willis*

Industry Events Co-ordinator, Deniese Willis, was awarded the Certificate of Management, and Industry Liaison Co-ordinator, Miriam Mason, an MBA with distinction. Deniese and Miriam believe their academic achievements will bring significant business benefits to the Industry Programme in terms of commercial awareness and innovative thinking.