SUPA NEWS

5 NOVEMBER 2007

SUPA KNOWLEDGE TRANSFER SHOWCASE COMING SOON!

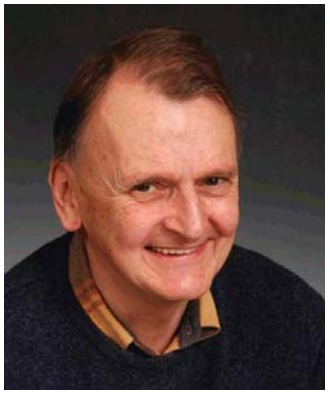
SUPA KT Showcase

27 February 2008

Hall 1, SECC, Glasgow

IN THIS ISSUE

WELCOME FROM YOUR CEO



Professor Ian Halliday, SUPA CEO

In July we submitted the SUPA II bid to SFC. The bid was unfortunately of an outline tentative nature as not all Universities could support it in all detail. The bid was for £65 million. The bid has been welcomed by senior SFC staff. It is, of course, a smallish cork floating on the financial tides of the Spending Review, Scottish Higher Education aspirations, and Research Council funding. Although the Research Council funding has indeed been increased substantially the message from EPSRC and STFC is a constant volume of research while extra money goes to the Universities. In other words the cost of UK University research is increasing substantially; not always a comfortable strategy. The next step for SUPA II is to await a meeting of the Principals which the Edinburgh Principal has promised to arrange.

The SUPA II bid was renormalized, in my head at least, when the Japanese Government invited me to sit on their final decision panel for what they call "World Premier Institutes". Just as in Scotland they are feeling the tides of global competition. In particular they want to move their University system towards the US/UK model of autonomy and financial freedom. They had winnowed the bids down to 13 for the panel to see; with 5 winners to be fixed. Each winner was to receive roughly 160 million US dollars over 10 years. The criteria were: global level science expertise and impact, freedom to manage their affairs unconstrained by Japanese University regulation and habit and finally openness and engagement with the outside world. As a theorist I was amused that one of the winners was a serious attempt to join particle and astronomy theory along with a strong engagement with pure mathematics. Two of the other winners were also of great interest given the SUPA PALS discussions. One of the, and possibly the, leading immunology groups in the world proposed unequivocally that the future of immunology would require great improvement in imaging and diagnostic equipment. Their winning proposal was therefore to join with physicists in particular to attain this goal. A second winner was a proposal to join a (Stem) Cell group with nano-technologists. Again the challenge was to engage the nano manipulation technology with the biology; Lots of overlap with the SUPA II PALS discussions. Also lots of competition for us and undoubtedly higher levels of ambition!

On a different time scale my position as President of ESF takes me into high level meetings both of the European Heads of Research Councils (Eurohorcs) and of various Commission events. At the political level the words "Duplication and Fragmentation" have been accepted as two problems that need solving. Duplication is shorthand for the feeling that a) we are probably funding the same science two or three times across Europe in different countries and b) many of the funded proposals would have been seen to be inferior if we could only compare them; this rings the big political bell of "waste of taxpayers money". Fragmentation describes the feeling that all the small European budgets inhibit decision making a) for facilities and b) to allow correct funding for the best scientists, where correct means a rate and concentration of funding to compete with the best in the USA. Both the Commission and Eurohorcs accept the arguments but find it very hard to make things happen. Nonetheless it is taken as read that at the decision time for Framework 8 around 2010, which is soon, the following discussion will happen. The European R&D budget, currently €55 billion over 7 years, will increase to €100-150 billion. The ERC budget will also at least double. The money will come from the agricultural funds. The big question is then what will happen to national Science budgets. Will they stay constant or shrink? In my mind there is a race. Can the ERC prove it is fit for purpose with low bureaucracy and good, trusted, decision making or can the national agencies prove they can solve the "Duplication and Fragmentation" problem by joint peer review and good joint decision making? Can the European Research Area (ERA) be made to work better?

All three efforts (SUPA, WPI, ERA) are driven by the same global scientific competition. The good news is that all the governments involved accept this is serious debate. *It is always advantageous to a political case that extra funding will be used in an improved system.*

ian.halliday@e-halliday.org

www.supa.ac.uk

SUPA NEWS AND EVENTS

EDINBURGH ASTRONOMERS TO MAP THE UNIVERSE WITH THE WORLD'S MOST POWERFUL CAMERA

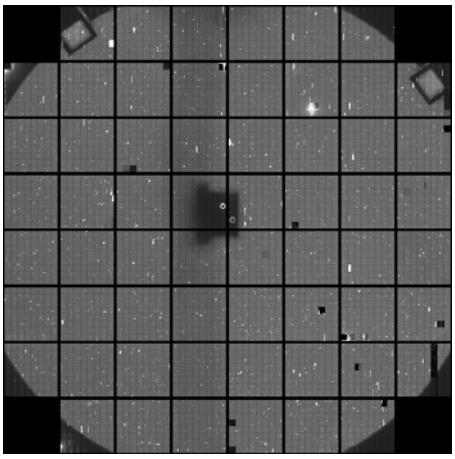
Astronomers from the Institute for Astronomy at the University of Edinburgh, in conjunction with several other major research institutions in Europe and America, have signed an agreement with astronomers at the University of Hawaii to use the most advanced telescope system ever built for rapid imaging of the sky.

The Edinburgh astronomers will exploit a revolutionary new survey telescope on Haleakala on the island of Maui, known as Pan-STARRS 1 (PS1), which is expected to discover billions of new stars, galaxies and solar system objects. The PS1 telescope will study the farthest reaches of the universe, mapping 'dark matter' on scales of 1000 Million light years. PS1 will also survey nearby space for 'killer asteroids' and comets that could collide with the Earth in the future, so-called Near-Earth Objects (NEOs).

Professor John Peacock, of the University of Edinburgh, described the plans to use PS1 to study the large-scale distribution of galaxies: "Pan-STARRS will give us the largest ever three-dimensional picture of the universe. There are huge patterns in the galaxy distribution that were generated in the first instants of the big bang, so we're able to look back in time to the origins of all structures in the universe - from galaxies down to stars and planets. Working with Pan-STARRS will put us right at the forefront of this research, and the next few years should be really exciting."

The universe contains much more than the visible galaxies, which are embedded in 'dark matter' of an unknown nature. This matter reveals itself because its gravity bends light rays, distorting the images of distant galaxies. Professor Alan Heavens, of the University of Edinburgh, plans to use this 'gravitational lensing' effect to study the dark matter: "Gravitational lensing is expected to be one of the big growth areas in cosmology over the next few years, and it gives us unique insights into the different kinds of energy in the universe". His colleague, Dr Andy Taylor, added: "We've worked hard on the theory of gravitational lensing for the past decade, and it's wonderful that we will now get to apply this method to the best data in the world".

By monitoring most of the sky every week, Pan-STARRS will also become the world's leading search for exploding stars called supernovae. A supernova is a fantastically energetic explosion at the end of the life of a very massive star. They are a billion times brighter than the sun and can be seen in the distant Universe. As Professor Peacock comments: "This is just another example of the fantastic science that Pan-STARRS makes possible. It's going to have a huge impact on every area of astronomy that we study at Edinburgh".



Picture of the 'First Light' image – always a seminal moment for a new telescope/instrument – the first picture of the sky with the world's largest

Having achieved 'First Light' in June of this year, the PS1 telescope is fitted with the world's largest digital camera, constructed at the University of Hawaii Institute for Astronomy in Manoa, under the leadership of John Tonry. With a resolution of 1.4 billion pixels, about 300 times as many as a typical commercial digital unit, the camera will be used to capture images generated by the telescope's mirror, which measures 1.8 metres in diameter. It achieved 'First Light' in August this year.

Over 200 world-renowned scientists and their graduate students have committed themselves to analysing the unprecedented flood of data from PS1 over the next three and half years. Kenneth Chambers, from the University of Hawaii, who is the Project Scientist responsible for carrying out the PS1 survey, said: "We decided to recruit a number of top astronomers to join us in order to make the best use of this fantastic instrument."

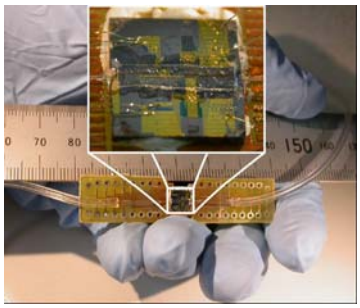
Rolf Kudritzki, Director of UH's Institute for Astronomy added: "We are delighted to have assembled a powerful consortium that includes the Max-Planck-Institutes for Astronomy and for Extraterrestial Physics in Germany, Harvard University, Johns Hopkins University, Las Cumbres Observatory in the USA and Durham, Edinburgh and Queen's Universities in the United Kingdom".

Developed by astronomers at the University of Hawaii, Pan-STARRS is the first stage of the Panoramic Survey Telescope and Rapid Response System project, which is the brainchild of IfAs Nick Kaiser. The consortium will contribute about $10M to cover the cost of operating the telescope in Hawaii, which has been constructed at a cost of about $40M. Further information on the project can be found at http://pan-starrs.ifa.hawaii.edu/public/, while the website for the Institute for Astronomy at the University of Edinburgh can be viewed at http://www.roe.ac.uk/ifa/

jap@roe.ac.uk;
afh@roe.ac.uk;
ant@roe.ac.uk

MONOLITHIC OPTICAL TRAP – TOWARDS CREDIT-CARD SIZED BIOMEDICAL ANALYSIS

The vision of creating "Lab-on-a-chip" devices has fascinated both researchers and clinicians for some time. A family of devices that would offer the same biochemical functionality as arrays of test tubes or expensive and complicated machines operated by skilled personnel is very attractive indeed. Lab-on-a-chip devices simplify biochemical testing and allow conducting many processes that are currently done in a remote laboratory at the point of care. An EPSRC research grant worth £850k recently awarded to Profs Krauss and Dholakia of the University of St. Andrews will bring this vision one step closer to reality. Their concept of an optical trap made directly in semiconductor laser material allows for a variety of optical manipulations to be carried out directly on-chip, thus adding functionality and optical control. Specific applications that will be targeted include optical flow cytometry for the identification and separation of different types of cells as well as fluorescence excitation directly on-chip using GaN-based material. The concept will also allow the on-chip combination of optical trapping with Raman spectroscopy. Raman spectroscopy performed on cells held in conventional optical traps is a technique recently pioneered by the group in conjunction with researchers in the Bute Medical School at St. Andrews. The technique is particularly promising for the rapid and accurate diagnosis of small samples, so realising it monolithically in a Lab-on-a-chip format will lead to the development of credit-card sized analysis kits for home diagnostics, forensic science and point-of-care analysis.



The monolithically integrated optical trap on your fingertip.

Profs Krauss and Dholakia with Dr Cran-McGreehin who pioneered the device.

tfk@st-and.ac.uk, kd1@st-and.ac.uk

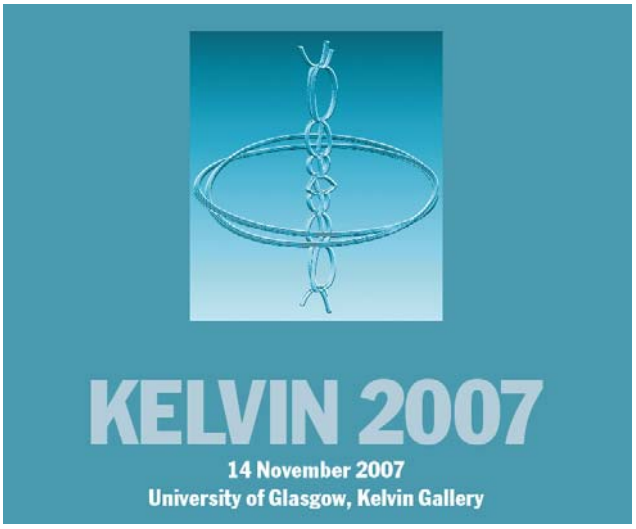
BEYOND THE WEB

At the recent BA Festival of Science in York, Professor David Britton, who has just joined the department of Physics and Astronomy at the University of Glasgow, described "The Grid", a sort of extra-dimensional internet being developed in many contexts world-wide. David' talk, entitled "The Grid: A supercomputer in every lounge?" was from the perspective of Particle Physicists; a community that gave the world the Web and is now actively prototyping the Grid. David has manged GridPP, the project responsible for deploying the Grid for High Energy Physics in the UK, since its inception, and takes over the project leadership next April from Professor Tony Doyle, also from the University of Glasgow.

But what drives these Particle Physicists to tackle computing problems? The answer lays deep underground near Geneva where scientists are putting the finishing touches to the world's largest experiment. When the 27km Large Hadron Collider is turned on next year, it will smash together hundreds of millions of particles every second to recreate the conditions in the early universe just after the Big Bang. But to work out why particles have mass and probe deep into the structure of matter, physicists will have to sift through the masses of data coming from the LHC's cathedral-sized detectors. And it is a lot of data - 15 Petabytes (15 million billion bytes) each year, equivalent to a stack of CDs three times the height of Mount Everest.

Rather than deal with these data on expensive supercomputers, based at a few sites and in high demand, LHC will use a computing 'Grid'. More than one hundred thousand processors, spread across the world at hundreds of institutions, will let scientists from different countries access the data, analyse it and work together in international collaborations. Grid computing has been hailed by many IT experts as the next step for the internet. Whereas a PC using the web provides information or access to services, such as banking or shopping, a PC on the Grid offers its computing power and storage. Individual scientists using the Grid won't need to know where the data is held or which machines are running their programs.

d.britton@physics.gla.ac.uk



Kelvin 2007: Four lectures celebrating the modern face of Kelvin's Legacy 14th November 2007

Lord Kelvin was a giant of 19th Century Science, his fundamental contributions to thermal physics, electromagnetism and optics being matched by practical achievements ranging from undersea amplifiers to marine compasses.

In Glasgow, where Kelvin held the chair of Natural Philosophy for over 50 years, we plan to celebrate the 100th anniversary of his death by inviting four leading scientist to look where the fields Kelvin started are now and where they are going. Sir Michael Berry will talk on vortices in light, Ed Hinds on cold atoms, Wilson Sibbett on telecommunications and Denis Weaire on Foams and Kelvin's Legacy. The event will be chaired by the current holder of the Kelvin Chair, David Saxon.

This event will be held in the recently renovated Kelvin Gallery within the historic buildings of Glasgow University, adjacent to the Huntarian Gallery and Kelvin Exhibition.

10.15 Arrival and Registration

10.45 Welcome

11.00 Lecture Sir Michael Berry, Dark threads of nothing: vortices in light

Kelvin's idea that vortices play a central part in fundamental physics has recently been reincarnated, as a result of the discovery that the energy in beams of light swirls around lines of perfect darkness. These 'optical vortices' have a rich fine structure, and they can be looped, linked and knotted. At the deepest level, the dark light of an optical vortex is a window, opening to our view the faint glimmering of the quantum vacuum.

12.00 Buffet Lunch

13.00 Lecture Ed Hinds, The physics of cold atoms: *Kelvin's ideas about the connection between temperature, heat and work, led to the absolute temperature scale, with zero temperature being a state of no motion. Experiments on cold atoms now come astonishingly close to zero temperature, but there is an irreducible amount of motion due to quantum mechanics. These quantum fluctuations and their effects on the state of matter would have pleased and interested Lord Kelvin, who considered that all forces have their origins in motion*

14.00 Lecture Wilson Sibbett, From telegraphy to telecommunications: *Among his many contributions to science and technology, Lord Kelvin had a keen interest in improving communications and his research has had far-reaching influences into modern telecommunications. Wilson Sibbett will highlight the most relevant of Kelvin's work and make particular reference to the work of Kerr who was one of one of Kelvin's research students.*

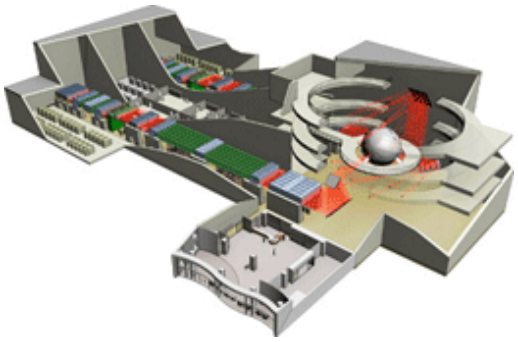
15.00 Coffee

15.30 Lecture Denis Weaire, Foams and Kelvin's Legacy: *The 1994 discovery of an ideal foam structure that surpassed the 1887 conjecture of Kelvin, and is to be the basis for the structure of the prominent "Water Cube" structure at the Beijing Olympics. Weaire will also re-enact the contribution of his illustrious predecessor in Dublin, George Francis Fitzgerald - who spoke at the Kelvin Jubilee*

16.30 Concluding Comments and Close

If you wish to attend Kelvin 2007, please register on: http://www.iop.org/Conferences/Forthcoming_Institute_Conferences/KEL07/event_9067.html

NEW LASER-FUSION PROJECT GETS THE GREEN LIGHT FROM THE EU



Artist's impression of the HiPER facility building—Source www.hiper-laser.org

Members of the laser-plasma group at Strathclyde's Department of Physics are amongst a consortium of scientists from 15 countries, led by the STFC-Central Laser Facility at the Rutherford Appleton Laboratory, involved in a new European project called HiPER - **Hi**gh **P**ower laser **E**nergy **R**esearch facility. The principal aim of the project is to demonstrate the feasibility of laser driven fusion as a future energy source. The facility is also being designed to investigate a broad range of new science in extreme conditions.

It is expected that net energy gain from inertial fusion of deuterion and tritium using a laser will be demonstrated in the period 2010 to 2012 on the National Ignition Facility, USA. HiPER, a purely civilian facility, is designed to move forwards from this landmark demonstration, using an approach called "fast Ignition". Conventional inertial confinement fusion uses shock waves launched by lasers/radiation to compress a deuterium-tritium fuel capsule and heat it to fusion temperatures. The fast ignition approach separates the compression and heating phases by using an additional short pulse laser to produce energetic particles which deposit their energy and raise the fuel to fusion temperatures at a critical point in the compression phase.

Following positive reviews from the EC in July 2007, the preparatory phase project is planned to commence in early 2008. This will prepare the case for a detailed design and construction phase to start in 2011. The facility is anticipated to open towards the end of the next decade, dependent on the success of this preparatory phase. Negotiations have begun to establish where the facility will be located, how the £500-million project will be funded and what technical options to pursue.

Members of the department are involved in a number of aspects of the project, including laser-particle acceleration, nuclear physics under extreme conditions and the development of particle and radiation diagnostics.

For more information visit the HiPER website **http://www.hiper-laser.org/** or contact Paul McKenna p.mckenna@phys.strath.ac.uk

SPINNING SLOWLY IN THE WEB

University of St Andrews astronomers have succeeded in tracing the magnetic web that binds newly forming stars to their surrounding gas and dust.

The findings will improve understanding of how stars, including the Sun, form.

The Scottish scientists were part of an international team led by French astronomer Jean-Francois Donati.

St Andrews researcher Dr Moira Jardine said, “This is the first time that we’ve been able to map the magnetic field of a star that is so young that it is still forming. We know that new stars form in molecular clouds and, as they collapse they should spin up - just like an ice-skater pulling in their arms to spin. That was the theoretical prediction anyway, but when young stars were first observed it was found that they were in fact spinning quite slowly, contrary to the original prediction. We’ve thought for some time now that this rapid spinning is prevented by the magnetic web that links the new star to the disk of gas and dust out of which it formed. Now, for the first time, we’ve been able to trace the individual strands of this web along which gas drains out of the disk and onto the star. These new observations will help us to understand how stars like the Sun formed, and how their surrounding disks might evolve to form planets like our own.”

The baby star in question (V2129 Ophiuchi) is only a few million years old and is so young that it is still forming. It is currently shrinking down to its adult proportions, so although it is about the same weight as the Sun, it about 2.5 times its size. It can be found in the constellation Ophiuchus, but at a distance of 420 light years it is about a million times too faint to be seen with the naked eye.

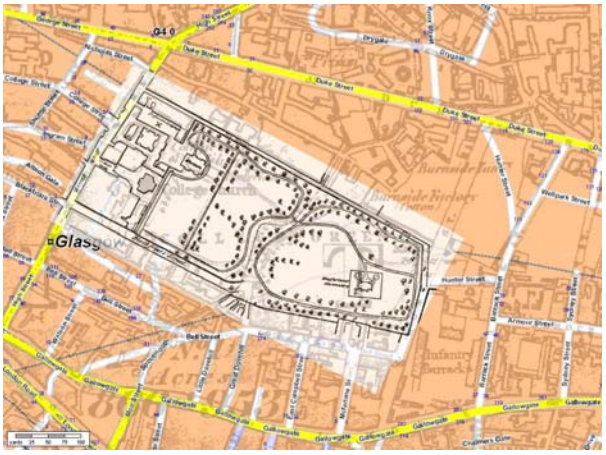
The paper is published in Monthly Notices of the Royal Astronomical Society.

mmj@st-andrews.ac.uk

GLASGOW OBSERVATORY COMPLETES FIRST QUARTER MILLENNIUM

On August 17, 1757 The University of Glasgow opened its first observatory - also the first in any Scottish University and one of the earliest in the UK.

This major anniversary was celebrated in a variety of ways including talks by Dr. D. Clarke (former Director of Observatories) and Prof. J.C. Brown (Astronomer Royal for Scotland), and exhibitions by Dr. Clarke and Mrs. M.I. Morrris (former Observatory RA), at the 2007 national "Out of London' Meeting of the (amateur) British Astronomical Association held in Strathclyde August 31 - Sept 2.



Location of original MacFarlane Observatory at Dowanhill

Dowanhill Observatory ca 1850

Acre Road Observatory today

The Observatories have undergone several moves over the centuries to escape the worst of the city sky pollution while remaining accessible to students and today make considerable use of radio facilities established by Dr Graham Woan (Director) to enable 24 hour weather-independent observing.

2010 will see the 250th anniversary of the first Astronomy Regius Chair appointment - again the first in Scotland and high on the UK list - of Alexander Wilson, discoverer of the 'depression' of sunspots (Wilson Effect) still widely discussed, solar activity physics being a field in which Glasgow features strongly to this day. That event will be marked by the hosting in the University Glasgow of the (professional) National Astronomy Meeting in April 2010

Further details at

http://www.gla.ac.uk/news/headline_40787_en.html

http://www.astro.gla.ac.uk/observatory/observ.shtml

http://www.astro.gla.ac.uk/observatory/history/obs-hist.shtml

j.brown@physics.gla.ac.uk

GLASGOW TAGS A EUROPEAN SUCCESS

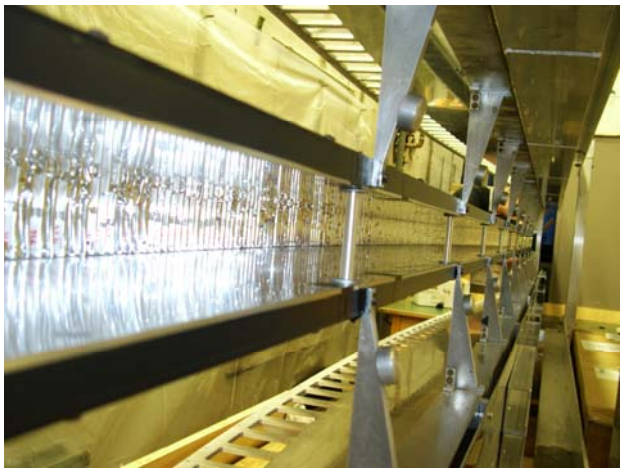
Earlier this year, the Scots were popping Champagne corks at the University of Mainz in Germany as their high-energy Photon Tagger and the 1.5 GeV MAMI C electron beam came online for the first time.

The physics performed by the Tagged Photon A2 Collaboration at MAMI has wide-ranging impact: studies to unravel the internal structure of nucleons, which are the building blocks of nuclei and the most strongly bound complex systems in nature, are performed alongside experiments of astrophysical relevance, such as the recent determination of the neutron skin of very heavy nuclei. The high rate energy-tagged photon beam provided by the Glasgow Photon Tagging Spectrometer (Glasgow Tagger) is essential for these studies. The Glasgow group is world-leader in providing this type of instrumentation.

The photon-tagging technique involves placing a 30 to 50 μm thin (diamond) radiator in the electron beam provided by MAMI, and then bending the main electron beam into a beam dump using a large dipole magnet. Some electrons, when passing through the radiator, will radiate and lose energy, with emission of a bremsstrahlung photon. The bremsstrahlung photons continue down the beam line into our experimental area. The lower-energy, radiating electrons are bent further by the field of the dipole magnet and impinge on a focal plane detector system (an array of fast plastic scintillator elements). The position of electron incidence is directly related to its energy and thus we can "tag" the energy of the radiated photon via simple energy conservation, using timing coincidence between the detected electron and the reaction products detected around our experimental target to link the photon beam energy with the resulting reaction products.

To provide photon tagging facilities for the energy-upgraded MAMI C electron beam, it was necessary to upgrade the Glasgow Tagger magnet substantially to dump the higher energy beam. It was also decided to take the opportunity of the full Tagger dismount to refurbish the entire focal plane detection system. This refurbishment took the form of completely new custom electronics cards and new CATCH ADC and TDC systems and the renewal of all the scintillators. To effect the dumping of the higher energy beam, it was necessary almost to double the Tagger's magnetic field. This was achieved by narrowing the Tagger magnet pole gap from 50 mm to 25 mm, and by adding pole shims to the existing pole shoes. To cope with the increased field, an additional 20 tonnes of iron were added to the magnet return yoke.

The upgraded Glasgow Tagger is now running successfully and the A2 collaboration are fully immersed in the second phase of the Crystal-Ball@MAMI experimental series. The high quality photon beam supplied by the upgraded Glasgow Tagger is being used in conjunction with the Crystal Ball (formerly of SLAC and Brookhaven National Laboratory), the TAPS BaF2 crystal detector system and a custom-built Scottish Particle Identification Detector. This large acceptance system, coupled with the high flux, newly energy upgraded beam, provides the ideal platform for studies of the second nucleon resonance region and experiments involving two- and three- nucleon knockout, using linearly polarised photon beams to access polarised observables at hitherto unachievable energies. Again, Glasgow is world-leading in developing the techniques to produce high-energy linearly polarised photon beams.

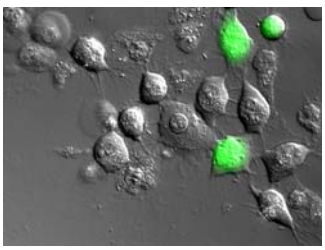


The completely refurbished Glasgow Tagger focal plane detection system.

Reinstalling the Glasgow Tagger focal plane detection system. The lighter blue parts of the additional magnet return yoke can be seen.

g.rosner@physics.gla.ac.uk

BIOPHYSICS: MOLECULAR DELIVERY WITH ULTRASOUND



H1299 cell monolayer exposed to 1.00MHz ultrasound for 10ms (100% duty cycle) in the presence of micro-bubbles and fluorescent calcein. Those cells exhibiting fluorescence post exposure have experienced sonopo-ration, that is, ultrasound mediated membrane disrup-tion. (viz Nature Physics 1, 107 (2005)).

Understanding mechanism may be the key to opening up this technique for generic non-invasive surgery and gene-therapy.

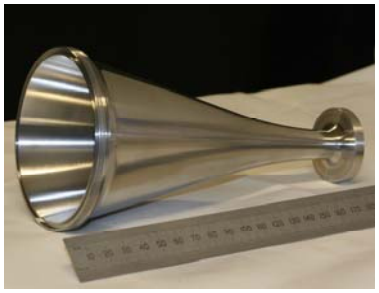
Project funded by EPSRC – Metrology for Life Sciences Call.

a.cuschieri@dundee.ac.uk, p.a.campbell@dundee.ac.uk, kd1@st-andrews.ac.uk, ws@st-and.ac.uk

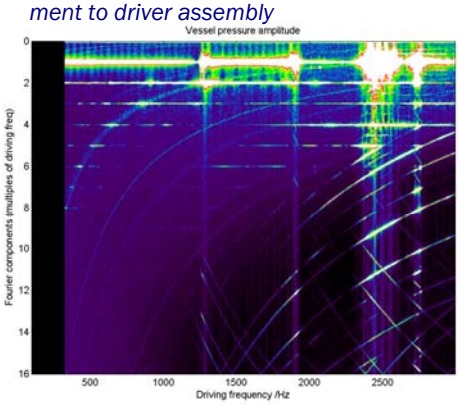
MACROSONIC PLASMA REACTOR

Plasma researchers Dr Hugh Potts & Dr Declan Diver (Astronomy & Astrophysics group, Glasgow) have been investigating generating extraordinarily large (macrosonic) pressure waves in a specially made dissonant vessel. The blueskies research project is aimed at building an atmospheric pressure plasma reactor with a unique property: the vessel will be able to sustain sonically-driven large pressure contrasts that can be exploited to control the ignition of plasma by a planar electrode assembly at one end of the vessel. The conditions for gas breakdown are governed by the Paschen law, a strong function of the product of the gas pressure and the electrode separation; this new acoustic ignitor will be designed to create a self-pulsing plasma for high-pressure processing. Recent experimental results show a factor 2 pressure contrast in the largest driven waves - sound this loud could suspend a person in the air due to the extreme pressure gradients! In comparison the threshold of pain for hearing is about 3000 times lower amplitude than this.

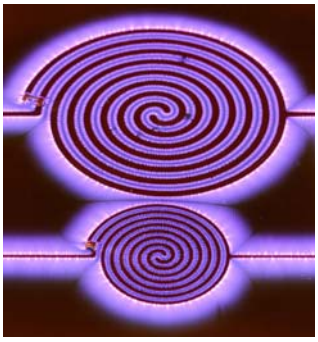
diver@astro.gla.ac.uk



The dissonant vessel that is used for macrosonic wave production, before attachment to driver assembly

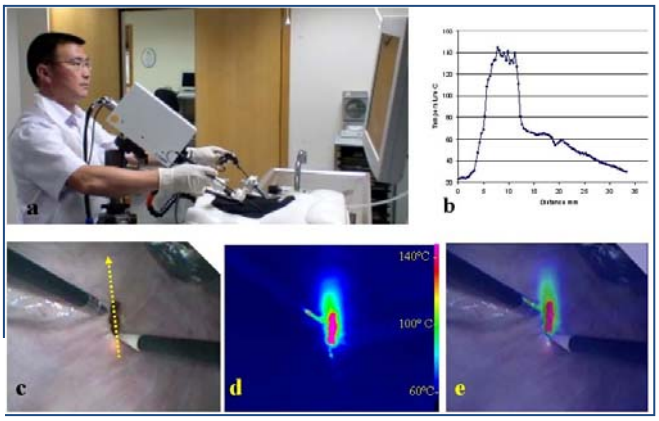


Characterisation of the dissonant vessel. The plot shows the excitation of various resonant modes as the driving frequency is increased at high amplitude. Structures parallel to the x-axis are exact multiples of the driving frequency, typically harmonics caused by the non-linear nature of the resonance. The curved structures are at fixed frequncies and represent the mechanical resonances (sometimes aliased) of the vessel and driving structure.



Two prototype spiral electrode assemblies, used for acousic driving, showing an atmospheric plasma in air.

PHYSICS DRIVEN MULTI-SPECTRAL IMAGING (OPTICAL + THERMAL)



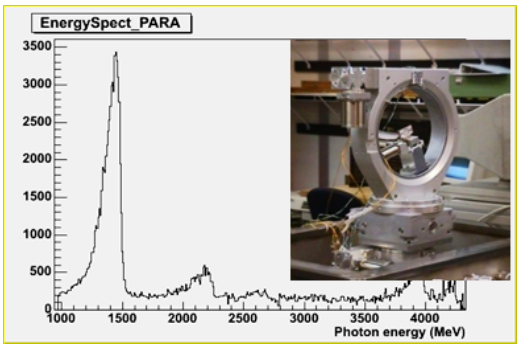
The unique thermal imaging endoscope developed at Dundee, here shown during trials in Ninewells Hospital. (c) Optical view [with software defined region of interest (ROI) (dashed yellow line in (c))] showing the electrocautery tool during activation, and the corresponding thermal cross-section (b). (d) is the purely thermal view whereas (e) shows the optical overlay of thermal and optical views.

It is hoped that the availability of such visual data will facilitate selection of appropriate power levels to reduce thermal collateral damage during electrosurgery.

Funded by EPSRC – Physics for Healthcare Call

a.cuschieri@dundee.ac.uk, p.a.campbell@dundee.ac.uk, ws@st-and.ac.uk

MULTI-GEV PHOTONS PRODUCED IN A THIN DIAMOND WAFER



High-precision CLAS goniometer at Jefferson Lab in the US (right), and high-energy photons emitted in the diamond (left)

Shining light on a diamond causes it to sparkle. A diamond will also sparkle if struck by a narrow beam of electrons, such as those produced by Jefferson Lab's CEBAF accelerator in the USA. When electrons pass through the diamond, some are diverted and emit photons in a coherent fashion. If the diamond is oriented correctly, it produces a linearly polarised photon beam (peaks in Fig. 1, left). The polarisation plane of all the photons is the same, instead of their being oriented randomly.

A device called a goniometer (Fig. 1, right) tilts the diamond, much like a jeweller turning an engagement ring to admire its sparkle. The goniometer is precise to hundredths of a degree. To make a graph of the diamond's alignment, the goniometer rotated it in a full circle. The diamond was exposed to about one second of electron beam for each of 180 steps.

Photon scattering pattern of a perfectly aligned diamond when rotated full circle.

Fig. 2 shows a perfectly aligned 30 μm thin, 5 mm wide slice of diamond that produced up to 2.5 GeV linearly polarised photons for hadron physics experiments. It is the Glasgow Nuclear Physics group that has been world leading in developing this technique.

g.rosner@physics.gla.ac.uk

SEVERAL NEW APPOINTMENTS BOOST UNIVERSITY'S VISION FOR 'PALS'

It is becoming increasingly apparent that a meaningful assault on the outstanding seminal questions within life science and medical arenas will require the development of innovative cross-disciplinary teams in order to converge on timely and progressive solutions. What is also becoming increasingly apparent is that a multidisciplinary approach can lead to leaps in understanding: new enabling technologies can trigger a more fundamental understanding of the biologically relevant physical processes; leaps can also result simply through the fresh approach given by a different perspective.

It is now five years since the Dundee vision in this regard was first mooted. Here, it was recognised that for the University's life science research to remain world leading, then a natural progression would involve more direct collaboration with the University's adjunct disciplines. Not surprisingly, a role for physics was deemed wholly appropriate, though not only with Dundee's resident physics community but also with the wider Scottish breadth of expertise, and especially at the internationally renowned neighbouring School of Physics and Astronomy at St Andrews. Moreover, it was recognised that a grass-roots injection of longer-term investment in the local physics research base would also be needed.

These early discussions have now given rise to a regeneration of the Division of Electronic Engineering and Physics (EEP) and the creation of a sister Division within the School of Engineering, Physics and Mathematics, the Institute of Medical Science and Technology (in direct partnership with the University of St Andrews): a multi-million pound facility hosted on the site of Ninewells Hospital in Dundee. This institute, headed up by Prof Andreas Melzer (a pioneer in interventional MRI), will soon open its doors, with a remit to strongly focus on the translation of physics-driven technologies into novel clinical diagnostic and therapeutic applications. Though MRI plays a key role in the new facility, other imaging modalities and multi-modal imaging will play an important role, especially for intra-operative guidance.

Joining the permanent staff of IMSAT this year are acoustics specialist Dr Sandy Cochran, previously of Paisley University, and also RCUK Academic Fellow Dr Paul Prentice. Dr Prentice has a background in combining acoustic and optical approaches gained through previous work at Dundee (see figure) with Dr Paul Campbell, who himself has recently moved to take up a Readership in Physics at Dundee, having previously spent 5 years working within the Surgical Technology group at Ninewells Hospital.

Photonics is central to the PALS theme and Dundee has seen three new EEP appointments in this area, starting with Dr Edik Rafailov, who came to Dundee in 2005 from St Andrews to pursue his research into quantum dots. In 2007 another two researchers moved from St Andrews: Dr Mike MacDonald, EPSRC Advanced Research Fellow in Biophotonics, and Dr David McGloin, Royal Society University Research Fellow in Applied Optical Manipulation. Another appointment made recently is Dr Gari Harris, who adds to the nanomaterials research expertise at Dundee, bolstering a group which is increasingly interacting with the life sciences. Importantly, the research themes at Dundee are complimentary to those across SUPA, yet unique opportunities exist due to the new synergies that are developing.

Established PALS work in EEP includes the implementation of first UK nanometer scale distance measurements in biomolecules using pulsed electron magnetic resonance in a collaboration between Dr David Norman, CRUK Nucleic Acid Structure Research Group, College of Life Sciences, and Dr David Keeble (EEP). This work was carried out under a RCUK BT award between St Andrews and Dundee. After proof of concept testing using DNA 'ladder' molecules the work has been extended to study the interaction of DNA binding proteins and through a recent BBSRC grant for the elucidation of the structure of the nucleosome, the primary building block of the chromosome. This work complements the established time-resolved and single-molecule FRET capabilities in the Nucleic Acids Research Group under the leadership of Prof. David Lilley FRS.

With all these new appointments it will come as no surprise that there is something of a buzz about physics at Dundee. This feeling of excitement extends throughout the disciplines, for example Dundee's need for physical scientists, according to keyhole surgery pioneer Sir Alfred Cuschieri, who holds an honorary chair in Medical Physics in EEP, is as follows: "Timely material and real progress in technologies for healthcare will only emanate from a broad range of scientific expertise, possible only by close interaction between life, physical and medical scientists, which apart from increasing the scope for realisation of novel diagnostic and therapeutic devices for improved healthcare, will also lead to more rapid and efficient translation from concept to product".

New collaborations are being built in areas such as multi-modal imaging/therapy in surgical oncology and laser microsurgery in developmental physiology studies. Managing the wide range of new opportunities will be something of a challenge if the highest impact is to be attained from the research pursued. Clearly it will also be some time before the expansion in physics at Dundee will lead to mature PALS collaborations, but with most of the ingredients now in place, we would recommend that you watch this space for further news of groundbreaking new interdisciplinary research here at Dundee.

m.p.macdonald@dundee.ac.uk

THREE IN A ROW FOR IOP

A hat-trick of recent successes for the Institute of Photonics at the University of Strathclyde has reinforced its position as a exciting centre of laser expertise and useful research.

Dr Stephane Calvez is the IoP lead in a three year award for £760,000 from EPSRC as part of a £3.5M consortium with Cambridge and led by St Andrews. The project will develop femtosecond lasers in a modular format. This allows lasers built for one application to be easily transferred to another as the uses range widely from high-speed communications to eye surgery.

The Solid State Laser Development team undertake research which will produce practical improvements to laser performance, be that in beam quality, functionality or cost. Their 'Low cost, high performance lasers' project, will build on new techniques possible and components available which could radically extend the uptake and uses of the Ti:Sapphire laser, currently a versatile but expensive luxury in the laboratory. This £385,000 award from EPSRC to the IOP has already attracted significant interest from industry.

The 'Advanced Disk Lasers: New horizons in solid-state and semiconductor lasers' programme is worth a further £327,000 from EPSRC to the Institute. Dr Alan Kemp will lead in this project and his expertise in thermal modelling and management will be a prominent part of the research. This project brings together both semiconductor and solid state laser expertise from across the IoP.

Dr David Burns, who leads the SSLD team, said 'These new projects will bring 3 new postdoc positions and 4 PhD studentsand includes contributions from several teams in the Instituteof Photonics.'.

Allied to one of the Institute's two prestigious Platform Grants, this portfolio of work sits alongside DTI, EU and industrially funded programmes giving a strategic blend of academic excellence and commercial value.

Tim Holt, Chief Executive of the IOP added 'This latest round of good news strengthens our research portfolio, develops our cross-team working and really delivers on our vision of strategic and applied research.'

simon.andrews@strath.ac.uk

COSMIC MAGNETISM AT GLASGOW

Researchers Drs Luis Teodoro, Declan Diver & Martin Hendry have been considering the impact that cosmic magnetic fields may have on the early evolution of the universe, particularly around the decoupling era. Conventional approaches often add magnetic fields as an afterthought, almost always using magnetofluid approaches. The Glasgow group has taken a different approach: whilst fluid models are fine in the context of slow evolution, the transition between fluid-amenable quasi-equilibrium states can involve timescales and physics that are beyond simple magnetofluid treatments, instead requiring a full electromagnetic, plasma analysis. The critical physics here is the loss of charged particles as the plasma recombines to form neutral atoms at a temperature of around 0.3eV. This relatively sudden loss of particle current density has a significant consequence for the ambient magnetic field in the Universe: electromagnetism will attempt to maintain the total current density by inducing a displacement current contribution, just as cutting the current on an inductive circuit will induce a large back electromotive force (emf).

diver@astro.gla.ac.uk

APPROACHING THE DARK SIDE OF THE UNIVERSE

Aerial view of LIGO Observatory, Hanford, Washington State

A team led by Prof Jim Hough in Glasgow, working with Dr N Lockerbie at Strathclyde has been awarded £7.6M from STFC to underpin its leading research in the quest to observe the Universe in the medium of gravitational waves.

Glasgow researchers have been working with colleagues in the UK, Germany and an array of international colleagues in the US and Europe to operate the worldwide network of gravitational wave detectors, seeking to detect the first of these tantalising signals from a range of astrophysical sources.

The 6 strong academic team in Glasgow University is being joined by Dr Giles Hammond, recently appointed to an RCUK Fellowship to further strengthen this growing field.

The last year has seen exciting developments in the search for gravitational waves with results of astrophysical significance being produced by the LIGO/GEO/Virgo detector network. Recent searches led by researchers in Glasgow for gravitational wave signals from the pulsar in the Crab Nebula, clearly show that less than 10% of the energy associated with its spin-down can be due to gravitational radiation thus making a fundamental jump in understanding of the Crab's radiation balance.

Following the recent and longest science data taking run which ends on 30 September 2007 both the US LIGO and European Virgo systems will undergo intermediate upgrades while the UK-German GEO detector will maintain an 'Astrowatch' for gravitational wave signals operating along with the low temperature bar detectors Auriga and Nautilus in Italy.

Research is now gaining pace at Glasgow and Strathclyde for the major rebuild of the LIGO system (AdLIGO) which commences at the detector sites in 2010, and with which compact binary coalescence sources are essentially guaranteed to be observed. There are exciting developments afoot in Europe also where 'third generation detectors' such as the planned Einstein Gravitational Telescope (ET) are being proposed with Glasgow playing a leading part in a newly funded FP 7 design study for the Einstein Telescope.

Recent good news for the proposed ESA-NASA space-based gravitational wave detector 'LISA' has come with the publication of a report from the US 'Beyond Einstein Program Advisory Committee' recommending LISA be the 'flagship mission' for the US Beyond Einstein program, with a mission to study dark energy flying just prior to it.

s.rowan@physics.gla.ac.uk

SUPA ASTRONOMERS HOST INTERNATIONAL SUMMER SCHOOL ON EXTRA-SOLAR PLANETS

In May 2007 more than 50 astronomers, from 21 different countries, gathered on the Isle of Skye for a two-week Advanced Study Institute entitled *"Extra-solar planets: the detection, formation, evolution and dynamics of planetary systems"*. The summer school, which received generous support from the SUPA Graduate School Summer Schools Programme, was the 62nd in the series of Scottish Universities Summer Schools in Physics and the latest in the "Cortina" series of Advanced Study Institutes in astrodynamics. The principal organisers were Prof. Bonnie Steves (Glasgow Caledonian University, Director), Prof. Andrew Collier Cameron (St Andrews University) and Dr. Martin Hendry (University of Glasgow). The summer school aimed to bring together young astronomers from a diverse range of fields relevant to the study of extra-solar planetary systems. The core programme consisted of lectures by internationally leading experts, supplemented by workshops and informal discussion sessions. The programme was designed to enable the exchange of new ideas across these fields, to improve our understanding of our own solar system and its place in the diverse range of planetary systems discovered so far. As well as reviewing comprehensively its current status, the lectures explored future directions for exo-planetary research, including proposed space missions and observing facilities which will lead the quest to find Earth-type planets in the habitable zones of solar-type stars.

The summer school was held in *Sabhal Mor Ostaig*, Scotland's only Gaelic College, set amidst breathtaking mountain and coastal scenery on the southwestern tip of the Isle of Skye. Although the lectures were exclusively in English, the participants enjoyed a very active social programme which included a workshop in Gaelic folk singing and a multilingual concert of songs and poetry from their home countries. The unexpected bonus of some very sunny weather, combined with Skye's northern latitude, also sustained games of Ultimate Frisbee late into the evening! All of this helped to make the summer school a tremendous success and a very effective showcase for Scottish physics – and the Scottish natural landscape – to the international scientific community.

Participants at the Skye exo-planets summer school, silhouetted against the stunning mountain panorama of Lochaber, enjoying a glass of wine before the closing gala dinner.

martin@astro.gla.ac.uk

SUPA DISTINGUISHED APPOINTMENT

We are delighted to announce the appointment of Professor Séamus Davis of Cornell University to a SUPA Distinguished Research Professorship at the University of St. Andrews. Professor Davis is a distinguished low temperature and condensed matter physicist, and was a co-recipient of the 2005 Fritz London Memorial Prize.

This 20% appointment signals the beginning of what we hope will be a long research collaboration between Cornell and SUPA, and will involve joint work between Davis's group and SUPA condensed matter physics groups, notably those of Professor Andy Mackenzie and Drs Santiago Grigera and Felix Baumberger of St Andrews and Professor Andrew Huxley of Edinburgh. Davis comments 'I am excited about the great potential of this collaboration. Combining SUPA and Cornell expertise in this way opens avenues of science that neither of us could explore in isolation. Before formalizing our collaboration with this appointment, we performed a full year's feasibility study involving personnel interchange and transatlantic group meetings, and it has worked so well that I am full of optimism for the future.'

Mackenzie, the leader of SUPA's Condensed Matter and Materials Physics Theme, adds that 'Seamus Davis is a brilliant and inspirational scientist who has received offers from all over the world. That he chose to accept this one is testimony to the benefits of setting up an alliance like SUPA. We are all looking forward immensely to working with him to set up something pretty special.'

apm9@st-andrews.ac.uk

WHEN COLLOIDS FLOW LIKE SAND

Pastes, concentrated colloidal suspensions with nearly as much solid content as random packing would allow, are immensely important in many industrial processes, ranging from ceramics to pharmaceutical production. Understanding the deformation and flow, or rheology, of pastes is therefore a key problem in process engineering. According to conventional understanding, a paste behaves as a 'yield stress fluid', showing solid-like behavior at low applied stresses, but becoming fluid-like beyond a critical, yield stress. We have studied the pressure-driven flow of a well characterized 'model' paste, consisting of micron-sized Perspex (plastic) spheres stabilized by short surface-grafted 'hairs', down a twenty-particle-diameters wide capillary of square cross section using ultra-fast laser-scanning confocal microscopy. By following the motion of individual particles, we are able to show that the average flow does not follow what conventional rheology predicts for a yield-stress fluid. Instead, we observed features similar to those previously found for the gravity-driven flow of dry grains down a chute. Apparently, at these high solid contents, it is the friction between particles that dominates paste rheology, so that as far as average flow down a pipe is concerned, a wet paste seems to behave like dry sand. Importantly, we were able to extend a mathematical model previously developed to account for granular chute flow to fit our observations. Our findings necessitate a fundamental rethink in the rheology of an entire class of important industrial materials, and demonstrate the power of modern optical microscopy in the study of 'soft matter'. The use of this methodology is likely to yield a host of other important findings in the near future.

L.Isa@sms.ed.ac.uk

MULTIPLE RAINBOW OPTICS PUZZLE

By a remarkabe coincidence a virtually identical picture, taken in Norway by Terje O. Nordvik, was selected and issued by NASA as the Sept 12 Astronomy Picture of the Day. See http://antwrp.gsfc.nasa.gov/apod/ap070912.html with the NASA caption - Have you ever seen six rainbows at once? They are not only rare to see -- they are a puzzle to understand [especially] the intermediate rainbow, between the two. This rainbow is likely caused by sunlight that has first reflected off the lake before striking the distant raindrops that is [sic] reflecting sunlight back toward the observer.

The multiple rainbow image was taken in Broadford, Skye on July 21 2007 by Dr.M.I. Brown, wife of Prof J.C. Brown of Glasgow Physics & Astronomy

Comments/alternate theories to john@astro.gla.ac.uk

ADAPTIVE MICROSCOPY– INSTITUTE OF PHOTONICS GAINS THIRD FELLOWSHIP

Dr Amanda Wright has recently been awarded a Royal Academy of Engineering/ EPSRC Research Fellowship in Adaptive Microscopy.

After completing her PhD in Force Measurement of an Optical Trap at the University of Manchester, Amanda took the road north to join the Institute of Photonics in February 2004. Since then she has been promoted to Associate Team Leader in Prof. John Girkin's Applications Team.

Over the next five years, Amanda will be building on the team's work in adaptive optics and in advanced microscopy techniques. Her objectives include investigating equivalents to the 'guide star' technique used in astronomy where much of the early work in adaptive optics originated. Ultimately, she expects to bring together a range of techniques to demonstrate active aberration correction in a combined imaging and particle manipulation system.

Amanda said 'This technology will be developed with the primary aim of improving image quality and resolution when imaging at depth into biological samples. So it will directly benefit biologists and life scientists who wish to make 3D images of biological media and monitor biological processes that occur below the surface of a sample. It will be very important in this project to involve multidisciplinary collaboration with biologists and life scientists.'

The Chief Executive of the IOP, Tim Holt added 'This award is a real testament to Amanda's hard work and successes in the last three years and it is great to have her further potential recognised in this way. Her work also fits well with the Institute's remit of conducting commercially oriented research.'

Amanda joins Dr Jennifer Hastie and Dr Alan Kemp as holders of Fellowships at the Institute.

simon.andrews@strath.ac.uk

OUR MAN AT ORSAY

Martin Evans from Edinburgh has been awarded a 3 month CNRS Visiting Professorship to visit the Laboratoire de Physique Theorique et Modeles Statistique at Orsay, France.

Martin Evans has been Reader in the School of Physics, University of Edinburgh since 2002. He completed his PhD in Edinburgh in 1990 then embarked on postdoctoral reseach in France at CEA, Saclay and Ecole Normale Superieure, Paris before returning to the U.K to Theoretical Physics, Oxford with a Royal Society University Research Fellowship. He was appointed Lecturer in Edinburgh in 1995.

His research has been in the broad area of statistical physics and its application to complex systems. Statistical Physics is the methodology by which one analyses the emergent properties of systems with very many microscopic constituents. The field originated in the nineteenth century to describe classical gases, and developed hand in hand with quantum mechanics in the twentieth century. Today the field continues to develop to describe diverse systems of many constituents. For example in his thesis Dr Evans was interested in investigating how connected networks of neurons could form a structure within which patterns might be stored and recalled. As a postdoctoral researcher he contributed to the analysis of disordered systems and the related field of optimisation problems such as the problem of finding the optimal path in a random environment. Over last decade his research has focused on non-equilibrium systems, a general theory of which is a central challenge for statistical physicists.

A particular emphasis of his research has been on the analytical solution of simple systems of interacting particles. With co-workers he has obtained exact solutions of fundamental mathematical models models known as exclusion processes and zero-range processes. These are used as basic models for the study of complex non-equilibrium systems such as traffic flow and granular clustering and biophysical transport processes. He has been awarded a CNRS Visiting Professorship `Mecanique statistique de systemes hors d'equilibre' for 2007-8 to be held at Laboratoire de Physique Theorique et Modeles Statistiques, Universite Paris-Sud, France to continue this research. In particular the research will build on recent breakthroughs made in collaboration with Professor S. N. Majumdar on the theory of real space condensation in non-equilibrium systems S. N. Majumdar, M.R. Evans, R.K.P. Zia {\it The Nature of the Condensate in Mass Transport Models} Phys. Rev. Lett {\bf 94} 180601 (2005) (9) and

M. R. Evans, T. Hanney, S. N. Majumdar {\em Interaction-driven real-space condensation } Phys. Rev. Lett. {\bf 97} 010602 (2006) (2).

The Laboratoire de Physique Theorique et Modeles Statistiques, Universite Paris-Sud is a major international centre for statistical mechanics and its applications, housing around 25 researchers in the field. Universite Paris-Sud is also the home of 2006 Fields medallist, Wendelin Werner and 2007 Nobel Laureate in Physics, Albert Fert.

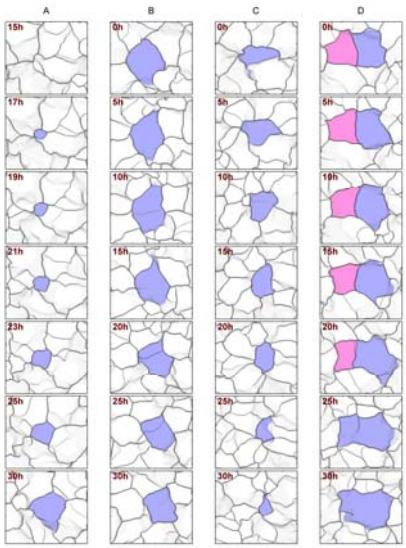
martin@ph.ed.ac.uk

SOLAR SURFACE FLOWS AND MAGNETIC INTERACTIONS

Glasgow Astronomy & Astrophysics researchers Dr Hugh Potts and Dr Declan Diver have developed an exceptionally noise resistant method for accurate and automatic identification of the large scale convection (supergranular) cell boundaries from velocity measurements (Potts and Diver, Solar physics 2007, accepted). Using these techniques we can identify certain basic properties of supergranulation cells, such as their characteristic sizes, the flow speeds within cells and their dependence on cell areas at exceptionally high resolution. We can also show in detail the evolution of supergranular cells over their lifetime, including observations of emerging, splitting and coalescing cells. A key result of our analysis of cell internal velocities is that supergranules appear to be scale-independent in this respect.

Developing this work further, we have looked at the interaction of the solar surface flows with the magnetic field that permeates the photosphere, and have identified a new heating mechanism for the solar atmosphere (Potts, Khan and Diver, Solar Physics DOI:10.1007/s11207-007-9021-7). Small magnetic structures are observed to be entrained with the photospheric flows, and where such flows converge these structures are compressed and drawn beneath the photosphere. This process transfers energy from the hydrodynamic regime of the photosphere to the plasma that is trapped in the magnetic structures, heating it, and causing observed bursts of X-ray emission.

diver@astro.gla.ac.uk



The evolution of selected supergranular cells over a 31 hour period. The four colums show representative processes of creation, evolution, destruction and merging of cells.

UNDERSTANDING THE STRUCTURE OF THE EXOTIC NUCLEI AND THE NUCLEOSYNTHESIS IN UNIVERSE

After the Big Bang and billions years of evolution, the universe has provided us around 200 nuclei. These nuclei consist of the so-called beta-stability line in the nuclear chart. Based on the information from these nuclei, nuclear theory is established to understand the nuclear structure. With more than 2000 nuclei produced by the nuclear physicists in the Laboratory and around 6000 more expected to be produced in the facilities in operation or under construction in China, Europe, Japan and US, the conventional nuclear theory meet serious challenge. For example, the discovery of neutron halo in 11Li leads to the reexamination of the so-called incompressible assumption widely used in the nuclear collective model. The disappearance and appearance of the magic number will leads to the reexamination of the shell model and also the path of the the nucleosynthesis in Universe.

In order to understand the structure of the neutron halo in 11Li, the proper treatment of the resonance and the bound states on the same footing and the coupling between them is both challenging and exciting, in particular, if the nucleus adopts non-spherical shape. Jie Meng and his collaborators are the pioneers in predicting chirality in the atomic nucleus, giant halos in medium mass neutron rich nucleus, and magnetic rotation. He is currently theoretically exploring the deformation effects in halo nucleus, proton and neutron radioactivity in exotic nuclei, as well as the impact of the exotic nuclear structure on the astrophysical process.

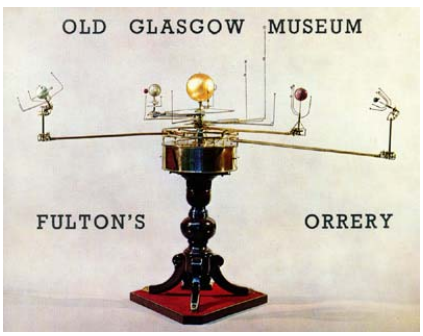
Jie Meng, Peking University, SUPA Distinguished Visitor to UoE

While visiting Scotland Prof Meng has given three lectures on his current research

mengj@pku.edu.cn

THE PLANETS SUITE - BBC SSO - SEPT 2007

The New Season of BBC Scottish Symphony Orchestra City Hall Concerts opened on Sept 20 with, inter alia, Holst's Planets Suite. This was introduced by a short discussion between presenter Jamie MacDougal and John Brown of Glasgow P&A, by Fulton's Orrery Kelvingrove and in the GSC Scottish Power Planetarium, of the mood of the movements relative to our modern impression of the 7 planets involved. The concert itself was augmented both in the Hall and on-screen by planetary images from state of the art astronomy such as the stunning back-lit Saturn seen from Cassini. This music-science interface event, master-minded by BBC Senior Music Producer Lindsay Pell, was generally well received and there are hopes of further collaborations. Watch/listen to this space. The full broadcast is now available online http://www.bbc.co.uk/scotland/player/?item=44532823&size=vt100



j.brown@physics.gla.ac.uk

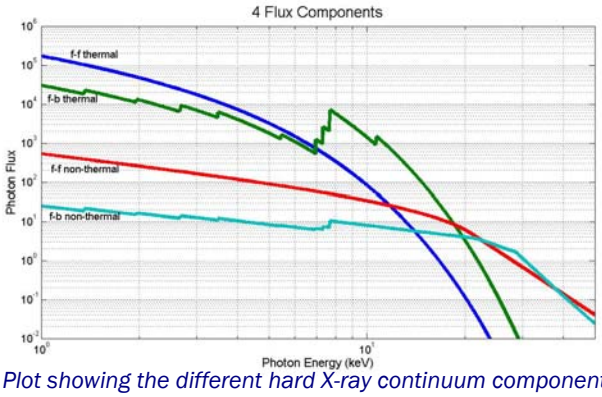
RESEARCH RETHINK ON SOLAR HARD X-RAYS

After 200 years of solar research in Glasgow, things took a new direction in the space age with the discovery of Hard X-Rays (HXRs) (> 10 keV) from solar flares. These are at energies above those of atomic lines from significant solar material (Z < Fe) and from electrons with longish mean free paths. They are therefore assumed to be from accelerated non-Maxwellian electron distributions, the nature of which is an important clue to the acceleration physics. Deconvolving electron spectra from the photons requires very high quality photon spectra which have only been acquired since the launch in Feb 2002 of the NASA Award winning R (amaty) H(igh) E(nergy) S(olar) S(pectroscopic) I(mager) on which the Glasgow A&A Group has Co-Investigator status, funded by STFC.

The deconvolution also requires knowledge of the radiation process (cross-section) which, since the very first data in the late 1960s, has been taken by all to be collisional bremsstrahlung (e.g. seminal paper JC Brown 1971 Solar Physics 18, 489, the citation history of which shows the solar activity cycle!). In particular, non-thermal recombination radiation has been ignored till now on the grounds that the cross section is small. In a paper in press, Brown and Mallik have just shown that, for quite a few solar events, this is simply untrue and we will have to rethink considerable amounts of previous work.

There are two main reasons for this oversight. Firstly, since the 1970s solar Fe abundance estimates have been revised upwards by factors of 10-40. Though Fe is very rare its highly ionised states have a very high value of Z^4, which enters the recombination cross-section. Secondly emission of a 20 keV bremsstrahlung photon needs electrons of E > 20 keV but recombination onto ionised Fe requires only

E ~ 11 keV and such electrons are much more numerous than 20 keV ones for the typically steeply decreasing flare electron spectra. Consequently, in those flares, where the HXRs originate in very hot plasma, non-thermal recombination cannot be ignored and may even dominate. For such events at least, much spectral analysis of RHESSI data will need to be re-done and we may have to reconsider the "Standard Model" paradigm of 4 decades that non-thermal electrons dominate the solar flare energy budget.



Plot showing the different hard X-ray continuum components for a representative situation, with a mixture of emission from a thermalised plasma at 2.0 x 10^7 K and a non-thermal component inferred from the RHESSI observations of the flare of April 14, 2002. Note that the non-thermal free-bound component dominates at some energies.

In the hot plasma model example shown, the pale blue line is the non-thermal recombination and the red line the non-thermal bremsstrahlung (while the green and dark blue are thermal) for an electron spectrum cut off below E_c= 10 keV. While recombination complicates things, the presence of edges may allow, unlike bremsstrahlung, inference of the value of E_c, which is crucial to flare energetics.

p.mallik@physics.gla.ac.uk, j.brown@physics.gla.ac.uk

CSEC ON THE FORUM

Dr. Eugene Gregoryanz, at the Centre for Science at Extreme Conditions at the University of Edinburgh has been featured in the "Fast Moving Fronts" section of the online forum "Essential Science Indicators."

Check details at

http://www.esi-topics.com/fmf/2007/september07-EugeneGregoryanz.html

Gregoryanz fields questions on the highly cited CDAC paper in Nature Materials from 2004 in which he and co-workers reported on the synthesis of platinum nitride. [Nature Materials, 3, 294-297 (2004)].

More details at

http://www.nature.com/nmat/journal/v3/n5/abs/nmat1115.html

e.gregoryanz@ed.ac.uk

ROBOTIC TELESCOPE FACILITY FOR SCOTTISH 9-14S

With combined funding of £15,500 from STFC and The Scottish Government, John Brown of Glasgow P&A and Alec MacKinnon (Dept of Adult and Continuing Education), in collaboration with John Baruch of Bradford University and pilot schools in Oban and the Glasgow area, are implementing a Scottish 9-14 Curriculum version of the educational materials on the Bradford Robotic Telescope (BRT) Website. BRT is quite distinct from Faulkes and the National Schools Observatory Robotic facilities in that it is completely automated and aimed at taking images only - wide medium and narrow fields- rather than quantitative spectra for advanced projects as Faulkes does. However, the imaging facility comes with powerful image processing packages from which many under-10s have produced very fine results. The projected cost to schools is around £400 per year for one high school + its feeder primaries which covers the cost of educational materials and training. Use of the telescopes themselves is free to anyone at www.telescope.org More details at http://schools.telescope.org/schools-info.php

j.brown@physics.gla.ac.uk

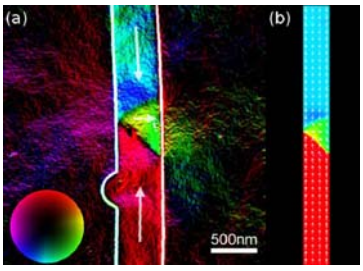
STUDENT WINS PRIZES FOR TRAPPING AEROSOLS

Daniel Burnham, a PhD student in St. Andrews and Dundee, has recently won two prestigious prizes for his work on the optical manipulation of aerosols. Daniel was the only UK winner (out of 136 awards) of one of SPIE's scholarships which are awarded for potential for long range contributions to optics and photonics. Daniel currently works with Dr. David McGloin at the University of Dundee on the applications of holographic optical manipulation with a particular emphasis on the optical trapping of airborne particles.

Daniel's work on the dynamics of optically trapped aerosols also netted him the Skinner poster prize at the recent Royal Society of Chemistry Faraday Discussion meeting on the 'Dynamics and Spectroscopy of Microparticles'.

d.mcgloin@dundee.ac.uk

TOP NANOCHARACTERISATION CONFERENCE IN GLASGOW



Asymmetric transverse domain wall in a 10 nm thick permalloy wire (courtesy of Dr Nils Wiese, Dr Damien McGrouther and Prof John Chapman, University of Glasgow)

The biennial Institute of Physics EMAG (Electron Microscopy and Analysis Group) conference subtitled "Characterisation, manipulation and fabrication on the nanoscale" was this year held in Glasgow at Glasgow Caledonian University with Dr Ian MacLaren of the University of Glasgow as the chair of the local organising committee. This was a particularly successful conference and attracted 182 delegates, well in excess of those for recent EMAG conferences, including visitors from all over Europe, as well as from all continents except South America and Antarctica! Highlights of the conference included plenary lectures from Prof. Christian Colliex (Université Paris Sud), Prof. Michael Treacy (Arizona State University) and Prof. John Chapman (University of Glasgow), as well as a conference dinner at the Tall Ship at Glasgow Harbour. There were also many contributions from the University of Glasgow including 2 invited presentations, 6 contributed talks and 4 posters. The conference venue was chosen to accommodate the associated exhibition of instruments and accessories. This attracted a wide range of day visitors in addition to the conference delegates.

Prior to the main conference, a 2-day advanced school on 'Introduction to EELS and EFTEM' (Electron Energy Loss Spectroscopy and Energy Filtered Transmission Electron Microscopy) was held at the University of Glasgow, with Dr Maureen MacKenzie and Prof Alan Craven of the University of Glasgow as local organisers. The event consisted of lectures from top international experts in the field accompanied by practical demonstrations of the material discussed in the lectures using the top class electron microscopy and computer facilities in the Kelvin Nanocharacterisation Centre. The event was initially planned to accommodate 24 participants but was expanded to accommodate a total of 35 attendees from 13 different countries due to the high demand for places. In view of the popularity of this school, plans have been discussed as to whether such events could be repeated regularly in future years.

i.maclaren@physics.gla.ac.uk

THE FZD ROSSENDORF – SUPA BEAM LINE

In late March of this year, SUPA supported a workshop entitled "Laser Driven Proton Oncology – A Unique New Cancer Therapy" at the University of Strathclyde which was attended by several of the world's leading laser and accelerator physicists as well as by clinicians and radiation physicists. Our initial idea was to set up such a facility in Scotland. The workshop was attended by an international panel who were asked for advice on how we should proceed. The decision of the panel was that we must set up a centre in a place which had lasers, accelerators, physicists, clinicians, biologists and radiologists whose prime objective was to do this line of research.

The decision we came to was that an ideal site was the Rossendorf Centre in Dresden, whose director Prof. Roland Sauerbrey was already a visiting professor at the University of Strathclyde. This centre was already collaborating with OncoRay–Center for Radiation Research in Oncology, Medical Faculty Carl–Gustav–Carus, TU Dresden, Prof. Ledingham of Strathclyde University's Department of Physics had been elected as an FZD fellow at the Rossendorf Centre and along with colleague Dr. Galster decided to invest SUPA–I funding to set up a laser/ electron beam line at the Rossendorf Centre. This will allow us to work at a centre one of whose prime functions is to develop proton oncology. In addition working with the local nuclear team, we can develop the technique of laser backscattering from accelerator produced electron beams to produce monochromatic x-ray beams. This will of course be one of the prime functions of the future 4GLS light source at Daresbury using an energy recovery linac.

How will this fit in with the SCAPA development at Strathclyde which we hope will be funded in SUPA II? The answer to this is 'very well'. The nuclear teams which are part of the SCAPA proposal will be working at Strathclyde developing detectors to be used abroad at international accelerators like FAIR, MAMI and JLab. The Strathclyde/ Paisley nuclear laser team will also set up and test experimental arrangements to be operated at the Rossendorf Centre and elsewhere in the UK.

Our SUPA team is also part of an exiting new initiative to set up the first cyclotron/ laser centre for research in proton and heavy ion oncology in the world in Dresden. This proposal is focussed around a multimillion pound development of a new cancer facility which in the longer term could help to provide treatment to patients throughout Europe and is of particular interest to the future of cancer treatment in the UK, where charged particle cancer therapy of deep–seated tumours is not yet available.

K.Ledingham@phys.strath.ac.uk

FIBRE-OPTICAL ANALOGUE OF THE EVENT HORIZON

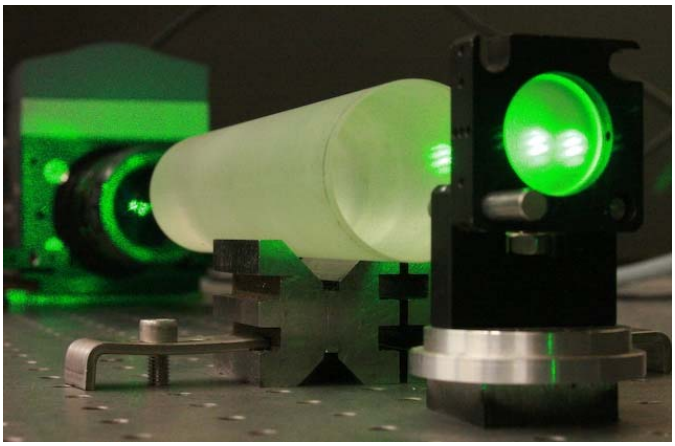
In 1974 Stephen Hawking predicted that black holes are not black; they radiate: the event horizon spontaneously creates quantum particles. However, Hawking radiation is unlikely to be observable in astrophysics, but rather in laboratory analogues of black holes. At St Andrews, a team led by Ulf Leonhardt is designing an experiment for fibre-optical black holes. According to nonlinear optics, light pulses in fibres modify the optical properties of the glass, increasing its susceptibility. Probe light at different wavelengths and polarizations is thus slowed in the vicinity of the pulse. The pulses establish horizons wherever the velocity of the probe is slowed below that of the pulse. The classical effects of the horizons on probe light is now been studied using ultrashort light pulses in microstructured fibres.

tgp3@st-andrews.ac.uk

ulf@st-and.ac.uk

WORLD THROUGH A SPINNING WINDOW

Following presentations at the recent SPIE conference in San Diego, USA, the work of SUPA researchers is to be reported in the SPIE newsroom. Together, Dr Jonathan Leach (Optics group, University of Glasgow) and Dr Amanda Wright (Institute of Photonics at the University of Strathclyde), are currently investigating how the World look if it was viewed through a spinning window. The project is an EPSRC funded component of the research prorgams of Prof Padgett, Prof Girkin and Prof Barnett. Perhaps surprisingly, if viewed through as spinning window, the World is in fact rotated.



Two moving interference patterns incident on a ground-glass screen. The screen is imaged onto the camera such that one of these interference patterns is imaged through the 20cm long glass bar and one is

The mechanism for this effect was termed ``ether drag" by R.~V.~Jones who investigated the influence of moving dielectric media on the properties of light in the 1970s. We have taken two approaches to investigating this problem. Firstly, at the Institute of Photonics, University of Strathclyde, we are rotating a 20cm glass bar at approximately 200Hz using a geared system built upon a washing machine motor and attempting to measure the rotation of transmitted images. Our second approach is to rotate or translate the light, rather than the dielectric medium, and use a camera with a 5ns shutter to freeze the motion, see figure. The initial results using this technique are very promising, confirming predictions relating to image rotation.

j.leach@physics.gla.ac.uk

ROY SOC SUMMER EXHIBITION

12 CSEC members represented Edinburgh at the Roy Soc Summer Exhibition in London

During 2-5 July, 12 members of the Centre for Science at Extreme Conditions (CSEC) in Edinburgh took part in the Royal Society's Summer Exhibition in London. This annual event featured 23 competitively selected exhibits from around the UK and attracted over 4,900 visitors, including 1,500 school pupils and 1,000 invited guests. We estimate some 1,500 or more spent time with us on our stand, and at least one Nobel Prize winner came specifically to visit the Edinburgh exhibit. It was entitled 'The Big Squeeze', and highlighted CSEC's research in high-pressure physics and chemistry. The exhibit started by encouraging visitors to see what pressures they could develop with their lungs by blowing into bagpipes, and then led them through the wonders of high-pressure phenomena, and showed them a variety of different materials at very high pressures, including a sample of crystalline hydrogen.

A press release from the Royal Society highlighting the ability of pressure to convert peanut butter into diamonds meant that the Edinburgh exhibit also featured heavily in the media, with live interviews on Radio Scotland and Radio 5 Live, and several reports in the press. A further request to appear on the Richard and Judy show was reluctantly declined!

Warnings beforehand suggested that taking part in the Exhibition was exhausting but very enjoyable - and this proved to be entirely accurate! I would strongly encourage other SUPA colleagues to take part in the future. The Exhibition provides a wonderful showcase for research, and highlights it to a wide range of people, including the media and the Royal Society's eminent invited guests.

The call for the 2008 Exhibition has just been made with a deadline of 5th November.

mim@ph.ed.ac.uk

BLACK HOLES AND BLACK MAGIC ON

This Sky at Night featured Fiona Speirits (Year 2 cosmology postgrad) and John Brown in Patrick Moore's "magic circle" completed by Chris Lintott. Prompted by a quick black hole conjuring trick by John in the (April 07) 50 Year Anniversary Party show, Patrick invited John and Fiona to do a full programme using magic to fake exotic black hole phenomena in the music room of his Sussex home.

John's "Magiscience" work received PPARC PUST funding in 1999 (together with Karen - "Annakadabra" - Mann, magicienne and then Physics undergraduate) and a 2002 IoP Physics Promotion Award. The content of his well tested "Black Holes and White Rabbits" was much augmented by Fiona's expositions on Branes, Gamma Ray Bursts, and gravitational lensing.

The shows are available on line http://www.bbc.co.uk/mediaselector/check/science/space/realmedia/skyatnight_sep07?size=16x9&bgc=000000&nbram=1&bbram=1

http://www.bbc.co.uk/mediaselector/check/science/space/realmedia/skyatnight_may07?size=16x9&bgc=000000&nbram=1&bbram=1

Sky at Night group, including Patrick Moore in fez

j.brown@physics.gla.ac.uk

PARTICLE PHYSICS STUDENT'S COSMIC RAY PROJECT WINS INTERNATIONAL AWARDS

Holly Batchelor, 18, a sixth-year pupil at the Mary Erskine School, Edinburgh, spent six weeks at the University of Edinburgh in the summer of 2006. As a Nuffield Science Bursar Holly worked under the supervision of Alan Walker, member of the Particle Physics Experiments group and the Particle Physics for Scottish Schools (PP4SS) Director, and Peter Reid, of the College of Science and Engineering outreach group SCI-FUN and the PP4SS Project Co-ordinator. Holly investigated the constant 'rain' of cosmic rays – high-energy particles that travel close to the speed of light through our atmosphere.

Holly built cosmic ray hodoscopes to detect the cosmic rays and to determine their angular distribution. She also designed and built a cloud chamber – sufficiently sensitive to see the tracks left by cosmic rays. Her design is reliable, cheap to make and easy to construct – ideal for a school project. She also helped to design a cosmic ray 'doorway' for outreach activities.

Having won a regional final for this project she went on to the BA CREST Science Fair, organised by the British Association for the Advancement of Science (BA), at the Royal Society in London in February 2007. There she was awarded the top prize, funded by Intel Education, to represent the UK at the Intel Science and Engineering Fair 2007 (ISEF2007) that was held in May in Albuquerque, New Mexico. Holly represented the UK against 1,511 of the brightest and most talented youngsters from 51 different countries around the world – all winners from national/state science fairs. Ten 15-minute interviews with Grand Awards judges and numerous other interviews with Special Awards judges saw Holly commended for her enthusiasm of her subject, her fantastic communication skills and the wide applications of her project, entitled 'Cosmic Rain: Investigating Particles from Space.'

At ISEF, Holly won three prizes; the First Award in the Physics and Astronomy Category ($3000 and the honour from MIT Lincoln Laboratories of having a near-earth asteroid named after her); a paid summer internship with Agilent Technologies; and a Certificate of Honourable Merit from the American Association of Physics Teachers and the American Physical Society.

"The other finalists' projects were absolutely amazing", said Holly, "so when listening to the ascending roll call of winners, I couldn't believe my ears when they called out my name. The noise in the auditorium was deafening but I could still hear the screams of my chaperones from the BA. More than the prize money, I love the idea of having my name in space forever - it's a huge privilege - I don't think it's sunk in yet!" Holly said of her success: "I was massively surprised. To be thought of in the same calibre as the other prizewinners is overwhelming. It's brilliant, just fantastic."

As a result of her experience Holly will be going on to study physics in September 2007. She recently returned from CERN having visited all four LHC detector caverns with a school group outing organised by the Edinburgh PPE Group.

Some Links:

Holly at ISEF
http://www.youtube.com/watch?v=U2c5m3TTL5g

Holly at the BA Crest Fair
http://www.scifun.ed.ac.uk/downloads/holly_crest.jpg
http://www.scifun.ed.ac.uk/downloads/holly_crest-1024.jpg

Particle Physics For Scottish Schools (PP4SS)
http://www.scifun.ed.ac.uk/pp4ss/index.html

The PP4SS Cosmic Ray Hodoscope
http://www.scifun.ed.ac.uk/pages/pp4ss/pp4ss-hodoscope.html

The PP4SS Cosmic Ray Doorway
http://www.scifun.ed.ac.uk/downloads/holly_door.jpg
http://www.scifun.ed.ac.uk/downloads/holly_door-1024.jpg

The PP4SS Cloud Chamber
http://www.scifun.ed.ac.uk/pages/pp4ss/pp4ss-cloud_chamber.html

a.walker@ed.ac.uk

PIPSS FELLOWSHIP AWARD

The PIPSS Panel approved the first PIPSS Fellowship at the Panel meeting in August 2007. This was awarded to Dr Val O'Shea from Glasgow University for a period of four years for a SUPA Business Development Manager.

The role of the SUPA PIPSS Fellow will be to generate new collaborative research and exploitation projects which involve the SUPA members where there is a strong emphasis on knowledge transfer through collaboration with other partners. The post will be funded in part by Scottish Enterprise.

Although this will be a free-standing role that will prioritise Business Development within targeted market sectors, it will fit within the desired model for future expansion of Knowledge Transfer (KT) as well as Project and Venture Support for SUPA activities. The appropriate KT routes will be created and in some instances this will be through new start up or spin-out companies, while in other circumstances it will be through working with existing businesses.

The SUPA PIPSS Fellow will spearhead a new multi-institutional initiative focusing on KT for university research that will benefit STFC, the participating organisations and the UK economy as a whole. The Fellow will take advantage of the synergies in research across SUPA, the breadth of commercial connections and the existing support networks to markedly increase KT outcomes as part of a targeted SUPA KT strategy. There will be a SUPA Showcase event at the SECC in Glasgow on 27th Feb 2008 to highlight the work that is being carried out as part of SUPA.

v.oshea@physics.gla.ac.uk

SUPA TAKES IT ALL

SUPA institutions have been very successful over the past year. We have received almost £20M worth grants from EPSRC (see table below)

Latest EPSRC Grant Announcements

Date of pannel: 24/10/2006

Rank	Principal Investigator	Holding Organisation	Grant Title	Value (£)
1	Professor M Cates	University of Edinburgh	Edinburgh Soft Matter and Statistical Physics Programme Grant Renewal	£3,976,785.00
2	Professor J Marangos	Imperial College London	Control of Electrons by Few-Cycle Intense Laser Pulses	£2,534,032.00
3	Professor DA Jaroszynski	University of Strathclyde	Harnessing laser-driven plasma waves as particle and radiation sources	£3,343,756.00
3	Professor RW Tucker	Lancaster University	Harnessing laser-driven plasma waves as particle and radiation sources	£166,862.00
5	Professor RJ Nelmes	University of Edinburgh	Fundamental systems at extreme conditions	£3,796,120.00
Date of pannel:08/11/2006				**£11,116,661.00**
1	Professor JM Rodenburg	University of Sheffield	Ultimate Microsocopy: Wavelength-Limited Resolution Without High Quality	£4,323,030.00
2	Professor DJ Lurie	University of Aberdeen	Fast Field-Cycling Magnetic Resonance Imaging	£2,428,520.00
3	Professor W Kolch	University of Glasgow	The Molecular Nose	£4,902,032.00
4	Professor RJ Barlow	The University of Manchester	The Non Scaling FIxed Field Alternating Gradient (NS-FFAG) Accelerator	£7,489,380.00
5 *	Dr M BORGHESI	Queen's University of Belfast	Laser Induced Beams of Radiation and their Applications (LIBRA	£4,747,342.00
Date of pannel: 31/01/2007				**£4,747,342.00**
1	Professor J Tennyson	University College London	Quantum states of Water at Dissociation	£88,697.00
2	Dr C Durkan	University of Cambridge	Electronic spin detection in single molecules and atoms by tunneling noise spec-	£191,041.00
3	Professor G Laricchia	University College London	Positron Reaction Microscopy	£604,297.00
4	Professor RJ Warburton	Heriot-Watt University	Laser cooling and spin resonance of a single spin in a quantum dot	£374,477.00
5	Professor PV Coveney	University College London	Large Scale Lattice-Boltzmann Simulation of Liquid Crystals	£324,180.00
5	Dr D Marenduzzo	University of Edinburgh	Large Scale Lattice-Boltzmann Simulation of Liquid Crystals	£467,011.00
7	Dr P McKenna	University of Strathclyde	Key physics for Inertial Confinement Fusion diagnosed by ion emission	£663,503.00
8	Dr FM Grosche	Royal Holloway, Univ of London	Investigating quantum phase transitions using designer-anvil pressure cells	£105,774.00
Date of pannel 25/04/2007				**£1,504,991.00**
1	Professor AD Huxley	University of Edinburgh	Field Induced Quantum Ordering	£863,807.00
1	Professor S Lee	University of St Andrews	Field Induced Quantum Ordering	£292,917.00
3	Professor WA Hofer	University of Liverpool	Transport through organic and inorganic interfaces with high resolution: Multiple-scattering description of electron transport	£381,648.00
4	Professor J Rarity	University of Bristol	Microstructured Fibre for Quantum Information	£314,404.00
4	Dr WJ Wadsworth	University of Bath	Microstructured Fibre for Quantum Information	£328,872.00
6	Professor MB Plenio	Imperial College London	Generation and Dynamics of Complex Hamiltonians in Coupled Cavity Systems	£340,875.00
7	Professor AT Boothroyd	University of Oxford	Nanoscale ordering phenomena in transition metal oxides	£374,092.00
7	Professor PD Hatton	Durham University	Nanoscale ordering phenomena in transition metal oxides	£356,651.00
Date of pannel: 25/07/2007				**£1,156,724.00**
1	Dr RH Hadfield	Heriot-Watt University	Ultrafast infrared superconducting single-photon detectors	£230,285.00
2	Dr N Madsen	Swansea University	Antihydrogen trapping and plasma control - RESUBMISSION 8/5/07	£310,376.00
3	Dr F Baumberger	University of St Andrews	Probing the quantum many-body states of low-dimensional metals by angular resolved photoelectron spectroscopy	£291,081.00
4	Dr I D'Amico	University of York	Simulation of Spin Transport, Diffusion	£390,461.00
5	Dr JL O'Brien	University of Bristol	Quantum Measurements with Photons	£370,719.00
				£521,366.00
				£19,047,084.00

** Dr M Borghesi, Queen's University of Belfast; Laser Induced Beams of Radiation and their Applications (LIBRA) £4,747,342 SUPA income: £637,034 (Strathclyde income: £619,383 plus Paisley income: £17,651)*

SUPA GRADUATE SCHOOL

GRADUATE SCHOOL UP AND RUNNING AGAIN

Avril Manners, SUPA Graduate School Director

Prize Studentship Competition

The fourth on-line competition opened on Friday 5th October 2007 with a closing date of Monday 31st January 2008. To date, 10 applications have been received which is comparable with the 13 applications received by the 1st November last year. Adverts have been placed with Physics World, THES, jobs.ac.uk and postgraduatestudentships.co.uk.
Around 300 contacts in the SUPA Central database have been sent a flyer advertising the studentship competition. The application process is advertised on the front page of the SUPA website http://www.supa.ac.uk/ along with a copy of a flyer to be printed off for display in your department or to be emailed to your contact list.

Graduate School Induction

The first SUPA Graduate School Induction event was hosted by the Physics Department at Strathclyde University on Wednesday 3rd October 2007. The event was well attended with around 150 students and staff from the SUPA universities and guests from Dundee, Aberdeen and Glasgow Caledonian. David Birch Head of Physics at the University of Strathclyde welcomed all to this event. Alan Miller VP Research and Enterprise St Andrews University gave the keynote address 'Your PhD, Your Opportunities', other speakers were the Director of the SUPA Graduate School, Jim Hough, Chair of the STFC Education, Training and Careers Committee, David Crooks, SUPA Learning Technologist and Lesley Hetherington from the Hunter Centre for Entrepreneurship @ Strathclyde. Two SUPA Prize Students - Andreas Rost, University of St Andrews and Aline Vernier, University of Glasgow gave an update on their research and experiences within SUPA and the poster competition was worn by Simone Marzani, University of Edinburgh. The event started with lunch followed by an ice-breaker and GRAD Hub Information Session from Ben Kotovic, UK GRAD Scottish Hub Project Officer and ended with refreshments and networking opportunities for students. It is proposed to run a similar event at another SUPA institution at the beginning of next academic session 2008/9 but with a less formal structure and more networking activities. If you have ideas, we'd like to hear them –email courses@supa.ac.uk.

There was time for information, fun and networking

Around 150 students and staff from across Scotland turned up for the Induction Day

Following on from the Induction event, we have a suggestion from a student (supported by staff) at the University of Glasgow that we run a SUPA Ceilidh. We'd like to hear your views on this – email courses@supa.ac.uk.

SUPA Courses and Enrolment

The current Graduate School brochure and timetable can be downloaded at http://www.supa.ac.uk/Graduate_School/Graduate_School.htm.
This academic year 2007/8, we have around 70 courses including some new courses. Semester 1 courses opened for enrolment in mid-September and closed on 12th October 2007 and Semester 2 courses will open for enrolment in November. Early indications show a marked increase (circa 50%) in Semester 1 student enrolments compared with last year. However, attendance will be monitored and recorded on an ongoing by SUPA Central for review by the Graduate School Management Committee.

✦ The Astronomy and Space 'Computational Astrophysics' course has attendees from mathematics departments within the SUPA universities.

✦ The Condensed Matter and Materials Physics 'Computational Chemistry' course is run in conjunction with East Chem and West Chem and has attendees from chemistry departments within the SUPA universities.

✦ The Nanophotonics course run by Derryck Reid and Ajoy Kar from Heriot-Watt University has been developed as an on-line course and split into 4 sub-courses - Photonic Crystals, Nanophotonic Devices, Interaction of Light with Nanoscale Objects and Nanophotonics and Biology.

✦ 10 new courses have been introduced for Semester 1 2007/8

✦ The core skills course 'Introduction to Data Analysis' is a new introductory course that will lead into the 2 day residential course 'Advanced Data Analysis' (ADA) scheduled to run in January 2008. Enrolment for (ADA) will open in November.

✦ The Cockcroft Institute Lectures, Autumn 2007 are now in progress. These are additions to the SUPA lecture series and staff and students within SUPA have access to the webcast

lectures. A link to further information is on the SUPA website.

✦ Where departments have requested and where it has been appropriate, some SUPA courses have been opened up to final year undergraduate students.

SUPA VC rooms are up and running again

Video Conferencing

Much effort has been invested over the summer months by the Graduate School Director, Learning Technologists, Video South, JVCS and SUPA University Technical Staff to ensure stability for lectures starting Oct 2007. So far, this effort has paid off with very few problems that will have been noticed by staff and students in the rooms. Most of these problems were resolved quickly because the Learning Technologists were on hand. As a result, we estimate that the amount of teaching time lost in total so far this semester is less than 20 minutes - including the 10 minutes lost from SUPARQM on the 16th October!

An initial meeting has taken place between staff at the University of Aberdeen (academic, estates and IT), the Graduate School Director and Video South to take forward the installation of the Aberdeen VC room under SUPA II.

AV Awards Finalist

Sad to say we did not win the National Audio Visual award – Videoconferencing Project of the Year - for SUPA, but to be nominated as one of the top three is not bad. However our VC contractor, Video South won a corporate award for "AV Systems Company" of the year. This was based on the quality of design and installation of four major projects, one of which was SUPA.

SUPA Graduate School Statistics

Post Graduate numbers for the SUPA Graduate School for 2007/8 are currently being collated across the university departments by SUPA Central.

STRATHCLYDE PHDS AT ROSS PRIORY

The annual Strathclyde postgraduate conference at Ross Priory, on the banks of Loch Lomond on August 22nd, was a great success. As usual the weather was excellent, and the standard of talks and poster presentation was extremely high. For this reason the awards committee judging the best talk was unable to eparate Alison Craigon, Neal Radwell, Alessio Tierno, and Karen Gillespie. The best poster award was given to Elric Esposito. Congratulations to all.

SUPA
Scottish Universities Physics Alliance

Scottish Universities Physics Alliance

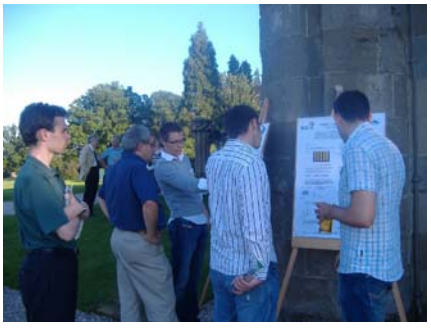
8 fully funded Prize PhD Studentships

The Scottish Universities Physics Alliance (SUPA) brings together internationally leading physics research across Scotland to form the largest physics grouping in the UK. Major research themes being pursued are astronomy, condensed matter and materials physics, nuclear and plasma physics, particle physics,

SUPA is offering 8 fully funded PhD studentships for outstanding students from anywhere in the world.

These prestigious and competitive awards are intended to attract excellent students to study for a PhD in Scotland. Applicants will be registered for a PhD in physics at one of the participating Universities namely Edinburgh, Heriot-Watt, Glasgow, Paisley, St Andrews and Strathclyde.

An excellent training environment will be provided by the SUPA Graduate School. With lectures via state of the art video-enabled teaching rooms and supported by on-line materials, students will have access to a comprehensive selection of advanced technical courses and transferable skills.



SUPA DIARY

Forthcoming SUPA Funded Distinguished Visits:

A visit by Professor Ian S. McLean, UCLA

Organised by Prof. Colin Cunninghams (UK ATC), Jim Dunlop (University of Edinburgh) and Jim Hough (University of Glasgow)

Autumn 2007

A visit by Professor Andrey Chubukov, University of Wisconsin-Madison

Organised by Dr Joseph Betouras (University of St Andrews) and Prof. Andrew Huxley (University of Edinburgh)

Spring 2008

A visit by Professor Ronald G. Larson, University of Michigan

Organised by Prof. Mike Cates (University of Edinburgh)

Summer 2008

Forthcoming SUPA Funded Meetings:

Kelvin 2007

Organised by Professor Miles Padgett

Hosted by the University of Glasgow

Event Date: 14th November 2007

Plasma Technology Training School

Organised by Declan Diver

Hosted by University of Glasgow,

Event Date: 2006-2008

Dark Matters and Colliders

Organised by Dr Tilman Plehn

Hosted by University of Edinburgh

Event Date: 19th – 23rd November 2007

Physics with LHC early data

Organised by Dr Samir Ferrag

Hosted by University of Glasgow

Event Date: 26th – 30th November 2007

Young Astronomer's Meeting 2007

Organised by Dr Ken Rice

Hosted by University of Edinburgh

Event Date: December 2007

SUSSP 63 – High Pressure Physics

Organised by Prof Malcolm McMahon

Hosted by Sabhal Mòr Ostaig, the Gaelic College, Skye

Event Date: 26 May – 6 June 2008

The XVth Cambridge Workshop on Cool Stars, Stellar Systems and the Sun

Organised by Dr Moira Jardine

Hosted by University of St Andrews

Event Date: 21 – 25th July 2008

8th International Position Sensitive Detector Conference

Organised by Dr Paul Soler and Dr Chris Parkes

Hosted by University of Glasgow

Event Date: 1 – 5th September 2008

SUPA provides funding for the support of workshops, meetings and conferences and for the support of the expenses of distinguished visitors. The primary aim of these schemes is to advance and further the international reputation of SUPA research. The potential benefit of the meetings or visits to SUPA graduate students and researchers is a major criterion for judging applications. The grants are administered by the Graduate School Management Committee (GSMC). Application forms are available on the SUPA website and should be returned to SUPA Central by email not later than three working days before the GSMC meeting. Meetings are held every 4-6 weeks. The date of the next GSMC meeting can be found on the My.SUPA calendar.

For latest SUPA events and SUPA Grad School courses info please go to our interactive portal my.supa.ac.uk

SUPA NEWS NEXT EDITION

SUPA Central
James Clerk Maxwell Building,
The University of Edinburgh,
The King's Buildings, Mayfield Road,
Edinburgh, EH9 3JZ
Tel: 0131 651 7192
www.supa.ac.uk

The present edition of SUPA News was put together by the SUPA News Editorial Team with contributions from all the SUPA institutions.

Ideas for future editions include adverts for situations vacant (studentships and research and academic posts), requests for collaborators in SUPA, a list of who's who in SUPA and profiles of interesting SUPA people.

If you have comments or suggestions or have an interest in contributing to future editions, please address them to newsletter@supa.ac.uk.