

# Institute of Physics

# PHYSICS

# ON MERSEYSIDE

The newsletter of the Merseyside Branch of the Institute of Physics

Issue 6 Autumn 2005

## Welcome message

A major reason for producing this newsletter is to inform members about the programme of branch activities arranged for 2005–2006. However, it is also an excellent opportunity to report recent news and achievements.

The work of the committee has been rewarded by a rapid increase in the total annual attendance in recent years, reaching 1000 between September 2004 and June 2005. Our links with other local professional institutions have strengthened and expanded too. Consequently we will hold our first four-way joint meeting in October, linking with two branches of the IEE as well as the Institute's Manchester Branch. This will be a major energy debate led by a presentation by Prof. Maxwell Irvine, who will feed opinions to a committee of enquiry into energy policy that he is chairing.

We were pleased to welcome Dr Robert Kirby-Harris, the new chief executive of the Institute, to the Annual Liverpool Physics Teachers' Conference this June. He gave a presentation explaining the work of the Institute with schools and also its wider aims for education as it works with government bodies to encourage the interest of young people in physics. He grasped the opportunity to discuss issues with teachers and university staff, and he thought that the conference was impressive in terms of the scope and quality of services provided for teachers.

One highlight of the packed day was the Paperclip Physics demonstration by the team from



Merseyside and Manchester branch chairs thank Frank Close (centre) for his excellent talk to the February joint meeting. Photo: Stewart Revell.



The Merseyside 2005 Paperclip Physics Competition heat competitors.

Altrincham Girls Grammar, which is in the Merseyside Branch, and which won the 2005 National Final of the Paperclip Physics Competition. We offer the team our hearty congratulations. Intriguingly, all of the competitors in the Merseyside heat were girls.

The meeting about intellectual property, which was planned in response to our industrial survey, attracted members who had not attended any previous meetings. Unexpectedly, Keith Hodkinson brought "The Ball", a new Dyson

cleaner, as a physics demonstration. After lively, informal discussions and consultations over the free buffet, newcomers commented that they will certainly attend more events.

We would like to take this opportunity to thank all who have contributed towards this outstanding year of activities. In particular we thank all of the speakers, without whom there would be no programme.

The committee has planned another varied and intriguing programme for the coming year,

hoping that there are meetings to interest all members. All talks in the 2005–2006 session will start at 6.30 p.m. to allow those who have to travel some distance to reach the events in time. As usual, refreshments will be available from 5.30 p.m. for those who arrive early.

November 2005 has been designated as a branch month of science and art, with Prof. Sandra Chapman illustrating her talk about Antarctica with her beautiful paintings. Prof. Peter Kalmus will present the Christmas lecture, Prof. Sir Christopher Llewellyn Smith will update us on fusion and the branch vice-chair, Prof. Mike Poole, will look ahead to accelerators of the future. We will learn about smart glass, acoustic music and extrasolar planets, and we'll also visit a ship simulator. Do join us!  
Ann Marks, **Branch Chair**

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<http://merseyside.iop.org>

# LJMU Robotic telescope views an exploding star

On Monday 2 May 2005 a team of UK astronomers from Liverpool John Moores University discovered the optical light, or afterglow, from a gamma-ray burst just three minutes after the vast explosion of highly energetic gamma rays that were caught by the gamma-ray satellite, Integral.

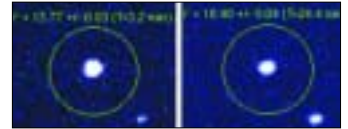
The most exciting aspect of the Liverpool team's discovery was that the entire process of detection, identification and intensive follow-up monitoring of the optical flash was carried out automatically with no human intervention, owing to the fully

robotic nature of the telescope and the sophisticated object-identification software developed by the team. This discovery demonstrates that a whole new era of automatic rapid-response follow-ups are now possible using telescopes like the Liverpool Telescopes.

Gamma-ray bursts are the most luminous transient objects in the universe and are thought to be caused when a massive star in a distant galaxy reaches the end of its life, collapsing to form a black hole and, in the process, ejecting a jet of material at ultra-high velocities.

The so-called optical afterglow is thought to originate from light emitted when this material crashes into the gas surrounding the star. In the first few minutes after the initial burst of gamma rays the optical and infrared light carries the clue to the origin of these catastrophic explosions, but this has been difficult to capture with traditional telescopes.

It is absolutely critical that the light from gamma-ray bursts is caught at the earliest possible opportunity and then intensely monitored before it fades away. We cannot afford to waste



Two images of the optical counterpart (OC) of the gamma-ray burst (GRB) taken 3.2 minutes (left) and 24.4 minutes (right) after the initial GRB. A longer exposure time was used for the second image, as evidenced by the standard star to the lower right appearing brighter. The OC faded 2.6 magnitudes in just 21 minutes.

critical minutes waiting for a human to respond. This is why the Liverpool Telescope is ideally suited to catch this early light automatically and probe the physics of these objects as early as possible.

Carole Mundell, **John Moores University**

## Physics and dance forge a unique relationship for Einstein Year 2005



Rambert Dance Company performs Mark Baldwin's *Constant Speed*, which was commissioned by the Institute. Photo: Anthony Crickmay.

As part of the year-long celebrations to mark Einstein Year, the Institute commissioned Rambert Dance Company to produce a new work, *Constant Speed*, based on physics and Einstein's theories. The dance has been choreographed by Rambert's new artistic director,

Mark Baldwin – his first work for Rambert since his appointment. The new dance received its world première at Sadler's Wells, London, in May 2005.

Dance is an expressive medium and it is ideal for abstract concepts like the theories of Einstein on

everything from tiny atoms to the dynamics of the whole cosmos. The fizz and sparkle of molecules ricocheting in space has been the inspiration for this outstanding production.

The company will visit the Lowry, Salford Quays, on 21, 22, 23 and 24 September 2005. On Thursday 22 September the show will be preceded by a short presentation on the work of Einstein. Full details can be found on the Web at <http://www.thelowry.com/WhatsOn/EventDetail.aspx?EventId=1985>.

A significant additional element of this project will be the programme of education work that will support it. The Institute will be working in close collaboration with Rambert's education department in the development of practical dance workshops for schools, a specially devised Schools Matinee Performance and resource materials that will have dual use for both science and dance teaching.

## Spaceport opens at Seacombe port



Lift-off.

Spaceport, the new £10 m visitor attraction in space and astronomy, opened its doors to the public at the end of July.

Conceived by staff at the Astrophysics Research Institute of Liverpool John Moores University and brought to fruition in a partnership with Mersey Ferries, it is housed next to the Seacombe Ferry Terminal building in Wallasey, Wirral.

Within Spaceport's walls, visitors are taken on a journey from the Earth, through our solar system, out into the Milky Way and then to the farthest reaches of the universe. The attraction aims to be both educational and fun, and it contains the public face of the National Schools' Observatory.

More information can be found at [www.spaceport.org.uk](http://www.spaceport.org.uk).

Visit the branch website at <http://merseyside.iop.org>

# Liverpool University Guild of Undergraduates names PHYSOC as the best educational society

With Valerio Riberio as president and an enthusiastic committee, PHYSOC, the student-run Physics Society of Liverpool University, has become extremely active over the last 12 months.

Departmental talks, bowling and ice-skating are just some of the new activities that have been introduced over the session, while the traditional pub crawls and the annual trip to Alton Towers have been maintained. To top it all, at the end of the year a joint ball was organized with the English, History and Cocktail societies. This was a huge success and thoroughly enjoyed by all.

The committee's dedication has not gone unrewarded: at the annual Guild Society Awards



*The presidents with their award.*

evening, PHYSOC received the Best Educational Society Award.

The new PHYSOC committee intends to better these achievements next year with



*A collection of enthusiastic and dedicated PHYSOC committee members.*

similar events, as well as a large collection of new ideas for both the social and physics-related activities of the society. As the newly elected president, I plan

to use these opportunities to increase the enthusiasm of Liverpool physics students for both PHYSOC and physics. Daniel Porter, **PHYSOC president**

## Daresbury SRS celebrates its 25th birthday

This September the Daresbury Synchrotron Radiation Source (SRS) celebrates its 25th birthday. The facility, which is the world's first purpose-built, dedicated synchrotron radiation source, has now operated for well over 100 000 hours, supporting a broad and highly successful research programme, which has included the life, physical, materials and environmental sciences.

To mark the occasion the annual users' meeting has been expanded to include a day-long celebration of the facility's achievements, when speakers from around the world will pay tribute to the contribution that has been made to international science over the last 25 years. This event will be most relevant to the accelerator and scientific



*The Synchrotron Radiation Source (centre) on the Daresbury site.*

personnel who built, operate and make use of the facility.

However, the celebrations do not end there, because on Saturday 8 October, Daresbury Laboratory will have an open day, with displays and presentations aimed at all of those who would like to learn more about the SRS and the work of the laboratory. Everyone is welcome at this event, which should be of interest to all members of the family.

For further information about both of these events, visit the SRS website at <http://www.srs.ac.uk/srs/>.

## Free mobile careers surgeries return

Following her successful 2005 tour, Vishanti Lall will visit Merseyside on 1 and 2 February 2006. She will give individual careers surgeries and provide group sessions, if requested.

See [http://careers.iop.org/Mobile-careers/mobile\\_careers\\_surgery.html](http://careers.iop.org/Mobile-careers/mobile_careers_surgery.html) for more information or contact Vishanti at [Vishanti.Lall@iop.org](mailto:Vishanti.Lall@iop.org) to make an appointment.

## Branch creates stronger links with the Liverpool Medical Institution

The Merseyside Branch and the Liverpool Medical Institution (LMI) have held very successful annual joint meetings for the last three years.

To date the meetings have been generously hosted in the LMI's historical building, which has provided opportunities for tours of the beautiful library. Founded in 1779, it has a substantial collection of books dating from the early 16th century. We would like to thank Dr Nick Clitherow for liaising between the two committees.

In May, Anna Ellison astounded her audience with a mixture of physics, detective work and graphic forensic medical details, thereby ably highlighting the value of the different professions sharing their expertise with each other. It is pleasing to note that some members have attended each others ordinary meetings as well as the joint meetings.

A fourth joint meeting is planned for April 2006. This time it will be the turn of the branch to welcome the medics to the Surface Science Research Centre, when Prof. Keith Horne will consider whether we are close

to knowing if life is commonplace beyond the solar system or very rare.

In parallel another link has been forged, in this case between the Department of Physics and the LMI. Prof. Dainton gave a fascinating lecture, entitled "The mysteries of subatomic particles unravelled", to a medical audience. Consequently the LMI will be the venue for the forthcoming symposium to celebrate the centenary of the Liverpool theoretical physicist Herbert Frohlich.

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The contents of this newsletter do not necessarily represent the views or policies of the Institute of Physics, except where explicitly stated.

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# Merseyside branch pro

Unless stated otherwise, talks start at 6.30 p.m. (NOTE NEW TIME) with refreshments available from 5.30 p.m.

UoL = University of Liverpool  
[www.liv.ac.uk/UniversityPrecinct/precmap.html](http://www.liv.ac.uk/UniversityPrecinct/precmap.html).

(SSRC) Surface Science Research Centre = building #47 on map.  
(CLT) Chadwick Lecture Theatre = building #42 on map.

DL = Daresbury Laboratory, near Warrington [www.clrc.ac.uk/Activity/ACTIVITY=DLMaps](http://www.clrc.ac.uk/Activity/ACTIVITY=DLMaps).

23 September 2005

\*UoL, CLT, midday

Dr Mike Houlden

University of Liverpool

## Gravity, an unsolved problem

For the last 300 years the phenomenon of gravity has been studied by some of the most brilliant minds that have existed, including Newton, Einstein and Feynman. However, a full understanding of gravity still eludes us and is the subject of current experiments, ranging from gravity-wave detectors to orbiting satellite-based experiments and even particle-physics experiments. This talk gives an overview of our present understanding of this fascinating subject.

This is a special lunchtime event for undergraduate freshers, which will be followed by a buffet lunch. However, all members are welcome.

4 October 2005

UoL, SSRC, 6.30 p.m.

Dr Paul Warren

Pilkington European Technical Centre

## Glass and its coatings: intelligent transparency?

Glass is all around us – windows, bottles and the optical fibres that carry data, to give just a few examples. Becoming ever-more important are glass products that have additional uses because of coatings applied to their surfaces. Especially exciting are those coatings that have the potential to make the glass “smart” or “intelligent” – so that it responds to its surroundings.

This presentation will outline how a knowledge of the physics of glasses and their coatings enables us to create useful products, while also providing a rich source of scientific problems to work on.

This talk has been planned to continue our meetings to include industrial members. As with all of our evening talks in the 2005–2006 programme, it will start at 6.30 p.m. to allow time for those who have a distance to travel. There will be no problem parking close to the Surface Science Research Centre.

12 October 2005

<sup>†</sup>UoL, CLT, 12.45 and 2.15 p.m.

Laura Grant & Karen Bultitude

## Our planet – our future

This travelling School Lecture seeks to answer topical questions and the show will look at the ways in which science and technology are helping us to understand the impact that human life has had on the planet. All members are welcome. For more details see the Education Programme (p8).

18 October 2005

\*DL, 6.30 p.m.

Prof. Maxwell Irvine

University of Manchester

## When the lights go out: power to the people?

Prof. Irvine has been invited to chair a committee of enquiry into energy policy and he will give a presentation that will be followed by a panel-led discussion chaired by Prof. Paul Nolan of University of Liverpool.

The demand for energy is growing strongly. Between 1950 and 2000 it quadrupled; the most conservative estimates suggest that it will double between 2000 and 2050.

Globally, 80% of our energy is provided by burning fossil fuels. There are concerns about the sustainability of these fuels and the environmental impact of their continued use.

The government White Paper “Our energy future” has been

seriously criticised by the all-party select committees of both the House of Lords and the House of Commons. There are concerns that the current proposals for alternative energy sources are unrealistic. Nuclear power currently provides about 20% of UK generating capacity but current plans would see no nuclear provision post 2030. Fusion power will not be commercially available much before 2050.

Large-scale generating capacity takes several years to plan and construct. How can we prevent a descent into a dark age?

This will be the first joint meeting between the Merseyside and Manchester branches of the Institute as well as both the Cheshire and Manchester branches of the Institute of Electrical Engineers. All who attend the meeting are welcome to a buffet after the discussion.

November has been designated as the branch month of science and art for Einstein Year.



10 November 2005

\*UoL, SSRC, 6.30 p.m.

Prof. Sandra Chapman

University of Warwick

## Going south – art meets science in Antarctica

Astrophysicist Sandra Chapman was recently a recipient of a NESTA Dreamtime fellowship, designed to support open-ended “explorations” that are cross-disciplinary. She chose to spend her dreamtime in Antarctica, spending the Antarctic summer



season with the British Antarctic Survey as an artist. In this talk she will discuss life in

Antarctica, art and science, and prospects for communicating the beauty of scientific knowledge through art.

This is a public meeting – please do remember to bring guests and inform your contacts about this illustrated talk.

24 November 2005

UoL, SSRC, 6.30 p.m.

Gavin Starks

## Astrophysics and acousmatic music

Continuing the historical links between music and astronomy into the astrophysics and cosmology of the 21st-century, this talk will show some ways in which astronomical data can be turned into sound and used as an early stepping-stone or inspiration for large-scale compositions. Utilizing western classical compositional style within an “acousmatic” music structure, new directions in both music and the connections between science and art will be explored.

14 December 2005

\*UoL, CLT, 2.00 p.m.

Prof. Peter Kalmus

Queen Mary College, London

## Schools' Einstein Christmas lecture: particles and the universe

Peter Kalmus is renowned for his schools lectures. This one will be at a level suitable for sixth-formers. For more details, see the Education Programme (p8).

24 January 2006

UoL, CLT, 6.30 p.m.

John Porter Memorial Lecture

Prof. Janet Drew

Imperial College, London

## What goes up doesn't always come down: towards a realistic astrophysics of mass loss

Janet was John Porter's PhD tutor at Oxford. There will be a presentation in his memory. The topic of the talk will be closely related to the work for which John was known internationally.

Mass loss is a complex and subtle phenomenon occurring in many astrophysical settings.

# Programme 2005–2006

Models have been transformed, thanks to the huge increases in computing power, and now reflect reality much more closely. This illustrated talk will draw on a range of examples of star and disk winds to show the dramatic advance that has taken place.

**9 February 2006**

\*UoL, SSRC, 6.30 p.m.

Prof. Mike Poole

## **CCLRC Daresbury Laboratory New challenges for particle accelerators in the 21st century**

Charged particle accelerators have already had a major influence on science and technology progress in the modern world. Originally developed for fundamental research (e.g. splitting the atom), they are now much more widely employed, ranging from high-energy and nuclear physics, through neutron and radiation sources, to medical, industrial and perhaps even energy-generation applications.

The basic features of accelerators will be reviewed and the more demanding recent evolutions identified. Examples of particular challenges in both the physics and engineering of accelerators will be given, illustrated by modern techniques and technologies. Finally, a UK strategic perspective will be outlined.

**2 March 2006**

\*UoL, SSRC, 6.30 p.m.

Prof. John Shaw

## **Geomagnetic reversals: one of life's big mysteries**

For the past 50 years we have been aware that the Earth's magnetic field reverses. Geomagnetic reversals have been identified, dated and correlated on a global and geological timescale. The phenomenon of geomagnetic reversals has been used extensively as a dating tool and a means of locating the relative positions of the continents in the past, but what do we know

about these reversals? How do the shape and strength of the field change during a reversal? What happens to the magnetosphere during a reversal? When is the next reversal due?

Recent developments in techniques and instrumentation have given us an insight into the behaviour of the field that may help to answer these questions.

**14 or 16 March 2006 (date to be confirmed)**

\*UoL, SSRC, 6.30 p.m.

Prof. Jim Hough

University of Hertfordshire

## **The search for gravitational waves**

After 35 years of experimental research we are rapidly approaching the point at which gravitational waves from astrophysical sources may be directly detected by the long-baseline detectors – LIGO (USA), GEO600 (Germany/UK), VIRGO (Italy/France) and TAMA300 (Japan) that are currently in the preliminary stages of operation. This talk will provide a brief review of the detector development with particular emphasis on the forefront experimental techniques being utilized.

**6 April 2006**

UoL, SSRC, 6.30 p.m.

Prof. Keith Horne

University of St Andrews

## **The quest for extrasolar planets**

For 10 years now, astronomers have been discovering planets that orbit other stars beyond our solar system. With roughly 150 extrasolar planets now known, we are beginning to understand how planetary systems, both similar to ours and radically different, have come into being.

Today's planet-detection methods are sensitive only to large gas giant planets like Jupiter and Saturn, but new



techniques and upcoming space missions are expected to

reveal the smaller, rocky Earth-like planets, if they are there, and to show which of these, if any, have oceans of liquid water and oxygen-rich atmospheres indicating the presence of life. Thus we are close to knowing if life is commonplace beyond the solar system or very rare.

We welcome members of the Liverpool Medical Institution to this event.

**27 April 2006**

UoL, SSRC, 6.30 p.m.

Prof. Philip Moriarty

University of Nottingham

## **Nanotechnology: the next industrial revolution?**

This talk will focus on the current state of the art in the “bottom-up” synthesis of materials from individual molecules and nanoparticles. A recurring theme will be the consideration of nanobots, nanofactories and radical molecular manufacturing capabilities – as expounded by Eric K Drexler and co-workers – in terms of current and potential technological capability (see <http://www.softmachines.org/wordpress/index.php?p=130> for a recent debate on this topic).

Moreover, as new and exciting methods are found to tune and direct the assembly of matter, pattern formation at the nanoscale is becoming an increasingly fascinating area of research. Prof. Moriarty will discuss the variety of striking patterns that occur in the self-assembly of novel structures and materials, highlighting in particular how some types of pattern appear not just at nanoscopic length scales but on length scales spanning nanometres to metres to kilometres (and, in some cases, beyond).

## **The Merseyside Branch Annual General Meeting will also take place on 27 April.**

Members are invited to submit nominations, for positions of either officers or ordinary members of the next committee, to the honorary secretary, David

Martin. Each nomination must be proposed by two branch members and be accompanied by the consent of the nominee. The positions of both chair and honorary secretary will be vacant as those currently in office will have served for the maximum period.

**9 May 2006**

## **Visit to the Lairdside Ship Simulator**

This simulator is part of the Lairdside Maritime Centre and



consists of three fully equipped and integrated ship bridges, three instructor

control stations, a GMDSS control station and a VTS control station.

For more information, see the website at [http://www.lairdsidemaritime.com/The\\_Centre.htm#Simulator](http://www.lairdsidemaritime.com/The_Centre.htm#Simulator). Full details will be supplied when available. Contact David Martin (e-mail: [davidm@liv.ac.uk](mailto:davidm@liv.ac.uk)) for more information or to book a place.

**23 May 2006**

DL, 6.30 p.m.

Prof. Sir Christopher

Llewellyn Smith

## **Fusion**

Llewellyn Smith is director of UKAEA Culham Division, which is responsible for the UK's thermonuclear fusion programme, and for operation of the Joint European Torus on behalf of Euratom. His role is to lead the UK's contribution to the development of fusion, as a viable environmentally benign source of energy, on the “fast-track” advocated by the British government.

This will be a joint event organized by the Manchester Branch and will be followed by a buffet. All who attend the talk will be welcome to the buffet.

**\* Talks marked with an asterisk will be of interest to sixth-formers considering pursuing scientific careers. The lecture marked † is primarily for those aged 13–16.**

## Obituary: Dr John Porter

It is with a feeling of both shock and sadness that we report the untimely death of Dr John Porter of the Astrophysics Research Institute (ARI).



John Porter.

John came to Liverpool John Moores University (LJMU) in 1995 from the University of Oxford, where he had undertaken his PhD. He had previously gained first-class honours in physics from the University of Leeds, and subsequently completed his part III at Cambridge.

John was initially a temporary lecturer in astrophysics at LJMU, and then a PPARC postdoctoral research assistant. He moved onto the permanent lecturing staff there in 1998.

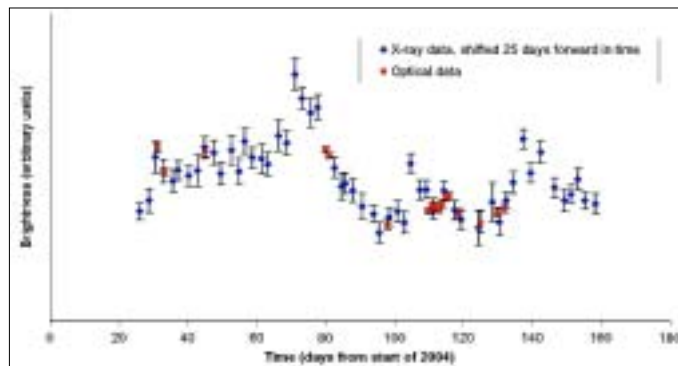
He was a very gifted researcher and was well known in his chosen field of "hot stars". His knowledge of the wider subject was, however, unsurpassed, and he was always someone worth talking to about the solution of otherwise difficult problems. His generosity in this regard was particularly appreciated by the ARI's research students.

John was a very able and extremely popular teacher of astrophysics. He was held in great affection by the undergraduate students on the joint-degree programme between the two universities in Liverpool. He was admissions tutor for the degree, and his enthusiasm and dedication were in no small measure responsible for the success in recruitment that the course has had.

As an active member of the Institute's Merseyside Branch he gave the 2004 physics freshers a fascinating talk about his work.

Everyone who knew John will miss him as a friend and a colleague. There will be a lecture in his memory on 24 January 2006.

# Nuffield Project students make exciting discovery



A comparison of X-ray and optical data from Quasar 3C279.

*In the Summer of 2004, two Merseyside sixth-form students, as part of the Nuffield Sixth-Form Bursary Project, carried out a four-week project, which was hosted jointly by the University of Liverpool and the Astrophysics Research Institute. Here are some of their comments on their experience.*

The Nuffield Sixth-Form Bursary Project last summer was a terrific experience enabling us to work on three separate projects during the placement.

The most exciting was entitled, "Quasar brightness". This task was to analyse the

variations in brightness of a pair of quasars recorded over a period of about 80 days at the beginning of 2004 by the Liverpool Telescope and the XTE (X-ray) Telescope.

In doing so we discovered that a portion of one of the quasars – about 80 light-days in diameter – was emitting roughly as much visible light as an entire galaxy, which are typically 100 000 light-years in size. In addition, trends in the optical data seemed to follow those in the X-ray data with a time delay of about 25 days – a larger delay than had previously been

observed (see graph).

These results are very significant in trying to find out what happens inside quasars. As a consequence, astrophysicists are now looking at our results in greater detail.

We were invited to present our project at the national BA Crest Science Fair at the Royal Society. The highlight was receiving a special mention for the AstraZeneca Young Scientist of the Year Award.

Although we did not win a prize, the event was an amazing experience because of the incredibly prestigious venue, the very high standard of work that was being exhibited and the opportunity to make a presentation in front of some of the leading people in the world of science today.

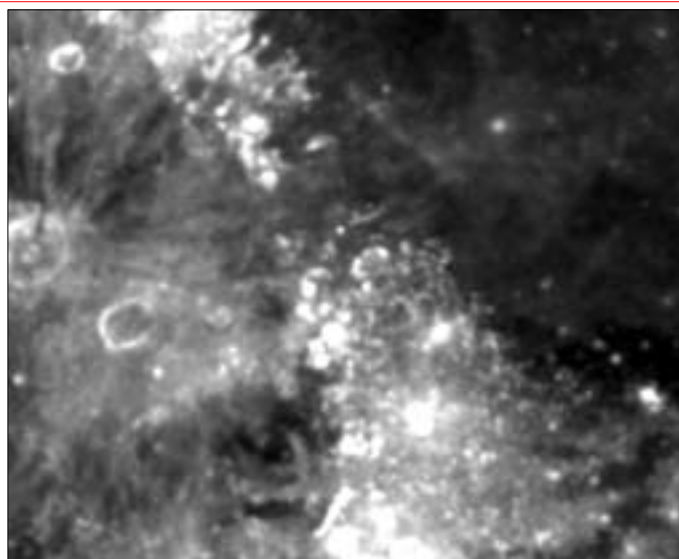
We both wholeheartedly recommend the bursary scheme to any student with an interest in science beyond that encountered in school. You never know where it will lead you or the opportunities that it will bring. Graeme Addison, Calday, and Neil Owen, Calderstones

## Schools can view Blazar outburst through the NSO

A rare, dramatic outburst by the Blazar 3C454.3 is being studied by schools. The event is being observed by the Liverpool Telescope as part of a scientific programme led by Southampton University's Prof. Ian McHardy.

Owing to the exciting nature of the outburst, Prof. McHardy has made the observations available to schools to study for themselves through the National Schools' Observatory.

For more information, visit <http://www.schoolsobservatory.org.uk/obs/ulab/blaz05/>.



Dramatic outburst of Blazar 3C454.3 viewed by the Liverpool Telescope.

Please take the time to check your e-mail address in your Institute details to ensure that you receive the e-mails that we send you.

Visit [www.iop.org](http://www.iop.org)

# Education report

**Paperclip Physics Competition**  
Congratulations to the team from Altrincham Grammar School on winning the 2005 Paperclip Physics Competition! The team from the Merseyside Branch won the last National Final of the competition.

This year's competition will see a slight change in format, which should make the event more accessible to schools. There will be the usual local heats, with the winners now going forward to a regional grand final. There will be prizes for winners of the local heats and substantial prizes for members of the north-west's winning team, which will also receive £500 for its school.

Details and dates are still being finalized and will be sent out to schools soon.

## Physics Olympics

The ever-popular Liverpool Physics Olympics takes place on 8 October. Details are given in the programme (p8).

## Our planet – our future

On 12 October there will be two sessions of a fascinating talk entitled "Our planet – our future". The two speakers will present an interactive lecture, where the audience chooses solutions for the Earth. This is highly recommended to all Key Stage 3 and Key Stage 4 students, and early booking is suggested.

## Christmas Lecture

2005 was designated Einstein Year, and this year's Christmas Lecture, entitled "Particles and the universe", will round off a year of fascinating events.

Respected physicist and speaker Prof. Peter Kalmus will deliver the lecture, tying together many of the advances of 20th-century physics, and will show how our understanding of tiny particles leads us to begin to understand the very large universe.

This lecture is particularly suited to sixth-formers and will cover aspects of many A-level specifications. It will take place on 14 December at the University of Liverpool.

## Einstein Year and Industry



Pilkington's European Technology Centre at Lathom has been working with the north-west branch support officer to arrange events for schools as part of Einstein Year. This is a new venture for sixth-formers. Activities will include visits to a special exhibition and will take place during this autumn. Watch out for details.

## Liverpool Physics Teachers' Conferences 2006

This year will finish with two conferences. The first is aimed specially at teachers of Key Stage 3 and Key Stage 4 and will have a varied programme with lots of fresh ideas and support for teachers. The second is the 2006 Annual Liverpool Physics Teachers' Conference on 29 June. This well established conference has been running for more than 15 years, providing excellent talks, demonstrations and A-level support.

Both conferences are free and are highly recommended. We thank Liverpool University's Physics Department for its support of these events.

## Teachers Network

The Institute's Teachers Network on Merseyside now has more than 250 members and provides valuable support and networking opportunities for all who are responsible for teaching physics in schools.

Updated information about the above activities will be sent by e-mail to network members. To join, e-mail your contact details to [mtnc@amarks.co.uk](mailto:mtnc@amarks.co.uk).

I hope that you and your students will be able to attend many of these activities. They are designed to fit into current A-level specifications and should enhance both the teaching and the learning experience. Further details are contained in the Education Programme (p8).  
Neil Heritage, **Education secretary**

# 2900 schoolchildren search for asteroids

During Einstein Year the Institute has awarded a number of small grants to initiatives that are aimed at exciting the interest of young people in physics. Two awards have been made to groups via the Merseyside Branch and these have enabled thousands of young people to learn more about physics.

The National Schools' Observatory received a grant of £1200 from the Institute for the Hunting for Asteroids Workshop as the Merseyside Branch activity for Einstein Year. It was decided to create a standalone workshop to help pupils to detect asteroids.

For the first part of the year this was confined to City Learning Centres and selected schools. During this first round of workshops, about 45 schools/CLCs and some 2900 children participated. For the second half of Einstein Year it was decided to allow all schools to participate.



*Schoolchildren hunt for asteroids*

You can visit the website at [www.schoolsobservatory.org.uk/einstein](http://www.schoolsobservatory.org.uk/einstein) if you would like to download the workshop and the accompanying worksheets to use for teaching in your school.

Part of another small award has been used to set up an exhibition that will link science and art. This will be held in the new pavilion in Birkenhead Park on 19 November – 3 December. For more details, contact Mary Green (e-mail: [atcox.green@virgin.net](mailto:atcox.green@virgin.net)).  
Andrea Fesmer

# 2005 Liverpool Physics Teachers Conference



*The panel after the question-and-answer session (left to right): Dr Mike Houlden, Dr Dominic Dickson, Prof. Paul Nolan and Dr R-D Hertzberg.*

# National Schools' Observatory gets its 2000th request for observations

After just six months of operation, the National Schools' Observatory has received its 2000th request for observations

with the Liverpool Telescope. The observation of craters on the Moon was requested by the Grove School in East Sussex.

## EDUCATION PROGRAMME 2005–2006

Many of the talks in our main programme of events (pp4–5) will be of interest to sixth-formers. These are marked with an asterisk.

8 October 2005

### Liverpool Physics Olympics

LIVERPOOL PHYSICS OLYMPICS



The Liverpool Physics Olympics is an annual event organized by the Department of Physics at the University of Liverpool. Teams of four school students are invited to take part in a day of events that require teamwork, problem-solving and maybe just a little physics. Although this event is staged as a competition, it is designed to be fun.

For details, see <http://www.liv.ac.uk/physics/olympics>. To enter a team, contact Steve Barrett (e-mail: [S.D.Barrett@liv.ac.uk](mailto:S.D.Barrett@liv.ac.uk)).

12 October 2005

UoL, CLT, 12.45 and 2.15 p.m.  
Laura Grant and Karen Bultitude

### Our planet – our future

Can scientists build a sun here on Earth? How will cars work in the future? Will extreme weather wreak havoc on our world? This travelling lecture seeks to answer such questions in an inspiring and educational science event. The show will look at the ways in which science and technology are

helping us to understand the impact that human life has had on the planet.

Exciting demonstrations will be used to bring the material to life and will incorporate cutting-edge research and technology. The audience will be involved in deciding the content of the lecture through use of an interactive choose-your-own-lecture format. Audience members will also have the opportunity to vote on the best solutions to ensure that we can plan for a healthy and happy future here on Earth.

The Institute's annual Schools and Colleges Lecture is a free event that visits many venues around the country throughout the year. The hour-long talk is linked to the National Curriculum and aimed at 11–16-year-old science and technology students.



“Our planet – our future” is a lecture that is likely to generate as many questions as answers and is not to be missed.

Dr Karen Bultitude has appeared on the BBC's *Learning Zone* and *Scrappy Races*, presented the IEE Faraday Lecture and works with the University of the West of England.

Dr Laura Grant has presented for the BBC and 4 Learning, is involved with outreach programmes at Liverpool University and has held a Physics Communication Fellowship for the Institute.

If you would like to bring a

school party to either sitting, contact Prof. Paul Nolan (e-mail: [nolan@ns.ph.liv.ac.uk](mailto:nolan@ns.ph.liv.ac.uk)).

14 December 2005

UoL, CLT, 2.00 p.m.

Prof. Peter Kalmus, Queen Mary College, London  
**Einstein Year Christmas lecture for sixth-forms: particles and the universe**



One of the outstanding achievements of 20th-century science was the realization that the great diversity of nature is based on a handful of elementary particles acting under the influence of only a few fundamental forces. It forms the basis of particle physics, a field that extends beyond the confines of the atom towards a synthesis with astronomy and cosmology. We explain particle physics and show how experiments at large accelerators help us to recreate some of the conditions of the early universe.

Peter Kalmus is renowned worldwide for his schools lectures. This one will be illustrated by numerous demonstrations and will be at a level suitable for sixth-formers. To book places for a group, contact David Martin (e-mail: [davidm@liv.ac.uk](mailto:davidm@liv.ac.uk)). Early booking is advisable.

March 2006

### Schools Lecture

We have reserved a slot in March for the 2006 Institute Travelling Schools Lecture, which will be suitable for pupils in years 9–11. Watch out for details.

June 2006

### KS 3 and 4 Conference for All Teachers of Physics

By popular request this will be another free day-long event organized by the Merseyside Physics Teachers Network Coordinators. There will be workshops, talks, free software, discussions, networking and fun demonstrations to fit into your lessons. NQTs, non-specialists and PGCE students are particularly welcome.

29 June 2006

### Annual Liverpool Physics Teachers Conference

This annual conference will have its usual excellent format, including discussions, hands-on activities, talks to provide extra background for A-level teaching and the opportunity to question a panel of physicists. In recent years this has become known as a major physics conference and teachers have found it worthwhile to travel long distances to attend. It includes an excellent free lunch.

**Watch out for more news of events in 2006. For further details, contact Neil Heritage, Education Secretary (e-mail: [neilheritage@kingschester.co.uk](mailto:neilheritage@kingschester.co.uk)).**



2004 Physics Olympics: above: 29 teams competed and 116 people gained a mug; right: students prepare to transmit a code.



**2005 is Einstein Year. For news of fun events for all, visit the website at [www.einsteinyear.org](http://www.einsteinyear.org)**