

Institute *of* Physics  
**PHYSICS**  
ON MERSEYSIDE

The newsletter of the Merseyside Branch of the Institute of Physics

Issue 7 March 2006

## Welcome note

At this time of year the committee is planning the programme for 2006–2007, and I should like to take this opportunity to thank them for their enthusiasm. The proportion of committee members attending each meeting has increased, so that the committee now meets in a larger seminar room. The events arranged for the remainder of this session are detailed on p2.

Joint meetings with other professional bodies are popular and, building on the success of the meetings with the Liverpool Astronomical Society and the Liverpool Medical Institution over several years, contact has now been established with the local branches of the Institute of



*Einstein in relief: a brass sculpture of Albert Einstein at the Physics and Art Exhibition, Birkenhead.*

Electrical Engineers and very recently with the Royal Society of Chemistry on Merseyside.

The Einstein Year on Merseyside closed with links between physics and art. Gavin Starks' talk brought a new dimension to branch lectures, with the audience being treated to his acousmatic compositions. The relief head of Einstein in brass at the art exhibition sponsored by the Institute of Physics was striking. Another Institute grant has enabled thousands of schoolchildren to hunt for asteroids.

Rather than provide a written report, there is an illustrated record of some of our events since October 2005 on pp4 and 5. We aim to widen our scope in the future. If you would like to be involved in the development of our activities, why not stand for election to the committee at the AGM?

**Ann Marks**, retiring chair

### Branch committee members

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Branch website:  
<http://merseyside.iop.org>

## The 2006 Annual General Meeting of the Merseyside Branch of the Institute of Physics

will take place on 27 April 2006  
at the Surface Science Centre, University of Liverpool  
(building 47 at [www.liv.ac.uk/UniversityPrecinct/precmap.html](http://www.liv.ac.uk/UniversityPrecinct/precmap.html)).

It will follow the talk **Nanotechnology: the next industrial revolution?** by **Prof. Philip Moriarty** of the University of Nottingham. See programme (p2) for details.

### Nominations

Members are invited to nominate officers and committee members. Nominations shall be proposed by no fewer than two branch members and be accompanied by the consent of the nominee. Please note that both the branch chair and the honorary secretary will have served their full term. Only branch members shall be eligible to be officers of the branch in accordance with the bylaws of the Institute. Nominations should be sent to the honorary secretary, David Martin (e-mail: [davidm@liv.ac.uk](mailto:davidm@liv.ac.uk)), in advance or proposed from the floor of the meeting.

### Agenda

1. Minutes of the 2005 AGM
2. Chair's report
3. Treasurer's report
4. Election of officers
  - Chair
  - Vice-chair
  - Honorary secretary
  - Honorary treasurer
5. Election of committee members  
The Committee shall comprise the officers and 12 ordinary members, including members in the following capacities:
  - the past chairman
  - a representative for education
  - a representative for media and publicity
  - a representative for industry
  - a student representative
6. Any other business

# Branch programme March – May

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).

2 March 2006

UoL, SSRC, 6.30 p.m.  
Prof. John Shaw

University of Liverpool

## 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 to 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 does 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 March 2006

UoL, SSRC, 6.30 p.m.  
Prof. Jim Hough

University of Glasgow

## 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), which are currently in preliminary stages of operation.

This talk will provide a brief review of the detector development with particular emphasis on the forefront experimental techniques being utilised.

29 March 2006

## \*Schools Lecture

See Education Programme (p8). All welcome

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. However, 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 will 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 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 on nanoscopic lengthscales but on lengthscales spanning nanometres to metres to kilometres (and, in some cases, beyond).

## The talk will be followed by the Merseyside Branch Annual General Meeting

Members are invited to submit nominations, for positions of 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. Both positions of chair and honorary secretary will be vacant as those in office will have served for the maximum period.

9 May 2006

## Visit to the Lairdsie Ship Simulator

The simulator is part of the Lairdsie 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.



See the website at [http://www.lairdsie-maritime.com/The\\_Centre.htm#Simulator](http://www.lairdsie-maritime.com/The_Centre.htm#Simulator) for further information.

Full details of the visit 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, to which all who attend the talk will be welcome.

21 June

## Physics can be easy

A day conference for all teachers of physics. See Education Programme (p8) for more details.

29 June

## Annual Liverpool Physics Teachers Conference

See Education Programme (p8) for more details.

\* Talks marked with an asterisk will be of interest to sixth-formers considering pursuing scientific careers. The lecture marked † is primarily for those aged 14–16.

# Congratulations are in order!

## Mott medal and prize go to Peter Weightman of University of Liverpool

The Institute of Physics's prestigious Mott medal and prize for 2006 have been awarded to Prof. Peter Weightman of the Department of Physics and the Surface Science Research Centre at the University of Liverpool.

The award recognizes Weightman's work on the electronic structure of metals, alloys and semiconductors, and their surfaces and interfaces, using a variety of laboratory and synchrotron techniques, as well as his development of Auger spectroscopy and reflection anisotropy spectroscopy.

The medal and prize were

presented to him at the Institute of Physics 2006 Awards Ceremony and Dinner, which was held at the Savoy Hotel, London, in January.

The award was instituted by the Council of the Institute in 1997 to commemorate Sir Nevill Mott FRS, who was president of the Physical Society from 1956 to 1958 and Nobel Laureate in physics in 1977, and who died in 1996. Mott was the outstanding British theoretical physicist of his generation, and he had a major influence on the development of condensed matter and materials physics in the UK.



Peter Weightman.

2006 is the 125th anniversary of the Department of Physics at the University of Liverpool!

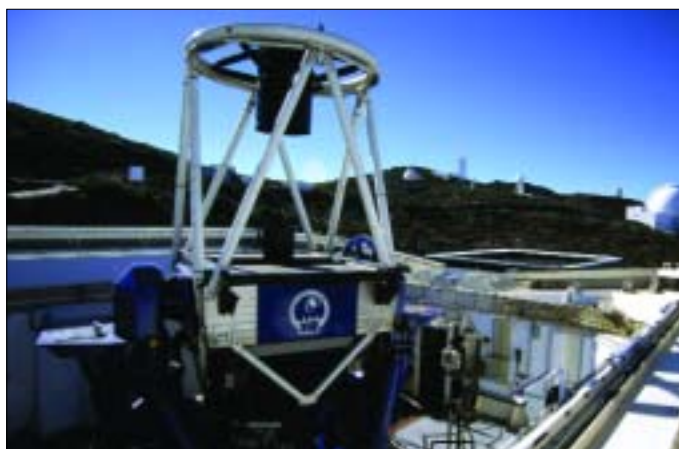
## LJMU is awarded a Queen's anniversary prize

One of the UK's most prestigious educational awards has been made to Liverpool John Moores University for its astronomical excellence and public engagement in science: a royal accolade for creating the world's largest robotic telescopes.

The biennial Queen's anniversary prizes for further and higher education recognize the outstanding contribution that universities and colleges in the UK make to our intellectual, economic, cultural and social life.

LJMU's winning entry centres on the development of the world's largest and most sophisticated ground-based robotic telescopes. The university is praised for the creative application of this technology, not only as part of its research work and innovative courses (including the joint astrophysics degree with the University of Liverpool and those available via its distance learning programme), but also because it is being harnessed to reveal the wonders of science to schoolchildren.

Prof. Michael Brown, LJMU's vice-chancellor, said: "Our Astrophysics Research Institute has led the world in developing



The Liverpool Telescope on La Palma in the Canary Islands.

robotic telescopes, which can monitor variable astronomical objects in a way that's not possible with other telescopes. Even more ground-breaking is that they have been able to harness this cutting-edge technology to enthuse future generations of scientists, from primary school pupils to postgraduates, through innovative courses and the National Schools Observatory (NSO). The Liverpool Telescope is the only optical telescope in the world where science, education and outreach are

really working side by side.

The development of the Liverpool Telescope – and four other subsequent robotic telescopes – has enabled the Astronomical Research Institute to play an instrumental role in realizing the scientific vision of a network of research-class telescopes on world-class sites around the globe. This idea was first espoused by Mike Bode, LJMU's professor of astrophysics, through the Particle Physics and Astronomy Research Council-funded RoboNet project.

A proportion of the Liverpool Telescope's observational time is set aside for use by UK schools through LJMU's NSO. More than 500 schools are currently members, enabling thousands of primary- and secondary-school pupils to bring high-quality astronomical images into their classrooms.

LJMU played an instrumental role in the development of Mersey Ferries' new £10 million visitor attraction in astronomy and space exploration, Spaceport. This partnership further demonstrates the unique approach adopted by the university and its astronomers in that they are directly contributing to the economic regeneration of the region.

Prof. Bode said: "If you want people to consider a career in science, you have to excite teachers and pupils. They have to be able to see something of the real work that scientists do. The Queen's anniversary award – and the increasing number of schools that have signed up to the NSO – prove that our approach is working."

The prize was presented at Buckingham Palace in February, following dinner at the Guild Hall.

# Some of the more recent Merseyside

## October 2005 Energy debate

The four-way joint meeting at Daresbury for the energy debate was a great success. Thanks go to Prof. Maxwell Irvine, who gave an excellent

presentation, which explained the problems and inefficiency of the present national system of energy provision and which triggered a lively debate.



*Prof. Colin Whitehouse thanks Prof. Maxwell Irvine. The panel of experts are behind (left to right: Prof. Mike Poole, branch deputy chair; Prof. Paul Nolan, chair of the session; Mr Stan Kewley and Prof. Nick Jenkins.)*

## October 2005 Schools lecture

Dr Laura Grant and Dr Karen Bultitude gave a fascinating, interactive schools lecture, Our Planet- Our Future, to about 400 young people. The lecture looked at the ways in which science and technology are helping us to understand the impact that human life has had on the planet.



*Astonishing tornado; pink silly putty; and hydrogen illumination.*

## December 2005 Sixth-form Christmas lecture

Prof. Peter Kalmus travelled up to Liverpool to give a lively Christmas lecture on particle physics to about 200 sixth-formers. Members of the audience quizzed him long after the lecture finished.



*Peter Kalmus offers an explanation of his tin of "cosmic soup".*

## January 2006 Chairs of Branch

The Chairs of Branches meeting in January 2006 was held in Dublin at the Irish Young Scientists' Competition. The competition received some 5000 entries and in the three days about 50 000 people saw the entries and exhibits.

The winner was a 14-year-old girl who had come up with a simple addition to food packaging, which would indicate whether or not the contents is in good condition.

# Branch activities

## December 2005

### Physics and Art exhibition



Using Institute of Physics funding, Mary Green organized an Einstein and Art Exhibition in the Williamson Gallery, Birkenhead. Numerous different media were used by the artists in attempts to portray abstract physics concepts.



String theory, and Mary Green with a couple of the exhibits.

## January 2006

### Memorial Lecture

The first John Porter Memorial Lecture took place on 24 January. Prof. Janet Drew talked about "What goes up does not always come down: towards a realistic astrophysics of mass loss", which linked with John's area of research. After the talk, Prof. Chris Collins

made a presentation to Janet, which was funded by John's parents. Then a plaque was unveiled in the laboratory in the Chadwick Physics Building, where John had taught.

NB: Dr Porter of the Astronomical Research Institute died suddenly last year.



Fitting memorial: Janet Drew unveils a plaque in John Porter's memory.

## Branches

2006 was

the 500th anniversary of the young

and thought which will be good

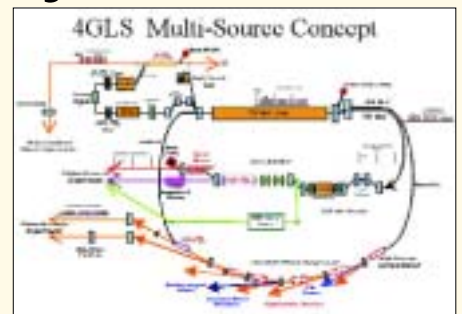


The Institute's chief executive officer, Dr Robert Kirby-Harris, and Neil Marks, the chair of the Chairs of Branches Committee (and a member of the Merseyside Branch committee), examine the portfolio of the pupils from Colaiste Choilm, Cork, who won the Institute in Ireland's prize at the 2006 BT Young Scientists Exhibition.

## February 2006

### 21st-century accelerators

Prof. Mike Poole, director of ASTeC, gave a brilliant overview of the history of particle accelerators from the Cockcroft Walton voltage multiplier, 1930, to the 4GLS (fourth-generation light source) multisource concept, using free electron lasers, now being developed at Daresbury Laboratory.



One of Prof. Poole's slides from his presentation on 21st-century accelerators.

# PHYSOC: parties from Alton Towers to CERN



*Making waves? Liverpool, Manchester and Lancaster physics societies join forces at the Einstein Ball, which was held on 15 October 2006.*

PHYSOC has had a very successful first term of the academic year, with several social events, a trip to Alton Towers and the return of the departmental talks. We also had the first (hopefully of many) inter-university physics events, bringing Liverpool, Lancaster and Manchester physics departments together for the Einstein Ball. A big thank you for this is due to Nexus for

organizing and funding the event, and to Manchester PHYSOC for hosting the event.

If all of that wasn't enough, we didn't just give them one Christmas party but two. The first was the traditional PHYSOC party keeping to its roots in the Head of Steam, and for the second event we saw the return of the Physicists Musical Evening (last held in the 1940s). Thanks for this go to Dr Dominic



*Christmas Party: excerpt from "Big Bang", the musical physics show.*

Dickson and the "Big Bang" cast.

This term things look likely to get even better and even busier, with already more departmental talks on the way, a trip to Daresbury planned for February, and not forgetting what will be our biggest event of the year – a trip to CERN in Geneva in May for 20 students from the department. Mixed with these should be a whole load more events, both social and educational, and even both.

**Dan Porter**, president of Liverpool University's PHYSOC

## Physicists and primary schools project: enthusiasm is infectious

Young children are fascinated by science. Teachers welcome visits from physicists who are happy to talk to the children, explain the physics in their curriculum and excite their interest in science. However, it's not easy to think of fun activities and demonstrations at the right level to communicate the science clearly, and it takes time.

Web-based presentations are being developed for physicists to use when visiting primary schools. For each topic there will be fully detailed plans with PowerPoint presentations accompanied by guidelines, as well as feedback from those who



*Generating excitement: enthusing children about science could have far-reaching consequences.*

have used the material.

The project has the potential to have far-reaching consequences and to encourage

more young people to take up physics. The idea was developed by the Institute's Women in Physics Group; the funding came from EPSRC and PPA awards; the website will be sponsored and hosted by the Institute of Physics; and the team are staff members at the University of Sheffield's Department of Physics and Astronomy, led by Prof. Gillian Gehring.

Physicists interested in visiting primary schools should contact Ann Marks, a member of the team, to find out how they can help with the trialling of material for the website (e-mail: [wigg@amarks.co.uk](mailto:wigg@amarks.co.uk)).

## Liverpool will be European Capital of Culture 2008

The Institute has established a link with the Liverpool Culture Company in order to develop physics activities before and during 2008. One suggestion is for physicists to work with city organizations on projects with schoolchildren. For example, a physicist and a musician or artist could work together with a group of children, who would develop the physics of a cross-curricula project.

Before this idea is taken further, we need to know whether there are any physicists who might be interested in getting involved. To find out more, please contact Ann Marks (e-mail: [liviop@amarks.co.uk](mailto:liviop@amarks.co.uk)), stating whether you would prefer dance, multimedia, fine art, sculpture, music, etc.

## Constant Speed comes to Mold



*Anthony Crickmay*

Rambert Dance Company performs Mark Baldwin's *Constant Speed*.

*Constant Speed*, Mike Baldwin's ballet, commissioned by the Institute of Physics for Einstein Year, will be performed at the Clwyd Theatr Cymru in Mold by Rambert Dance Company. It will be part of a programme of modern dance that will emphasize the "strong synergy that exists between dance, music and design".

The performances will be in the Clwyd Room each evening from Tuesday 14 March to Friday 17 March.

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

# Merseyside holds astronomy day



Clockwise from top left: the solar system zone in Spaceport; the bubble nebula (photo: the Liverpool Telescope); Spaceport and the ferry terminal.

Liverpool John Moores University's Astrophysics Research Institute will be presenting its first Merseyside Astronomy Day (MAD) on 11 March. This will combine a series of talks by professional astrophysicists with a day out at the new Spaceport Astronomy and Space Visitor Centre at the Seacombe Ferry Terminal.

The presentations will be spread throughout the day with plenty of time between each of them to explore the centre, take in a "Dome Show", talk to fellow enthusiasts or simply admire the views of the stunning Liverpool skyline.

The MAD is sponsored by the Astronomy by Distance Learning programme at LJMU, so entry to

the talks is free, with just the standard entry charge to Spaceport.

The programme will be:  
10.00 a.m. **Things that go bang in the Night** by Dr Andy Newsam from JMU  
12.00 **Exploring the planets** by Prof. Fred Taylor from Oxford University  
2.00 p.m. **When galaxies collide**

by Dr Phil James from LJMU 4.00 p.m. **Imaging the universe** by Dr Robert Massey from Royal Observatory Greenwich

You can book a place at the MAD, which will include two of the day's talks, by calling Spaceport on 0151 330 1333. For further information about this event, visit the MAD website at [www.astro.livjm.ac.uk/MAD](http://www.astro.livjm.ac.uk/MAD).

## Frölich: physicist ahead of his time

To mark the centenary of the birth of Herbert Frölich, (9 December 1905), an international symposium will take place in Liverpool on 4–5 April.

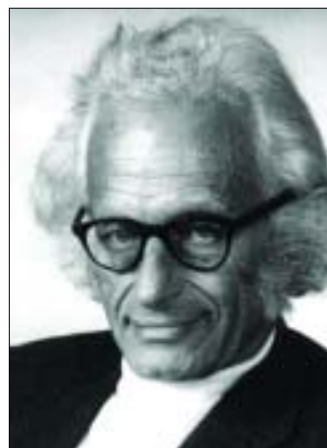
Frölich was the first holder of the chair of theoretical physics at the University of Liverpool from 1948 until his retirement in 1973 and professor emeritus until his death in 1991.

The aim of the symposium is to bring together physicists and biologists – particularly those who either knew Frölich personally or collaborated with him at some stage – not only to

reflect on past glories but also to evaluate the impact of his legacy on developments in physics and biology.

Invited speakers will cover the different fields to which Frölich contributed so significantly, and during the event there will be an exhibition of photographs and other memorabilia. The symposium will be held in the historic Liverpool Medical Institution building.

For further details, please see the website at <http://www.liv.ac.uk/FacultyMedicine/frohlich/> or contact John Hardie (e-mail: [jhardie@liv.ac.uk](mailto:jhardie@liv.ac.uk)).



Prof. Herbert Frölich FRS.

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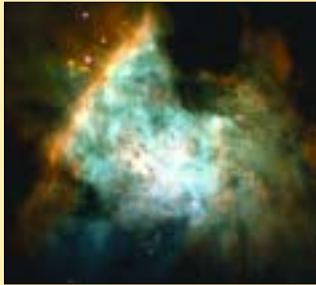
The Institute of Physics, 76 Portland Place, London W1B 1NT, UK. Tel: 020 7470 4800. Fax: 020 7470 4848.

## 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.

29 March 2006

### Institute of Physics 2006 Schools lecture: gravity, gas and stardust



Two sittings 12.45 and 2.30 p.m.

Dr Pete Edwards

Department of Physics, Durham University

How and when did our universe begin? What made it look like this? How will it end? These are all questions that have preoccupied us since the beginning of civilization. The last three years have witnessed considerable progress in our understanding of the universe: recent results from space telescopes have revolutionized our view of the cosmos. For the first time in human history we are close to answering the question: “How did the universe evolve into the beautiful place we see today?”

“Gravity, gas and stardust” takes the audience on a journey through the cosmos, exploring results from the world of astronomy regarding the birth,

life and death of our universe.

The show will include demonstrations, hands-on activities and 3D movie clips to uncover the evidence for the birth of the universe in a Big Bang. We will show how, using supercomputers, cosmologists can predict the fate of the cosmos.

The event is for 14- to 16-year-olds and is planned with numerous curriculum links for Key Stage 4.

Dr Pete Edwards is an experienced science communicator who coordinates the outreach programme of the Ogden Centre for Fundamental Physics at the University of Durham and the UK Dark Matter Collaboration at the Boulby potash mine near Whitby.

The venue will be the Chadwick Lecture Theatre in the Department of Physics at the University of Liverpool. Each sitting will last about an hour.

To book places, contact the Branch Honorary Secretary, David Martin (e-mail: davidm@liv.ac.uk).

22 June 2006

### Key Stage 3 and 4 Conference for all “teachers of physics”

By popular request, this will be another free day event organized by the Merseyside physics teachers network coordinators.

There will be workshops, free software, discussions, networking, fun demonstrations to fit into your lessons, an exhibition of materials and

equipment to try, and more.

Prof. Maxwell Irvine, who is chairing a committee of enquiry into energy policy, will report on the findings and lead a discussion on the energy crisis; Brenda Keogh of Concept Cartoons will speak about recent exciting developments and other speakers and activities are in the pipeline. Members of the Institute’s team of network coordinators will travel to Liverpool to lead sessions and share their innovative teaching ideas.

NQTs, non-specialists and PGCE students are particularly welcome.

Please contact Ann Marks (e-mail: mtnc@amarks.co.uk) for more information or Lucas Hayhurst (e-mail: lht@blueyonder.co.uk) to register.

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 it has become known as major national physics conference and teachers have found it worthwhile travelling long distances to attend this free event with an excellent free lunch. Watch out for more news.

To register or for further information, contact the education secretary, Neil Heritage (e-mail: neilheritage@kingschester.co.uk).

## Moon Watch invites you to stare at the sky



The Council for the Central Laboratory of the Research Councils invites members of the public to help make the lunar calendar more accurate.

As a continuing activity from Einstein Year, Moon Watch is refining the existing astronomical models that are used to set the lunar calendar by combining modern astronomy with recorded sightings of each new crescent moon collected by the public.

Participants should look for the new crescent moon immediately after sunset in the western sky on the first three days after the new moon appears. Using the unaided eye, binoculars or a telescope, participants will record data that include location (postcode), weather conditions, date, time and orientation of the crescent.

The data are then submitted to [www.crescentmoonwatch.org](http://www.crescentmoonwatch.org) for analysis by HM Nautical Almanac Office, which provides astronomical data for a variety of different users.

## Paperclip physics attracts yet more entries this year

The number of entries to the Merseyside heat of the Paperclip Physics Competition has increased again this year.

During the event, teams have five minutes to explain a physics problem to a non-scientist using only articles that are commonly found in the home. Then they answer questions about their presentation from the judges.

The winners will take part in the regional final, which will be held at Daresbury Laboratory CCLRC on 21 March. This year the regional finals will replace the national final and there will be generous prizes for the winning team members and their school. Runners-up will also receive prizes.

Thanks are due to the willing volunteers who act as judges and also to all of those whose participation in the competition ensures that these are inspiring events that incorporate a strong element of fun.

