

YORKSHIRE PHYSICS NEWS

The newsletter of the Yorkshire Branch of the Institute of Physics

Autumn 2008



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Frank Close launches lecture series in Leeds

The Institute's Yorkshire Branch is pleased to announce the start of a new lecture series to be held in Leeds. Prof. Frank Close, a noted particle physicist, will be giving the inaugural lecture entitled "The void: everything about nothing" at 6.00 p.m. on Tuesday 9 December in the Rupert Beckett lecture theatre at the University of Leeds.

Prof. Close is well known for his contributions to the public understanding of science. In a recent interview given to Richard Lea of the *Guardian*, he

attributes his start in writing popular science to an article he wrote for *Nature*. In the article he reported the proceedings of a nuclear physics conference to non-experts. Since then he has become notable for his contributions in this area.

In 1993 Prof. Close gave the Royal Institute Christmas lecture entitled "The cosmic onion" and was awarded the Kelvin Medal and Prize in 1996 by the Institute. Between 1997 and 2000 he was head of communication and public

education activities at CERN, the European Organisation for Nuclear Research.

In addition to his work on popularising science, Prof. Close is an active researcher in theoretical particle physics. During his career he has worked at Stanford, CERN and the Rutherford Appleton Laboratories. Currently he is a professor of physics and fellow at Exeter College, Oxford.

All are welcome to attend the lecture. Refreshments will be provided.

Blue plaque to commemorate Hoyle

The Institute of Physics aims to honour influential physicists by establishing blue memorial plaques in places with a close connection to the scientist concerned. Following the successful development of a blue plaque in honour of Revd John Michell BD FRS, we are now working on establishing a similar memorial for Sir Fred Hoyle FRS (1915–2001), who was born in the village of Bingley, just north of Bradford in West Yorkshire.

Hoyle is often considered to be the "father of modern cosmology" (the term Big Bang for the origin of the universe was coined by him, for instance). He was an astrophysicist,

cosmologist and prolific author who discovered the origin of carbon and other heavy elements, among other achievements.

Although his early school days were troublesome due to both genuine and pretended illness (the latter meant that he played truant persistently), he managed to get admitted to Bingley Grammar School in September 1926, where he quickly progressed to the top of his class. His brilliance and persistence paid off when in the summer of 1933 he was awarded a Yorkshire scholarship to read mathematics at Emmanuel College, University of Cambridge. Hoyle became one

of the leading physicists of the mid-20th century and eventually became Plumian professor of astronomy and experimental philosophy at Cambridge (1958–1972).

Given that Bingley Grammar School played a significant part in Hoyle's early life and education, the Institute's Yorkshire Branch will place a blue plaque there in his honour, in collaboration with the school's management, Hoyle's children and his surviving sister, who still lives in the house where she and her brother were born. There will be a formal unveiling ceremony, which will be announced through the usual communication channels.

Got an idea for a story? E-mail pjd113@york.ac.uk

Yorkshire Branch programme

HULL PROGRAMME

Tuesday 25 November 2008
Should physics get in bed with biology? Stories of life and death*
Prof. Tom McLeish (Polymer IRC, Department of Physics and Astronomy, University of Leeds)
7.30 p.m. Leslie Downs Lecture Theatre, Ferens Building, University of Hull

*A joint lecture with the Institute of Biology

Why might a theoretical physicist work with the life sciences? What do electrons, quarks, black holes and lasers have to do with cell walls, nanomembranes and the genome? Prof. Tom McLeish is convinced that physics has a central role to play in this multidisciplinary project.

The last 30 years have seen a resurgence of physicists' interest in a field now called soft condensed matter. This nanoscale domain of giant molecules, membranes, de-mixing and self-structuring fluids is dominated by the continuous random Brownian motion that is the molecular manifestation of heat. Brownian motion has counter-intuitive properties: it endows elasticity to labile structures and arbitrates between alternative ways of assembling molecular components. Working with it, rather than against it, is a fundamental rule of nanotechnology. The search problem of "protein folding" is

one example of problem solving in a stochastic world.

The lecture examines one example of a recent theme in which theoretical physics has shed light and has helped to direct a programme investigating the self-assembly of nanofibrils from peptide molecules – small versions of proteins. The aggregation of these molecules forms a hierarchy of structures that closely resembles amyloid fibrils in the brain tissue of patients suffering from Alzheimer's disease. Surprisingly, the nature of the structures is clarified by a physical theory that relates them to a small set of energies. McLeish speculates that when physics meets biology, it may have more to say when things go wrong than when they behave accordingly to highly evolved biological norms.

SHEFFIELD PROGRAMME

Tuesday 25 November 2008
50 years of the Lovell telescope
Prof. Ian Morison (Jodrell Bank Observatory, University of Manchester)
5.00 p.m. Department of Physics and Astronomy, University of Sheffield

The lecture will describe how the telescope was conceived and the excitement of its early days when it played a major role in the space race. Since then the Lovell telescope has become an icon of British

science and technology and has been involved in many exciting discoveries. Following an upgrade a few years ago it is now better than at any time in its history and is a key element in the MERLIN and European arrays as well as being a superb instrument for the observation of pulsars.

Tuesday 16 December 2008
Pulsars and extreme physics
Prof. Jocelyn Bell-Burnell (visiting professor of astrophysics, University of Oxford, and president of the Institute of Physics)
5.00 p.m. Department of Physics and Astronomy, University of Sheffield

With densities comparable to the nucleus of the atom, magnetic fields way beyond human capabilities, speeds a large fraction of the speed of light and timing accuracy to match humankind's best, pulsars surely stretch our understanding. This talk aims to explain some of the universe's most bizarre objects to scientists of all ilk and levels.

YORK PROGRAMME

Monday 3 November 2008
Exploring the dark side of the universe
Dr Alex Murphy (Department of Physics and Astronomy, University of Edinburgh)
6.30 p.m. P/L002, Department of Physics, University of York

A vast array of different types of astronomical observation all come to the same remarkable conclusion – that all we can see in the universe is a small fraction of what is out there. The majority of matter in the universe is "dark", and is most likely composed of particles whose properties are fundamentally different to those making up the material of everyday life. This view is now a standard theory in cosmology, and provides perhaps the best evidence for physics beyond the Standard Model, yet to date no direct evidence as to its truth has been established. The race to make the key discovery is hotting up, with one of the world's leading groups based nearby in a salt and potash mine in the north east. Come and learn about the strange universe we live in, and how we are trying to test our theories. Coffee and biscuits will be available in the physics concourse from 6.00 p.m.

Monday 24 November 2008
CERN, the LHC and ISOLDE – a student's perspective
Stewart Martin-Haugh (Department of Physics, University of York and CERN summer student 2008)
6.30 p.m. P/L002, Department of Physics, University of York
The media has been flooded recently with sensationalist reports of a Big Bang machine, black holes and strangelets. However, life at CERN for

If you teach physics but it's not your specialist subject, help is at hand

Are you a biologist, chemist or NQT teaching physics? If so then this networking group may be of interest to you. Andrew Rogerson, an Institute of Physics Teacher Network coordinator for the York area, is setting up a group to support non-specialists who teach physics in schools.

At the first meeting you are invited for some refreshments and a chat about when and how often the group should meet, and how best to provide

support. The headmaster of St Peter's School in York and David Morris, the school's head of physics, have kindly agreed to host the networking sessions in their well-equipped laboratories. The first session will take place at the Rutherford and Maxwell laboratories on Monday 10 November from 4.30 to 6.00 p.m. If you have any questions regarding the meeting, contact Andrew Rogerson (e-mail aw.rogerson@tiscali.co.uk, tel 01759 306 627).

Check out the branch website for the latest news and events at

<http://yorkshire.iop.org>

Calendar of events for autumn/winter

staff and students is rather different, but equally exciting. This talk will give an insight into life at CERN from a summer student's point of view. A popular introduction to LHC physics and experiments will be given, and CERN's nuclear physics programme will also be described. Coffee and biscuits will be available in the physics concourse from 6.00 p.m.

Monday 15 December 2008
Christmas lecture: When science goes bad!
Dr David Jenkins, Department of Physics, University of York
7.30 p.m. P/L002, Department of Physics, University of York
Dr Jenkins will take a light-hearted look at the issue of bad science. How do we detect and deal with scientific fraud? He will consider some recent examples and let the audience decide. Mulled wine and mince pies will be available in the physics concourse from 7.00 p.m.

Monday 26 January 2009
Should physics get in bed with biology?
Prof. Tom McLeish, University of

Durham
6.30 p.m. P/L002, Department of Physics, University of York
Why might a theoretical physicist work with the life sciences? What do electrons, quarks, black holes and lasers have to do with cell walls, nanomembranes and the genome? Prof. Tom McLeish is convinced that physics has a central role to play in this multidisciplinary project.

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Tuesday 3 February 2009
Ark in space*
Dr Marek Kukula, Public Astronomer, Royal Observatory Greenwich
*A joint lecture with Yorkshire

Philosophical Society
7.30 p.m. Tempest Anderson Hall, Museum Gardens, York
Our tiny blue planet is the only place we know where life can exist – a precious ark in the vast ocean of space. However, throughout Earth's history, everything from exploding stars to impacts with giant asteroids have all left their mark on our planet, with profound consequences for its cargo of plants and animals. In this talk Kukula explores how the world around us has been shaped by events in space and how life on Earth has adapted to survive them.

Got an idea for a branch event?

E-mail your suggestions to
pjd113@york.ac.uk

Planet SciCast competition calls for budding science film directors

Physics teachers are being urged to encourage their students to make a film for SciCast Physics 2009.

Can your pupils explain how a boomerang flies, reveal why tin cans make great bongos, or demonstrate the best shape for a flying wing, for example? Have they ever fancied themselves as the next Quentin Tarantino or Sophia Coppola? If so, then this competition is for them.

SciCast Physics is a science film competition and the challenge is to produce a short film of less than two-and-a-half minutes in duration that explains a principle of physics in an entertaining way to

non-scientists. Full details of the competition, including what judges will be looking for and handy film-making hints are available at www.planet-sciast.com/physics. All SciCast Physics films will also be eligible for the other Planet SciCast prizes that will reward skilful film-making techniques as well as good practical science.

SciCast Physics welcomes films from people of all ages in the UK. Unlike the rest of the SciCast competition, SciCast Physics is also open to entries from the Republic of Ireland.

To be eligible for the 2009 awards ceremony, films must be received by 9 January 2009.



Dr Grant (left) and Starlink – overall winners of Planet SciCast 2008.

Physics and guitars collide to make big bang in schools



Mark Lewney looks forward to creating a buzz in Yorkshire schools.

Rock guitars, superstrings, 11 dimensions and the world's largest high-energy particle accelerator are the lead instruments for the Institute of Physics' loudest Schools and Colleges Lecture to date.

"Rock in 11 dimensions: where physics and guitars collide" is an exciting, interactive and inspiring free talk for school students throughout the UK, building on everyday science to explain groundbreaking research into particle physics.

The 2008 Schools and Colleges Lecture, aimed at 14–16-year-olds, will visit local schools to reveal the secrets behind the distinctive sounds of rock guitars and how string vibrations might answer the big questions about the Big Bang.

In his mind-expanding and ear-stimulating show, acoustics physicist and rock guitarist Dr Mark Lewney, this year's presenter, has more than simple entertainment in mind when he straps on his Ibanez Sabre rock guitar and leaps onto the stage.

"If you understand string vibrations you can appreciate music with both your head and your heart, and understanding the fundamentals of the universe as well is a massive bonus," said Lewney, a science presenter who works at the UK Intellectual Property Office in Newport, Wales.

Lewney is already used to combining physics and rock. He won the first NESTA FameLab[®] competition at the Cheltenham Science Festival in 2005 (an *X Factor* for scientists), following

years of research into guitar physics at Cardiff University. Since then, he has made many appearances on TV and radio, including *The Physics of Rock Guitar* on Channel 4 and as "the Rock Doctor" on Children's BBC.

As well as demonstrating the physics of rock guitar and showing how the vibrations of guitar strings form the basis of string theory, Lewney will introduce students to the biggest experiment ever built – the Large Hadron Collider (LHC) at CERN in Geneva, Switzerland, and explain why the science community is so excited about the development.

The LHC will let us glimpse what the universe was like in its first trillionth of a second and may even help us to discover the origins and nature of matter. "It might even find the hidden dimensions of string theory, but there's plenty to be excited about even if it doesn't," said Lewney.

"Everyone should be excited to live at a time when this experiment is so new and we're entering such unknown territory. People in future will say, 'Wow, imagine living back then.'"

The lecture will take place at Leeds Grammar School on 2 December and at Hull Collegiate School on 3 December. For further details about the talk, contact Malcolm Jenkinson at Leeds Grammar School (e-mail physics.technician@gsal.org.uk, tel 01132 291 552) or Steve Pearce at Hull Collegiate School (e-mail steve.pearce@church-schools.com, tel 01482 657 016).

AstroMeet gathers for the 13th time

The Leeds Astronomical Society is holding its 13th annual AstroMeet on Saturday 15 November. The event will take place in the Clothworkers Hall and Foyer, School of Music, Leeds University. Doors open at 9.00 a.m. This year there

are five lectures, starting at 10.00 a.m. Details about the talks can be found on the Leeds Astronomical Society's website at www.leedsastronomy.org.uk. The entrance fee is £10 (or £5 for full-time students and people under 18).

The deadline for contributions to the next issue of this newsletter is: Thursday 15 January 2009

E-mail your materials to pjd113@york.ac.uk