IOP | Institute of Physics In Scotland

Edinburgh Programme – 2011 / 12

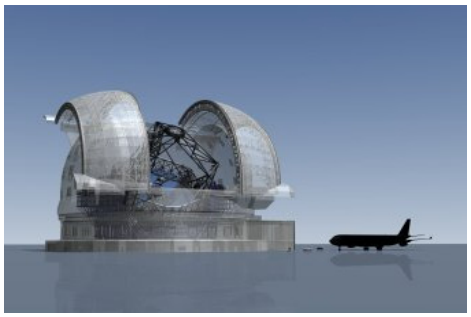
All talks start at 7.30pm in the Royal Society of Edinburgh, 22 - 26 George Street, with refreshments from 7.00 pm

Download the talk abstracts and speaker biographies at:
http://home.eps.hw.ac.uk/~phyrrt/IOPinEdinburgh2011.htm

Tuesday 13 December 2011

Prof. Colin Cunningham
(UK-Astronomy Technology Centre - Edinburgh)

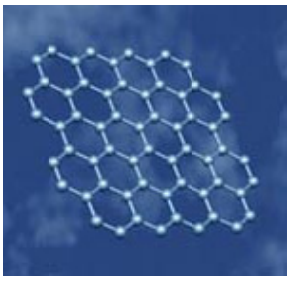
Science and Engineering Challenges of the European Extremely Large Telescope



Monday 23 January 2012

Dr. Aravind Vijayaraghavan
(University of Manchester)

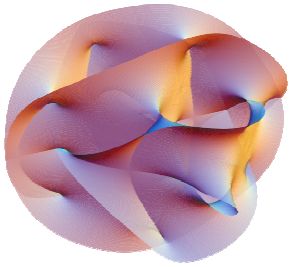
Graphene: Unexpected Science in a Pencil Trace



Tuesday 21 February 2012

Dr. Nadav Drukker (Kings College London)

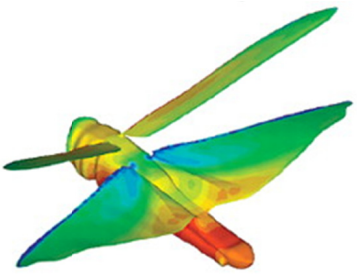
The power of supersymmetry; exact results in field and string theories



Tuesday 6 March 2012

Dr. Richard Bomphrey
(University of Oxford)

The aerodynamics and flight performance of insects



Free and open to non-members
For more information contact Robert Thomson (R.R.Thomson@hw.ac.uk)

Institute of Physics in Scotland, Edinburgh
Programme – 2011 / 12

Lecture Abstracts

Tuesday 13 December 2011

Prof. Colin Cunningham (UK-Astronomy Technology Centre - Edinburgh):
Science and Engineering Challenges of the European Extremely Large Telescope

Abstract: European partners are gearing up to start construction of the world's biggest optical and infrared telescope. I will explain the scientific breakthroughs we hope this will bring, and describe the technological and engineering challenges of building this huge telescope that will have a primary mirror of nearly 40 metres in diameter and be housed in an enclosure nearly as big as a football stadium.

Monday 23 January 2012

Dr. Aravind Vijayaraghavan (University of Manchester):
Graphene: Unexpected Science in a Pencil Trace

Abstract: In this Lecture, I will present the rapid progress that has been made in the field of Graphene, the 2-dimensional wonder material that has captured the imagination of the scientific community in recent years. Graphene was first isolated and studied in 2004 at The University of Manchester by Prof A. Geim and Prof. K. Novoselov, and they were rewarded with the 2010 Nobel Prize in Physics for this work. In the subsequent 7 years, there has been rapid progress in understanding its superlative fundamental properties and developing amazing applications. For example, graphene is the thinnest, lightest, strongest material known to man. It is stretchable, bendable, yet impervious to even gasses. Its potential applications include the next generation of high-speed, low-power computer chips, flexible touch-screens and even flexible computers, conductive coatings for aerospace applications, etc. Nonetheless, it is a very accessible, down-to-earth material; anyone can make it at home with just some cello-tape and graphite (pencil lead), just as the Nobel laureates did. I will also discuss how advanced transmission electron microscopy can be used to see individual atoms in graphene and demonstrate a 'virtual microscope' application for iPads in which everyone can do this for themselves.

Tuesday 21 February 2012

Dr. Nadav Drukker (Kings College London):
The power of supersymmetry; exact results in field and string theories

Abstract: I will take a tour through string theory and supersymmetric field theories and concentrate on quantities which can be calculated exactly. The theories I will explore are similar to the one describing subatomic particles (known as the standard model of particle physics), but not identical. Though at a superficial level they look very complicated (in particular more complicated than the standard model), they have some hidden beauty. This allows one to perform calculations, like the strength of the force between charged particles exactly - at arbitrary distance and arbitrary strength of the coupling constant. In fact, we have several very different ways of viewing these theories and where the same physical quantity is expressed as different questions, but we indeed find from them identical answers.

Tuesday 6 March 2012

Dr. Richard Bomphrey (University of Oxford):
The aerodynamics and flight performance of insects

Abstract: Mankind has been airborne for over one hundred years and advances in aeronautics during that time have been immense. Yet despite our wealth of knowledge in fundamental and applied aerodynamics we are still unable to recreate the performance exhibited by flying animals. Needless to say, they have had quite some head start over us. In the 350 million years since insects first took flight, Natural Selection has diversified a common ancestor that most resembled a modern day dragonfly into countless species and the rich assortment of shapes and sizes we see today - each one locally optimized and tuned for the tasks that define its ecological niche. Familiar trade-offs between, say, stability and manoeuvrability can be found, but in this small-scale, unsteady world, aerodynamic mechanisms we deem unconventional are, in fact, commonplace and traditional aircraft design practices are often rejected. I will highlight some of the peculiarities found in insect flight, illustrating these examples with case studies and describing the experiments that we use to reveal the mechanisms. Finally I will ask if we can learn anything that could be incorporated into the manned or unmanned air vehicles of the future.