

Physics

Alumni Newsletter

02/2011

Queen Mary
University of London

The Head writes:

The rapid expansion and strengthening of Physics continues. Both undergraduate and postgraduate intakes have doubled in recent years, and by the middle of this year at least eight outstanding new academic staff, together with four new support staff, will have recently taken up posts. Coupled with an extensive refurbishment programme, this is producing a dynamic and enthusiastic School that is a pleasure to be part of. I hope that you enjoy hearing some of our recent news.



Best wishes,
Professor Bill Spence

Alumni news

Our series of alumni days continued with talks on the theme of contemporary particle physics last October. Steve Lloyd, Professor in Experimental Particle Physics, and Dr Francesca di Lodovico, Reader in Experimental Particle Physics, spoke about the Large Hadron Collider at CERN and neutrinos. Professor Bill Spence, Head of the School of Physics, and Dr Sanjaye Ramgoolam, Director of Alumni Relations for the School, were delighted to meet over 40 alumni throughout the day.

The next Alumni Day on Astronomy and Astrophysics will be held on Saturday 26 March. Jim Emerson, Professor of Astrophysics, will speak about the VISTA telescope in Chile while Richard Nelson, Professor of Mathematics and Astronomy,



Alumni Day participants, October 2010

will speak about planetary systems in the galaxy. Please see the enclosed invitation for full information, including how to make a booking.

We are pleased to announce that the undergraduate scholarship which alumnus Stephen Francis (Astrophysics, 2000), is supporting is now underway and that a student has been selected.

We welcome your news and profiles for our School alumni web pages at www.ph.qmul.ac.uk/~alumni/alumni.php Please email Dr Sanjaye Ramgoolam at s.ramgoolam@qmul.ac.uk with your submission.

New staff

We are delighted to welcome the following new members of staff to the School of Physics.

Lucie Bone joined the School in November as our Student Support Administrator.

Predrag Micakovic, Computer Systems Manager, and **Sarah Cowls**, School Manager, took up their posts in January.



Lucie Bone



Predrag
Micakovic



Sarah Cowls

Student Recruitment

Home student applications to Physics are up an extraordinary 64 per cent on this time last year. The numbers of overseas applications are 34 per cent, higher compared to this time last year. These percentage increases are the highest amongst all Schools at Queen Mary, University of London. The new Physics with Particle Physics programme has also had an excellent number of applicants. These are very encouraging statistics and reflect the good work done in outreach, marketing and admissions. There is broader success in Science and Engineering, with an overall increase of 12 per cent across the Faculty.

Art and Strings

Dr David Berman, Reader in Theoretical Physics, is collaborating with Professor Grenville Davey, artist-in-residence at Queen Mary since December 2010 and winner of the prestigious Turner Prize (1992), on M-theory inspired sculptures.

Outreach

A packed schedule of outreach events continues. String cosmology and nanotechnology are two recent topics of teacher seminars. The complete list of past and forthcoming events can be found at www.ph.qmul.ac.uk/~schools2/schoolsliasion.php

Research:

Condensed Matter and Materials Physics

The School of Physics is launching a new Centre for Condensed Matter and Materials Physics in May 2011. The new Centre will be headed by Professor Martin Dove, currently at the University of Cambridge. It will build upon existing expertise in the Condensed Matter Physics Group at Queen Mary, and will be initially supported by two new lectureships and two PhD studentships.

The focus of the Centre will be on understanding the relationship between atomic structure and materials properties, with a new emphasis on emerging experimental and computational techniques to understanding the role of short-range order and local structure. The Centre will therefore have enhanced strengths in both computational and experimental work, and bring in researchers from Chemistry and Materials Science. The Centre will become a

full partner in the Thomas Young Centre for the Theory and Simulation of Materials, involving UCL, Imperial and King's. The research will also strengthen links with large central facilities such as the ISIS neutron/muon source, the Diamond light source, and corresponding international facilities, as well as with e-science initiatives on managing scientific data.

The research agenda of the Centre will build upon existing work on organic semiconductors, nanoparticles, carbon, glasses and magnetic materials, and will see the development of new work on hybrid metal-organic framework materials, materials with negative properties (eg negative thermal expansion), biomaterials, multi-ferroics and radiation-induced amorphisation.

Martin gained his BSc and PhD degrees in Physics from the University of Birmingham. This was followed by post-doctoral positions in Physics at the University of Edinburgh and Theoretical Chemistry at the University of Cambridge, before obtaining a lectureship

in Earth Sciences at Cambridge. His work in Earth Sciences has been concerned with understanding the physical properties and behaviour of natural materials and their synthetic analogues, following parallel programmes of work using atomistic simulations and neutron scattering. He was promoted to Reader in 1999 and Professor in 2003.



Professor Martin Dove

Martin is a Fellow of the Institute of Physics, and the recipient of an Alexander von Humboldt Research Award (2007). From 2002 to 2008 he was Director of the NERC-funded National Institute for Environmental eScience. To date he has published 253 papers (ISI index) and two books.

Following on from the establishment of the new Centre for Condensed Matter and Materials Physics, an extensive review of condensed matter teaching is underway.

Particle Physics

The Particle Physics Research Centre (PPRC) is pleased to report that Italy has approved a new international particle physics experiment: SuperB. This major new facility will cost 500m Euros to build and will be dedicated to the search for signs of new physics at high energy. SuperB will use the subtleties of quantum mechanics to perform high precision measurements and detect the effects of heavy particles that would be undetectable at the Large Hadron Collider. A second part of the programme will perform precision tests of the so-called Standard Model of Particle Physics.



Dr Adrian Bevan

Dr Adrian Bevan, Reader in Particle Physics, from the PPRC, leads the physics effort of the SuperB collaboration. He is also leading a team of UK scientists on a detector R&D

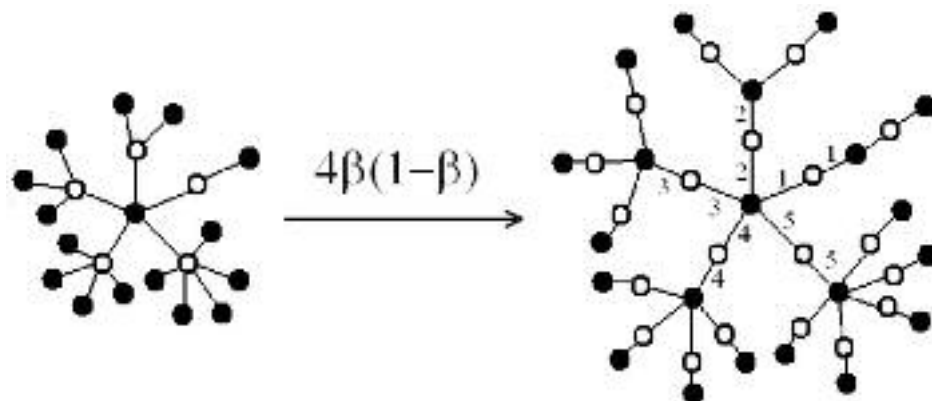
programme for this

experiment. The measurements that will be made possible by this facility, will study several fundamental aspects of nature. By putting these together with results from the LHC and neutrino experiments, such as T2K, it will be possible for scientists to build a more complete picture of the fundamental mechanisms of physics that explain how the universe evolved from the Big Bang into its current state. SuperB was the missing link in this puzzle and will take us a step closer to the holy grail of physics: a Grand Unified Theory.

String theory

The String Theory group at Queen Mary hosted Professor Robert de Mello Koch from the Witwatersrand University, Johannesburg from 10 to 28 January. Professor Koch and collaborators recently discovered novel integrable structures in the dynamics of giant gravitons propagating in 10 dimensions, using the gauge-string duality; he gave a fascinating seminar on these results. His ongoing collaborations with Dr Sanjaye Ramgoolam will seek to further develop the number of theoretic structures they recently discovered in gauge-string duality. Dr Ramgoolam, along with his post-doctoral researchers, Vishnu Jejjala and Diego Rodriguez-Gomez, discovered that the same number theoretic structures play a role in classifying the Calabi-Yau shapes of the hidden six dimensions of string theory.

Dr Andreas Brandhuber, Professor Bill Spence and Dr Gabriele Travaglini, along with Dr Paul Heslop (previously postdoctoral researcher at Queen Mary, now at Durham), have recently contributed to the discovery of a new "duality". They found a way to calculate certain scattering amplitudes - quantities related to the probabilities of observing certain specific particles in scattering experiments such as those carried out at CERN - through a completely different route, namely the calculation of a mathematical quantity called a "Wilson loop". Different (or, as we say, "dual") descriptions of the same physical phenomenon are often manifestations of new hidden structures or symmetries yet to be discovered; and, in turn, these hidden structures hint at the exciting prospect that a novel, powerful framework to describe particles and their interactions is about to be discovered. Stay tuned!



A number theoretic operation on a string theory Feynman diagram