

Newsletter

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YOUR VOICE

By Ian Tucker

A new comms team means change. As I volunteered for this job the Chairman told to me that I had a free hand to do as I wished. So here goes, with a minor rant about something we all frequently undervalue. **Communication.** If I have learned one thing through working in Industry is that you can never underestimate its importance. Get it right and your message gets noticed, but get it wrong or worse don't communicate and you pay a high price. A criticism of the NSG is that few people know we exist, and even fewer know who what we do. During the recent challenges to funding of ISIS and related facilities UK Neutron scatterers found their voice and the various separate community members began to speak to each other and act as a more cohesive body. IOP was challenged over its position regarding STFC funding and this was chiefly led by the previous NSG chair and close supporters, most of whom were NSG committee members. We are fortunate that IOP, ISIS and ILL

management are keen to hear the views of the community and our real challenge now is how best to transmit the community view and keep it live. This is where the committee believes the NSG can be of service, and where we need YOU to speak to US, preferably regularly and when things are good as well as when challenges arrive. Several hundred publications from ISIS alone in 2011 indicate that the community is healthy and publishing, so why not highlight your group's work with a short article in the newsletter? This includes Committee members too by the way...

The Willis prize nominations are due but we want to hear from you about all matters relevant to the community. Speak to us at NMUM or send us an email. Please address any communications to either myself, ian.tucker@unilever.com or our Chairman, Ali.Zarbakhsh@qmul.ac.uk

CONFERENCE REPORT

Report by D T Adroja

Theoretical and Experimental Magnetism Meeting, 16 – 17 June 2011



The Theoretical and Experimental Magnetism Meeting (TEMM) was held at Rutherford Appleton Laboratory, UK from June 16-17 2011. This two-day meeting was organised by the CECAM, Hartree Centre, ISIS-facility, SEPnet, Hubbard Theory Consortium and the Magnetism and Neutron scattering Groups of the Institute of Physics. This year, for the first time, TEMM 2011 was scheduled to coincide with the SEPnet Condensed Matter in the City programme, being part of a week focused on Frustrated Magnetism. The meeting was also combined with UK-Korea workshop on strongly correlated systems. The meeting attracted 89 registered participants from eight different countries. There were 29 oral presentations, out of

which 15 were given by the international speakers, and 11 poster presentations. This provided a substantial boost to the visibility to CECAM, ISIS, SEPnet and IOP. The participants included academics, senior researchers, post-doctoral fellows and Ph.D. students. This was the ninth highly successful meeting in this series. This meeting has become an important part of the UK as well as European

scientific calendar for those in the field of magnetism. The meeting presented an excellent opportunity to hear and discuss with leading experts from all over the world on topics of current research in magnetism such as exotic superconductivity in Fe-based systems as well as in high temperature superconductors and heavy fermion systems, manganites, multiferroics, orbital ordering, low-dimensional and frustrated magnetism, molecular and nano magnetism and quantum phase transitions. Steve Bennington, group leader of ISIS excitations group, on behalf of the organizing committee, welcomed the participants at the beginning of the meeting.

The meeting commenced with an excellent scientific presentation by Jens Jensen (NBI, Denmark) on the theoretical aspects on the chiral spin-wave excitations of the spin-5/2 trimers in the langasite compound $\text{Ba}_3\text{NbFe}_3\text{Si}_2\text{O}_{14}$. He made a direct comparison between experimental and theoretical results and showed how the complex spin waves can be observed in this system. He was followed by John Chalker (Oxford) who discussed the effects of impurities in a quantum spin liquid. In his talk he showed how the disorder can act as a distraction, as a probe as well as a source of new physics. He focused the role of disorder in the Kitaev model. The third talk of the session was given by Bella Lake (HZB, Berlin) on a quantum dimer magnet with extended lattice fluctuations in $\text{Sr}_3\text{Cr}_2\text{O}_8$. In the fourth talk Je-Geun Park (SNU, Seoul) explained the origin of unusual ferromagnetism in SrRuO_3 . The last talk of the first session was given by Peter Baker (ISIS) on μSR measurements of the correlated iridates.

Following tea, the third session was on HTSC and quantum criticality and the talks on HTSC were given by Henrik Ronnow (EPFL, Lusanne) on the mechanism of High-Temperature Superconductivity with a pinch of Iron, followed by Martin Greven (Stanford University) who talked on Two Ising-like collective magnetic excitations in a single-layer cuprate superconductor and Stephen Hayden (Bristol) talked on the magnetic excitations in the normal and superconducting states of $\text{YBa}_2\text{Cu}_3\text{O}_{3+x}$ studied by polarized neutron spectroscopy. Ernst Bauer (TU Vienna) gave an excellent talk on reentrant quantum criticality in $\text{Yb}_2\text{Pd}_2\text{Sn}$ and Edward Yelland (St Andrews) talked on high-field superconductivity at an

The discussion was focused on multiferroics and quantum magnetism, especially on new material CuO , in the second session after the lunch. In the first talk of the second session José Lorenzana (INFN-CNR, Italy) gave an excellent review on High-Tc multiferroic effect emerging from magnetic degeneracy in CuO . He was followed by Silvia Picozzi (INFN, Italy) who discussed on the modelling and understanding of multiferroics and magnetoelectrics. Christian Rugg (PSI) who talked on quantum spin ladders with frustration and non-magnetic vacancies and he was followed by Oleg Petrenko (Warwick) who talked on the low-temperature magnetism in SrRE_2O_4 , a family of geometrically frustrated materials. The final talk of the session was by Philip Lightfoot (St Andrews) who discussed on synthesis and magnetic properties of a new vanadium oxyfluoride exhibiting a unique $S=1/2$ kagome lattice.

electronic topological transition in ferromagnetic URhGe . The first day was concluded with a late evening poster session and drinks with many discussions on complex magnetism and a delightful conference dinner.

The discussion on exotic superconductivity and quantum magnetism was continued on the second day. The first session was on Fe-based superconductors. The first talk of the session was on theoretical aspects. The first talk was given by Qimiao Si (Rice University) on the new iron chalcogenide $(\text{K,Tl})\text{Fe}_x\text{Se}_2$: pairing strength and symmetries, and some general lessons

about iron pnictides. He was followed by Ray Osborn (Argonne) who discussed on the phase competition and superconductivity. The third talk of the session was given by Russell Ewings (ISIS) who talked on antiferromagnetic spin fluctuations in LiFeAs observed by neutron scattering. The fourth and final talk of the session was given by Alan Tennant (HZB, Berlin) on thermal transport and magnetic quasiparticles.

The second session, after tea, of the meeting was focused on computational magnetism. Arthur Ernst (Halle) gave a talk on first-principles design of magnetic oxides, who was followed by Jan Minar (Munich) who talked on correlation effects-from simple metals to complex systems. Julie Staunton (Warwick) talked on magnetism in transition metal and rare earth materials described by ab-initio electronic structure theory. The final talk of the session was given by Zsolt Gercsi (Imperial College) who gave an experimental talk on designed metamagnetism in Mn-based orthorhombic alloys.

The third session, after lunch, was on transition metal magnetism in low dimensions. The first talk was given by Byoung-Chul Min (KIST, Seoul,

Korea) on MgO-based magnetic tunnel junctions for spin-transfer torque devices and the second talk by Changyoung Kim (Yonsei Univ, Korea) on electronic structures and magnetic phases of 4d transition metal oxides. Tatiana Guidi (ISIS) gave an experimental talk on direct access to the spin correlations within zero dimensional spin systems and Pascal Manuel (ISIS) discussed on frustrated magnetism in the RBaCo₄O₇ antiferromagnet. The meeting closed with an excellent presentation by Nikitas Gidopoulos (ISIS) on the distinct phase transition at the surface of an antiferromagnet.

Overall, the meeting was a great success, very useful and enjoyable opportunity for experimentalists to have discussions with theoreticians on various aspects of current research in magnetism. Finally, on behalf of the organizing committee we would like to express our gratitude to all speakers who had taken great care for giving excellent and stimulating presentations. We would like to thank CACME, Hartree Centre, SEPnet, ISIS, UK-GPF and the IOP magnetism and neutron scattering groups for providing funding.

SPOTLIGHT

Report by A Zarbakhsh

ISIS scientist wins neutron prize for novel nanoscience technique

Dr Robert Dalglish from the ISIS Neutron and Muon Facility has been awarded the prestigious BTM Willis Prize for neutron scattering. This is in recognition of his development of novel neutron techniques that are opening up new areas of fundamental and applied research in nanoscience. The prize is awarded bi-annually by the Neutron Scattering Group of the Institute of Physics (IOP) and the Royal Society of Chemistry (RSC).

Dr Dalglish has built a new instrument called Offspec, one of instruments on the ISIS Second Target Station. It is designed to look at microscopic structures such as those found in polymer blends (plastics) and surfactants (soaps and detergents).

Researchers frequently use the well-established techniques of neutron reflectometry and small-angle scattering for studying samples at the nanoscale. However, both techniques have limitations; reflectometry is best suited to measuring nanometre structures perpendicular to a



surface, and small-angle scattering is restricted to an upper size limit of a few hundred nanometres.

“Dr Dalglish’s work in building Offspec has been vital in addressing these limitations” said Dr Ali Zarbakhsh, Chair of the IOP/RSC Neutron Scattering Group. “By labeling neutron trajectories with spin-echo techniques, the Offspec instrument is now able to study structures across a surface and to access bigger particle sizes such as those found in the complex aggregate structures such as cheese, yoghurt and milk. Previous studies have shown that

processing conditions and methods can change the structure of these products on the micron scale and this can alter taste, texture and shelf life.”

Aggregate structures in milk products such as cheese are of particular interest to researchers from the Netherlands, which contributed funding for the construction of Offspec.

Dr Dalglish explained the importance of ISIS to the scientific community: “Neutron scattering enables us to get results we can’t get with any other technique. Using Offspec, it is now possible to look at the structure of surfaces, buried interfaces between materials and complex assemblies of molecules in a new way. The development of these new techniques will help to significantly increase our understanding of extremely challenging and technologically important types of material.” “This is a great achievement by a talented young scientist,” said Dr Andrew Taylor, ISIS Director. “Offspec is already showing that it will revolutionise our ability to

understand surface structure in both biological and physical systems.”

The first publication from Offspec confirmed a prediction dating back to Isaac Newton; that neutrons undergo a slight shift or 'slip' along a surface before reflection in exactly the same way as light. Upcoming experiments include investigation into phase separating polymer blends, liquid crystals and particulate dispersions.

The BTM Willis prize is sponsored by the Institute of Physics.



Professor B.T.M. (Terry) Willis

It is named after Professor Terry Willis, one of the pioneers of the use of neutron scattering in the United Kingdom.

WHAT'S ON

Some interesting forthcoming conferences and meetings

- April 17, 2012** **NMUM, Neutron and Muon Users Meeting,**
Rutherford Appleton Laboratory, Didcot UK
Accommodation and travel costs for the meeting will be reimbursed to UK academic researchers and PhD students.
<http://www.wisis2.isis.rl.ac.uk/useroffice/NMUM2012/Register.asp>
- March 25-29, 2012** **Powder Diffraction and Rietveld Refinement School**
Durham University, UK
http://www.dur.ac.uk/john.evans/webpages/pcg_rietveld_school_2012.htm
- March 27-30, 2012** **Molecular Dynamics to Analyse Neutron Scattering Experiments (MDANSE 2012)**
Institut Laue Langevin, Grenoble, France
<http://www.ill.eu/news-events/events/mdanse/>
- April 15-18, 2012** **Neutron Imaging User Symposium (NIUS 2012)**
Bad Zurzach, Switzerland
<http://www.psi.ch/nius2012>
- May 27-31, 2012** **Perspectives for Neutron Science in Novel & Extreme conditions**
Zaragoza, Spain
<http://xtremec.setn.es>
- June 4-8, 2012** **Third Course on Neutron Scattering Applications in Structural Biology**
Oak Ridge, TN, USA
<http://neutrons.ornl.gov/conf/gcnb2012>
- June 24-28, 2012** **American Conference on Neutron Scattering (ACNS 2012)**
Washington DC, USA
<http://www.mrs.org/acns-2012>
- July 2-5, 2012** **9th International workshop on Polarised Neutrons in Condensed Matter Investigations (PNCFI'2012)**
Paris, France
<http://iramis.cea.fr/meetings/2012PNCFI>
- August 11-17, 2012** **2012 PSI Summer School on Condensed Matter Research**
Institut Montana, Zugerberg/Zug, Switzerland
<http://www.psi.ch/summerschool>



The next International Conference on Neutron Scattering organised by the UK Neutron Scattering Group (**NSG**) will take place in Edinburgh, the capital city of Scotland, at the Edinburgh International Conference Centre, from 8 - 12 July 2013. ICNS 2013 will bring together scientists from a wide range of disciplines including biology, chemistry, earth science, engineering, materials science and physics.

Venue

The Conference will be held at the Edinburgh International Conference Centre (EICC) located in the heart of Scotland's capital.



Registration

Information regarding registration will be made available shortly.

If you would like to register interest for this event and receive an email when registration is available, please contact conferences@iop.org with your name and the event you are interested in attending.

Key dates

- *Abstract submission deadline:*
15 February 2013
- *Early registration deadline:*
24 May 2013
- *Registration deadline:*
2 July 2013

PRIZES

B T M Willis Prize 2012

The IOP Neutron Scattering Group and the Faraday Division of the Royal Society of Chemistry have established a prize for outstanding neutron scattering science. The prize is named in honour of the founding chairman of the Neutron Scattering Group, Professor B T M Willis. It is intended that the prize will be awarded annually, usually in conjunction with the annual Neutron and Muon Beam Users Meeting, NMUM.

Terms

The prize is awarded to an individual in recognition of a single outstanding piece of work, or a longer term coherent body of work, in the application of neutron scattering to a significant problem in physics, chemistry, materials science, earth science, the life

sciences, or engineering, or alternatively in recognition of a major development in neutron scattering instrumentation or techniques.

Eligibility

The recipient of the prize will normally be a young physicist, i.e. in the first 12 years of a research career (allowing for career breaks) e.g. following an award of a PhD., who has made a substantial contribution to the development or reputation of physics / Chemistry / Biology in the UK or Ireland.

Nomination and further details please E-mail:
tatiana.guidi@stfc.ac.uk

Deadline date: 23rd March 2012.

Contact

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To join the neutron scattering Group, please visit either

Institute of Physics <http://physics.iop.org/IOP/Member/>

Royal Society of Chemistry <http://www.rsc.org/members/join.htm>

Members of other professional bodies should contact Ali.Zarbakhsh@qmul.ac.uk