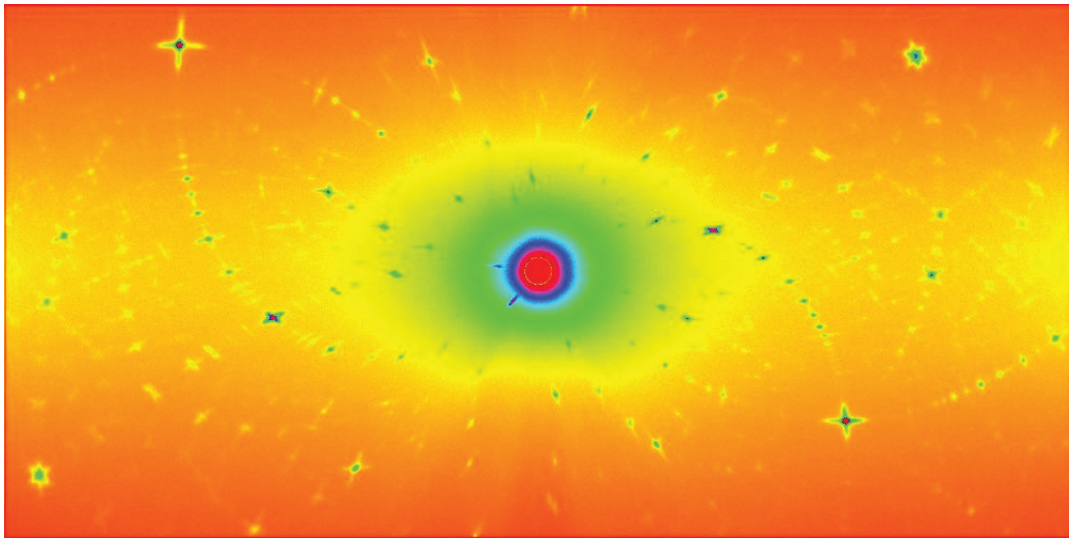
37th Annual Condensed Matter and Materials Meeting

Wagga 2013



Charles Sturt University, Wagga Wagga, NSW
5th February – 8th February, 2013

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Editorial Note
Proceedings of Wagga 2013
The 37th Annual Condensed Matter and Materials Meeting
ISBN: 978-0-646-59459-0
Editors: Garry McIntyre and Richard Mole

The 37th Annual Condensed Matter and Materials Meeting was held at Charles Sturt University, Wagga Wagga, NSW from 5th – 8th February, 2013. There were 88 attendees, including international visitors from Singapore, Brazil, Turkey and Germany. A total of 11 invited and 18 contributed oral papers were presented during the two and one half days of scientific sessions. There were also two sessions with a total of 53 poster presentations. All presenters were invited to submit a manuscript for publication in the conference proceedings. Each manuscript was refereed by at least two anonymous reviewers who worked to a set of guidelines made available by the editors. Each accepted publication therefore satisfies the requirements for classification as a refereed conference publication (E1). The organizers would like to thank the 25 reviewers for their time and effort in reviewing manuscripts, which resulted in 14 papers being accepted for publication. The accepted manuscripts are available at the on-line publication section of the Australian Institute of Physics national web site (http://www.aip.org.au/).

Organising committee: Garry McIntyre, Richard Mole, Kate Picirillo, Gordon Thoroughgood and Anna Paradowska

December 2013

2013 OVERALL TIMETABLE

Tuesday 5 February

16:00 -	Registration desk open
16:00 – 18:00	*Conference bar open*
18:00 – 19:30	*Dinner*
19:00 -	Posters wp1-wp28 to be mounted
19:30 – 21:00	*Wine, beer, and cheese tasting*

Wednesday 6 February

07:30 – 08:30	*Breakfast*
09:00 – 09:10	Conference opening
09:10 – 10:30	Oral Session: Papers wo1-wo3
10:30 – 11:00	*Morning tea*
11:00 – 12:30	Oral Session: Papers wo4-wo7
12:30 – 14:00	*Lunch*
14:00 – 14:50	Oral Session: Papers wo9, tp3
14:50 – 15:30	Poster Clips: wp1-wp28
15:30 – 16:00	*Afternoon Tea*
16:00 – 18:00	Poster Session: Papers wp1-wp28
18:00 -	Posters**:** tp1-tp25 to be mounted
16:30 – 18:00	*Conference bar open*
18:30 – 22:00	*Conference Dinner*

Thursday 7 February

07:30 – 08:30	*Breakfast*
09:00 – 10:30	Oral Session: Papers to1-to4
10:30 – 11:00	*Morning tea*
11:00 – 12:30	Oral Session: Papers wo8, to6-to8
12:30 – 14:00	*Lunch*
14:00 – 15:00	Oral Session: Papers to9-to10
15:00 – 15:30	Poster Clips: tp1-tp25
15:30 – 16:00	*Afternoon Tea*
16:00 – 18:00	Poster Session: tp1-tp25
16:30 – 18:00	*Conference bar open*
18:00 – 19:30	*Dinner*
19:30 – 22:00	Trivia Quiz (Lindsay Davis Cup)

Friday 8 February

07:30 – 08:30	*Breakfast*
09:00 – 10:30	Oral Session: Papers fo1-fo4
10:30 – 11:00	*Morning tea*
11:00 – 12:20	Oral Session: Papers fo5-fo7
12:20 – 12:40	Presentations and Closing
12:40 – 14:00	*Lunch*

2013 PROGRAM

Tuesday 5 February

16:00 -	Registration desk open
16:00 – 18:00	Conference bar open
18:00 – 19:30	Dinner
19:30 – 21:00	Wine, beer, and cheese tasting

Wednesday 6 February

09:00 – 09:10 **Opening: *Garry McIntyre, ANSTO***

09:10 – 10:30 **Chairperson: *Stephen Collocott, CSIRO Lindfield***

09:10 – 09:40 wo1 Magnetic Structures of Rare-Earth Intermetallics: A two-pronged Attack Featuring Neutron Diffraction and Rare-Earth Mössbauer Spectroscopy
Seán Cadogan, UNSW Canberra *INVITED*

09:40 – 10:00 wo2 Optical Investigation of the Magnetoelectric Coupling via Phonons and Electromagnons in Multiferroics
Pauline Rovillain, UNSW Kensington/ANSTO

10:00 – 10:30 wo3 Coupling Between Electronic and Lattice Degrees of Freedom in 4f-Electron Systems Investigated by Inelastic Neutron Scattering
Michael Loewenhaupt, IFP Dresden *INVITED*

10:30 – 11:00 Morning tea

11:00 – 12:30 **Chairperson: *Jeff Sellar, Monash University***

11:00 – 11:30 wo4 Atomic Scale Modelling for Real Nuclear Engineering Problems and Applications
Simon Middleburgh, ANSTO *INVITED*

11:30 – 11:50 wo5 Measuring Homogeniety of Metallic Glasses Using Novel Scanning/Transmission Electron Microscopy Techniques
Amelia Liu, Monash University

11:50 – 12:10 wo6 Micron Resolution Strain Spectroscopy of a Rare-Earth Ion Doped Crystal
John Bartholomew, Australian National University

12:10 – 12.30 wo7 A One-Dimensional Spin-Orbit Interferometer
Tommy Li, UNSW Kensington

12:30 – 14.00 Lunch

14:00 – 15:40 **Chairperson: *Roger Lewis, University of Wollongong***

14:00 – 14:30 wo8 High Resolution Dynamic Imaging at the Australian Synchrotron
Daniel Häusermann, Australian Synchrotron *INVITED*

14:30 – 14:50 wo9 Element Specific and Depth-Resolved Interface Magnetism in $BiFeO_3/La_{0.67}Sr_{0.33}MnO_3$ Thin Films
Joel Bertinshaw, UNSW Kensington

14:50 – 15:10 wo10 Quantum Molecular Dynamics Simulation of Newly Developed Magnesium Based Bulk Metallic Glasses
Reza Mahjoub, UNSW Kensington

15:10 – 15:40 Poster Advertisement wp1-wp28: selected 2 minute talks

15:40 – 16:00 **Afternoon Tea**

16:00 – 18:00 **Poster Session:** wp1-wp28

18:30 – 22:00 **Conference Dinner**

wo11 The Higgs Boson at the Large Hadron Collider
Sara Diglio, University of Melbourne *INVITED*

Thursday 7 February

09:00 – 10:30 **Chairperson: *Chris Ling, University of Sydney***

09:00 – 09:30 to1 Power Generation in Remote Areas Using Concentrated Solar Thermal and Hydrogen
Craig Buckley, Curtin University *INVITED*

09:30 – 09:50 to2 A Novel Multi-Scale Modelling Approach for Determining the Bulk Properties of Difficult-to-Characterise Composites
Paul Mignone, University of Melbourne

09:50 – 10:10 to3 MD Simulation and Experimental INS: A Marriage in Atomic Dynamics
Elvis Shoko, ANSTO

10:10 – 10:30 to4 The Search for Optically Addressable Single Spins in the Solid State: Lessons Learnt from the NV Colour Centre in Diamond
Marcus Doherty, ANU

10:30 – 11:00 **Morning tea**

11:00 – 12:30 **Chairperson: *Richard Mole, ANSTO***

11:00 – 11:30 to5 Graphene and Topological Insulators: In What Ways Are the Transport Propoerties Different from Other Two Dimensional Electron Gases
Shaffique Adam, Yale-NUS College, Singapore *INVITED*

11:30 – 11:50 to6 Effect of External Electric Field on the Application of Graphene
Zhimin Ao, UNSW Kensington

11:50 – 12:10 to7 Haldane-Like Models in Buckled Lattices
Anthony Wright, University of Queensland

12:10 – 12:30 to8 Time Resolved Magnetic Depth Profiles of a Thin Film Using Polarized Neutron Reflectometry
David Cortie, University of Wollongong

12:30 – 14.00 **Lunch**

14:00 – 15:40 **Chairperson: *Oleg Sushkov, UNSW***

14:00 – 14:30 to9 Transforming Carbon Onions into Nanodiamond: a New Pathway to sp^3 Carbon with Astrophysical Implications
Nigel Marks, Curtin University *INVITED*

14:30 – 14:50 to10 Magnetic Neutron Scattering on Nanomagnets: Decrypting Cross-Section Images Using Micromagnetic Simulations
Andreas Michel, University of Luxembourg

14:50 – 15.10 to11 Ferromagnetism in Teflon
Jiabao Yi, UNSW Kensington

15:10 – 15:40 Poster Advertisement tp1-tp25: selected 2 minute talks

15:40 – 16:00 **Afternoon Tea**

16:00 – 18:00 **Poster Session:** tp1-tp25

18:00 – 19:30 **Dinner**

19:30 – 22:00 **Trivia Quiz, Conference Centre**
Quizmaster: Trevor Finlayson, University of Melbourne

Friday 8 February

09:00 – 10:30 **Chairperson: *Lou Vance, ANSTO***

09:00 – 09:30 fo1 Polyamorphism: Fact or Fiction?
Simon Clark, Macquarie University and ANSTO *INVITED*

09:30 – 09:50 fo2 Novel Block Co-polymer of DGEBA and Poly(trimethylene terephthalate): Preparation, Characterization and Properties
Sarath Chandran, Mahatma Gandhi University, Kottayam, India

09:50 – 10:10 fo3 Effects of Strain on the Electronic Properties of InAs/GaAs Core/Shell Nanowires: First Principles Study
Quanguo Jiang, UNSW Kensington

10:10 – 10:30 fo4 Exchange Bias in Neutron Irradiated Concentrated CuMn Spin Glass
Lester Barnsley, Griffith University

10:30 – 11:00 **Morning tea**

11:00 – 12:20 **Chairperson: *Stewart Campbell, UNSW Canberra***

11:00 – 11:30 fo5 What's so Exciting about Low Dimensional, Magnetic Copper Oxides?
Kirrily Rule, ANSTO *INVITED*

11:30 – 11:50 fo6 Spin Gap Evolution upon Ca Doping in the Spin Ladder Superconductor System $Sr_{14-x}Ca_xCu_{24}O_{41}$
Guochu Deng, ANSTO

11:50 – 12:20 fo7 Magnetism and Magnetic Structure of $TbNiAl_4$
Wayne Hutchison, UNSW Canberra *INVITED*

12:20 – 12:40 **Awards and Closing:**
Glen Stewart, UNSW Canberra, and Garry McIntyre, ANSTO

12:40 – 14:00 **Lunch**

2013 POSTER SESSION: Wednesday 6 February

Theory, modeling, simulation

wp1 Detecting Artificial Graphene in GaAs Heterostructures
S. Bladwell and O.P. Sushkov

wp2 Modeling of Electrostatic Potential on Artificial Graphene
Z.-L. Cai and O.P. Sushkov

wp3 Dynamic Phase Transitions in the Spin-1 Blume-Capel Model under an Oscillating Magnetic Field within the Path Probability Method*
M. Ertaş and M. Keskin

wp4 Phase Diagrams of Spin S=1 Bilinear-Biquadratic Heisenberg Models
C.J. Hamer and J. Oitmaa

wp5 Skyrmion Liquid and Skyrmion Glass in the Spin Spiral State of Underdoped Cuprates
R. Kumar and O.P. Sushkov

wp6 The Energy Cost of Measurement for a Specific Curie-Weiss Model
D.J. Miller

wp7 Domain Wall Functionality in Complex Oxides
J.Seidel

wp8 Chemical Bonding in Aluminium: Comparison between QCBED and DFT
A.E. Smith, P.N.H. Nakashima, and B.C. Muddle

wp9 Topological Insulating States in Ordinary Semiconductors
O.P. Sushkov and A. H. Castro Neto

wp10 Using Quantum Magnetic Oscillations to Observe the 'Topological' in Topological Insulators
A.R. Wright and R.H. McKenzie

Magnetism (transition metal, rare-earth, actinide)

wp11 The Effect of Dy on the Time Dependent Behaviour of the Magnetization in $Nd_{60-x}Fe_{30}Al_{10}Dy_x$, x = 0 to 4, Bulk Amorphous Ferromagnets
S.J. Collocott, X.H. Tan, and H. Xu

wp12 Magnetoelectric Coupling in $TbMnO_3$ Explored via Raman Spectroscopy
P.J. Graham, M. Bartkowiak, P. Rovillain, A.M. Mulders, M. Yethiraj, E. Pomjakushina, K. Conder, M. Kenzelmann, and C. Ulrich

wp13 Giant Magnetoelasticity at a Spin Gap Transition in the 5*d* Oxide $Ba_3BiIr_2O_9$
C.D. Ling, W. Miiller, B.J. Kennedy, and M. Avdeev

wp14 Magnetic Properties and Magnetocaloric Effect in Layered $NdMn_{1.7}V_{0.3}Si_2$
M.F. Md Din, J.L. Wang, R. Zeng, W.D. Hutchison, M.Avdeev, S.J. Kennedy, and S. X. Dou

wp15 ^{18}O Isotope Substitution on the Multiferroic Compound $DyMnO_3$
N. Narayanan, F. Li, W.D. Hutchison, N. Reynolds, P. Rovillain, C. Ulrich, J. Hester, G.J. McIntyre, and A.M. Mulders

wp16 Thermodynamic Properties of an Anisotropic Heisenberg Model for the XY Pyrochlore $Er_2Ti_2O_7$
J. Oitmaa and R.R.P. Singh

wp17 The Effect of Fe and Ni Substitution in Magnetocaloric MnCoGe
Q. Ren, W.D. Hutchison, J.L. Wang, W. Kemp, J.M. Cadogan, and S.J. Campbell

wp18 Investigations into the Magnetic and Crystal Field Excitations of the Orthorhombically Distorted Perovskites RVO_3 (R=Dy, Tb, Pr, Ce)
N. Reynolds, P. Rovillain, S. Danilkin, K. Schmalzl, M. Reehuis, S. Miyasaka, F. Fujioka, Y. Tokura, B. Keimer, G.J. McIntyre, and C. Ulrich

wp19 Magnetic Order and Spin-Reorientations in RGa (R = Dy, Ho and Er) Intermetallic Compounds
R.A. Susilo, J.M. Cadogan, D.H. Ryan, N.R. Lee-Hone, R. Cobas, S. Muñoz-Pérez, B. Rosendahl-Hansen, and M. Avdeev

wp20 Spin-Reorientation in GdGa
R.A. Susilo, J.M. Cadogan, D.H. Ryan, N.R. Lee-Hone, R. Cobas, and S. Muñoz-Pérez

wp21 Structure and Properties of New Technetium Compounds
G.J. Thorogood, B.J. Kennedy, M. Avdeev, J. Ting, Z. Zhang, and G.R. Lumpkin

wp22 Magnetic Properties and Magnetocaloric Effect in $Mn_{0.9}Ti_{0.1}CoGe$
J.L. Wang, P. Shamba, W.D. Hutchison, M.F. Md Din, M. Avdeev, S.J. Kennedy, S.J. Campbell, R. Zeng, and S.X. Dou

Nanoscience (nanomaterials, spintronics, molecular magnetism)

wp23 Black Hydrogenated Titanium Dioxide
P. Imperia, R. Aldus, N. Booth, J. Muir, V. Jovic, and G. Waterhouse

wp24 Magnetic Properties of 3d Metal Nanoparticles Formed in SiO_2 via Ion Implantation
A.E. Malik, W.D. Hutchison, K. Nishimura, and R.G. Elliman

wp25 Explorations into the Electron-Phonon Interactions of the NV Colour Centre in Diamond
N.B. Manson and M.W. Doherty

wp26 ZnO/Ti-Compound Nanocomposites Prepared by Polyol Method
A. Murador Filho, D.I. dos Santos, J.G. Kim, D.Q. Shi, and S.X. Dou

wp27 Long-Range Transfer of Electron–Phonon Coupling in Oxide Superlattices
C. Ulrich, A.N. Driza, S. Blanco-Canosa, M. Bakr,, S. Soltan, M. Khalid, L. Mustafa, K. Kawashima, G. Christiani, H.-U. Habermeier, G. Khaliullin, M. Le Tacon, and B. Keimer

wp28 Controlled Synthesis of Nanocrystalline BaFCl:Sm^{3+} X-ray Storage Phosphor
X. Wang and H. Riesen