



14th National Congress of the Australian Institute of Physics

Adelaide University, South Australia:
December 10 — 15, 2000



**Driving Technology Through Discovery,
Understanding and Innovation**

INDIVIDUAL CONFERENCE PROGRAM

VERSION 2

(Excludes plenary sessions)

To find an author, or topic, select the
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CONDENSED MATTER PHYSICS (CMP)

Monday, December 11, 2000

2:00 pm — 3:30 pm VENUE: BRAGG THEATRE Chairperson: Jaan Oitmaa

- 2:00 pm Prof Michele PARRINELLO Max-Planck-Institut für Festkörperforschung
400 *Pressure-induced structural transformations in nanocrystals*
- 2:35 pm A/Prof David MCKENZIE University of Sydney
401 *Applications of materials processing for biotechnology*
- 3:10 pm A/Prof John DOBSON Griffith University
402 *Prediction of dispersion forces in condensed matter and biophysics*

4:00 pm — 5:30 pm VENUE: BRAGG THEATRE Chairperson: Don Chaplin

- 4:00 pm Prof Robert A ROBINSON Australian Nuclear Science & Technology Organisation
403 *Neutron scattering at Australia's replacement research reactor*
- 4:35 pm Prof Oscar MOZÈ Università di Modena e Reggio
404 *Magnetic structures and interactions in novel rare-earth intermetallics*
- 5:10 pm A/Prof John BOLDEMAN Australian Nuclear Science & Technology
405 *Boomerang: The Australian light source*

Tuesday, December 12, 2000

11:00 am — 12:30 pm VENUE: BRAGG THEATRE Chairperson: Stephen Collocott

- 11:00 am A/Prof Trevor HICKS Monash University
406 *Magnetic glassy behaviour in antiferromagnets*
- 11:35 am A/Prof Roger LEWIS University of Wollongong
407 *Optical studies of colossal magnetoresistance*
- 12:10 pm Dr Emma MITCHELL CSIRO Telecommunications and Industrial Physics
408 *Effect of Abrikosov Vortices on Josephson Junction Currents in High Temperature Superconductors*

2:00 pm — 3:30 pm VENUE: BRAGG THEATRE Chairperson: Geoff Smith

- 2:00 pm Dr David WILLIAMS Australian National University
409 *Folding of DNA - tennis racquets, toroids and hollow spheres*
- 2:35 pm Prof Paul MCCORMICK Advanced Powder Technology Pty Ltd
410 *Solid-state mechanochemical synthesis of nanopowders*
- 3:10 pm Dr Craig BUCKLEY Curtin University
411 *A quantitative analysis of the hydrogen-vacancy complexes in the hydrogen aluminium system*

**4:00 pm — 5:30 pm CMP POSTER SESSION 1
VENUE: GAMES, LEVEL 5**

- MT 110** Dr Arthur ANDERSON The University of New South Wales
*Evidence for linking an oxygen pairing process and superconductivity in high temperature
superconductors*

Tuesday, December 12, 2000

**4:00 pm — 5:30 pm CONDENSED MATTER PHYSICS (CMP)
CMP POSTER SESSION 1**

- MT 112** Mr Tim BYRNES University of New South Wales
Improved 4-block DMRG algorithms
- MT 168** Dr Yong CAI Synchrotron Radiation Research Center
Spin-resolved valence electronic structure in epitaxial Fe₃O₄ films on Pt(111)
- MT 114** A/Prof Don CHAPLIN University College, UNSW
NMRON on a mixed halide antiferromagnet (54Mn)Mn(Cl_{0.6}Br_{0.4})₂.4H₂O
- MT 116** A/Prof John DOBSON Griffith University
Correlation energy and excitation properties of many-electron systems from model exchange-correlation kernels
- MT 118** Mr Simon DREW Monash University
CW and pulsed EPR of transition metal ions in some silicate and fluoride glasses
- MT 120** Dr Hans-Peter ECKLE University of New South Wales
Electrical and mechanical properties of strongly-correlated systems
- MT 122** Dr Tunay ERSEZ Australian Nuclear Science and Technology Organisation
Polarised neutron scattering and magnetic studies of rhombohedral La_{1-x}Sr_xMnO_{3+s}
- MT 124** Dr Tunay ERSEZ Australian Nuclear Science and Technology Organisation
Polarised Neutron Scattering Developments at the Australian Nuclear Science and Technology Organisation
- MT 126** A/Prof Matthew FEWELL University of New England
Diffraction of expanded austenite using synchrotron radiation
- MT 128** A/Prof Trevor FINLAYSON Monash University
Microstructure and magnetic properties of rapidly solidified nanocrystalline Fe₈₁Zr₇B₁₂Alloy
- MT 130** Dr Darren GOOSSENS Australian National University
Diffuse x-ray scattering from benzil, C₁₄H₁₀O₂: analysis via automatic refinement of a Monte Carlo model
- MT 132** A/Prof Chris HAMER University of NSW
Linked cluster series expansions for multiparticle excitations in quantum lattice models
- MT 134** Mr Joo-Von KIM University of Western Australia
Calculations of long-wavelength spin-waves in exchange-biased bilayers
- MT 136** N KIRBY Curtin University of Technology
Crucible corrosion in the melt processing of YBa₂Cu₃O_{7-d} superconductors
- MT 138** Dr Michael KUCHIEV University of New South Wales
Enhancement of nuclear reactions in matter
- MT 140** Ms Audrey LOBO University of Sydney
Green function formalism for nonlinear acoustic waves in layered media
- MT 142** Prof Jaan OITMAA University of New South Wales
The square lattice J_1 - J_2 Heisenberg antiferromagnet
- MT 144** Dr Ross PILTZ ANSTO
In situ electric field studies of the relaxor ferroelectric PZN-PT using neutron scattering
- MT 146** Dr Don PRICE CSIRO Telecommunications & Industrial Physics
Non-linear elastic wave propagation in a planar waveguide
- MT 148** Prof Robert A ROBINSON Australian Nuclear Science & Technology Organisation
Neutron scattering studies of Mn₁₂-Acetate
- MT 150** Dr Glen STEWART Australian Defence Force Academy
Mössbauer detection of nuclear magnetic resonance at millikelvin temperatures
- MT 152** A/Prof Oleg SUSHKOV University of New South Wales
Spontaneous spin stripe dimerization in the doped t-J model
- MT 154** A/Prof Oleg SUSHKOV University of New South Wales
Spin 1/2 magnetic impurity in a 2D magnetic system close to quantum critical point

Tuesday, December 12, 2000

4:00 pm — 5:30 pm **CONDENSED MATTER PHYSICS (CMP)** **CMP POSTER SESSION 1**

- MT 156** A/Prof Oleg SUSHKOV University of New South Wales
Critical dynamics of singlet excitations in a frustrated spin system
- MT 158** Dr Gordon TROUP Monash University
EPR measurements of phenolic concentration in developing red grapeseeds - a pilot study
- MT 160** Dr Gordon TROUP Monash University
EPR studies of the free radicals in the spices and pigments turmeric and saffron
- MT 162** Yong ZHAO University of New South Wales
A study on magnetic properties of poly-schiff-base polymer containing bisthiazole rings with Fe (II) sulfate
- MT 164** Yong ZHAO University of New South Wales
Anomaly of second magnetization peak in overdoped Bi₂Sr₂CaCu₂O_z single crystals
- MT 166** Dr Weihong ZHENG University of New South Wales
Extended bound states in the $J_1 - J_2 - d$ chain

Thursday, December 14, 2000

11:00 am — 12:30 pm **VENUE: BRAGG THEATRE** **Chairperson: John Liesegang**

- 11:00 am Prof James WILLIAMS The Australian National University
412 *From fundamental solid state physics to innovative semiconductor devices*
- 11:35 am A/Prof Steven PRAWER University of Melbourne
413 *Diamonds and blue lasers*
- 12:10 pm A/Prof Philip SMITH University of Newcastle
414 *The dissociative chemisorption of silane on the Si(111)7x7 surface*

2:00 pm — 3:30 pm **VENUE: BRAGG THEATRE** **Chairperson: Gerard Milburn**

- 2:00 pm Prof Robert CLARK University of New South Wales
415 *Australian US initiative to construct a silicon-based solid state quantum computer*
- 2:35 pm Dr Robert STAMPS University of Western Australia
416 *High frequency spin dynamics in magnetic heterostructures*
- 3:10 pm Dr He Bi SUN University of Queensland
417 *Master Equation Approach to Probing Electron States*

4:00 pm — 5:30 pm **CMP POSTER SESSION 2** **VENUE: GAMES, LEVEL 5**

- TF 125** Dr Peter BOUWKNEGT Adelaide University
Non abelian fractional quantum hall fluids
- TF 126** Mr Rolf BRENNER University of New South Wales
Single-electron transistor architectures for simulation of solid-state quantum computer read-out
- TF 127** Mr Tilo BUEHLER University of New South Wales
Nanofabrication of a multi-qubit solid state quantum computer device
- TF 129** Dr Mukunda DAS Australian National University
Noise in quantum systems: facts and fantasies
- TF 130** Dr Hans-Peter ECKLE University of New South Wales
Kondo resonance in an aharonov-bohm-casher ring with a quantum dot: exact results for the persistent current
- TF 131** Peter FENG La Trobe University
Surface, interface and bulk properties of GaAs (111)B treated by Se layers
- TF 132** Prof Victor FLAMBAUM University of New South Wales
Possible mechanism of the fractional conductance quantization in a one-dimensional constriction
- TF 133** Prof Victor FLAMBAUM University of New South Wales
Increase of entropy in chaotic many-body systems and "quantum computer"

- TF 134** Dr Mike FORD Flinders University
Electronic structure of alkaline earth metals, Ca and Be, as revealed by electron momentum spectroscopy (EMS)
- TF 135** Dr Hsi-Sheng GOAN The University of Queensland
Continuous quantum measurement of coherence in two-coupled quantum dots
- TF 136** Dr Zhong-Tao JIANG Murdoch University
Quantitative analysis of PECVD processed silicon nitride thin films using AES XPS and spectroscopic ellipsometry (SE)
- TF 137** Dr Zhong-Tao JIANG Murdoch University
Further studies of photoelectron and auger electron lineshape of CuOx/Cu and Cu by a recently modified auger photoelectron coincidence spectroscopy (APECS)
- TF 138** A/Prof Roger LEWIS University of Wollongong
Thermionic cooling in semiconductor
- TF 139** Dr John M LONG Deakin University
Elemental depth profiling in solids by glow-discharge optical emission spectrometry
- TF 140** Dr Saravanamuthu MAHESWARAN University of Western Sydney
Investigation of iron oxide surfaces and interfaces using high energy ion scattering techniques
- TF 141** Dr Saravanamuthu MAHESWARAN University of Western Sydney
Surface properties of hydrogen-implanted SrTiO₃ using high energy ion scattering techniques
- TF 142** Mr Jeremy O'BRIEN University of New South Wales
Scanning tunnelling microscope fabrication of phosphorus array in silicon for a nuclear spin quantum computer
- TF 143** Mr Rodney POLKINGHORNE University of Queensland
Charge detection with micromechanical electroscopes
- TF 144** Dr Ali RAKHSHANI Kuwait University
Effect of microstructure on optoelectrical properties of CdS windows in thin-film solar cells
- TF 145** Mr David REILLY University of New South Wales
Many-body spin related phenomena in ultra-low-disorder quantum wires
- TF 146** Dr Sergey SAMARIN University of WA
*Spin-resolved (*e*,*2e*) experiment on a ferromagnetic iron surface*
- TF 147** Mr Steven SCHOFIELD University of New South Wales
Scanning tunnelling microscopy study of phosphorus dopants on the Si(001)2x1 surface
- TF 148** Dr Andrew SMITH Monash University
Ballistic electrons and plasmons in semiconductors and metals using empirical pseudopotentials
- TF 149** Prof Geoff SMITH University of Technology
Nanoparticle doped polymer foils for use in solar control glazing: limitations, theory and experiment
- TF 150** Prof Geoff SMITH University of Technology
Light transmission anomalies in metal films containing sub-50nm nanoholes
- TF 151** Miss Kallista STEWART Australian National University
An evaluation of phosphorus and cavity gettering
- TF 152** Mr Richard TARRANT University of Sydney
Deposition of thick carbon coating by cathodic arc
- TF 153** Mr Glen TRUDGETT University of Technology
Deconvolution of the instrumental profile function from soft Fe L x-ray spectra
- TF 154** Dr Maarten VOS Australian National University
The effects of electron-electron correlation in solids studied by electron momentum spectroscopy
- TF 155** Ms Carlin YASIN University of New South Wales
Observation of an apparent metal-insulator transition in an ultra high quality two-dimensional GaAs electron system

Friday, December 15, 2000

11:00 am — 12:30 pm **CONDENSED MATTER PHYSICS (CMP)**
VACUUM SOCIETY AND CONDENSED MATTER PHYSICS JOINT SESSION

Friday, December 15, 2000

11:00 am — 12:30 pm **VACUUM SOCIETY AND CONDENSED MATTER PHYSICS JOINT SESSION**
VENUE: BRAGG THEATRE **Chairperson: John O'Connor**

11:00 am A/Prof Stephen THURGATE Murdoch University

418 *The liquid/solid interface: UHV techniques*

11:35 am Dr Robert ELLIMAN Australian National University

419 *Ion beam analysis of thin films and surfaces using high-energy heavy ions*

12:10 pm A/Prof Matthew FEWELL University of New England

420 *Comparative studies of the composition of nitrided stainless steel*