The Abdus Salam International Centre for Theoretical Physics

1964 40th anniversary 2004

Workshop on Novel States and Phase Transitions in Highly Correlated Matter

Organizer(s): P. Coleman, A. Chubukov, Yu LU, C. Pepin, A. Rosch, A. Schofield, H. Takagi; Local Organizer: E. Tosatti
Trieste - Italy, 12 - 23 July 2004

Venue: Adriatico Guest House Kastler Lecture Hall

Final programme

MONDAY 12 JULY 2004 - HEAVY FERMIONS (Room:Adriatico Guest House Kastler Lecture Hall)

12 July 2004

08:15 - 09:00 (Room: Adriatico Guest House (Lower Level 1))
REGISTRATION / ADMINISTRATIVE FORMALITIES

09:00 - 09:15 **OPENING SESSION**
Organizers Piers COLEMAN (Rutgers State University, Piscataway, U.S.A.) Andrey CHUBUKOV (University of Wisconsin-Madison, U.S.A.) Local Organizer Erio TOSATTI (ICTP/SISSA, Trieste, Italy)

09:15 - 10:15 **Silke BUEHLER-PASCHEN** / *Max-Planck-Institut, Dresden, Germany*
Hall effect at quantum critical points

10:15 - 11:15 **Piers COLEMAN** / *Rutgers State University, Piscataway, U.S.A.*
Quantum criticality: a wide open field

11:15 - 11:45 (Room: Adriatico Guest House (Lower Level 1))
--- COFFEE BREAK ---

11:45 - 12:45 **Johnpierre PAGLIONE** / *University of Toronto, Canada*
Heat and charge transport at a field-tuned quantum critical point

12:45 - 15:15 (Room: Adriatico Guest House Cafeteria)
--- LUNCH BREAK ---

15:15 - 15:45 **Johannes GRASSBERGER** / *ICTP Computer Section*
ICTP COMPUTER ASSISTANCE / EXPLANATIONS

15:45 - 16:45 **Matthias VOJTA** / *Universitat Karlsruhe, Germany*
Phase transitions and critical dim. in quantum impurity models

16:45 - 17:45 **Kazumasa MIYAKE** / *Osaka University, Japan*
Critical valence transition in heavy fermion compounds

TUESDAY 13 JULY 2004 - A MIX OF QUANTUM CRITICALITY AND HIGH T_c (Room:Adriatico Guest House Kastler Lecture Hall)

13 July 2004

09:15 - 10:15 **Sergey BORISENKO** / *Institut fuer Festkoerper-und Werkstofforschung, Dresden, Germany*
Origin of the dominating electron-boson coupling in the HTSC cuprates as seen by ARPES

10:15 - 11:15 **Adam KAMINSKII** / *University of Wales, Swansea, U.K. & Iowa State University, Ames, U.S.A.*
Phase diagram of the cuprates - a spectroscopic perspective

11:15 - 11:45 (Room: Adriatico Guest House (Lower Level 1))
--- COFFEE BREAK ---

11:45 - 12:45 **Nai Phuan ONG** / *Princeton University, U.S.A.*
Vorticity, Nernst effect and pseudogap in cuprates: An update, followed by discussion

12:45 - 15:45 (Room: Adriatico Guest House Cafeteria)
--- LUNCH BREAK ---

15:45 - 16:45 **Senthil TODADRI** / *M.I.T., Cambridge, U.S.A.*
Deconfined quantum criticality

16:45 - 17:45 **Andrey CHUBUKOV** / *University of Wisconsin-Madison, U.S.A.*
Pseudogap in strongly coupled superconductors

18:00 - 18:00 (Room: Adriatico Guest House (Terrace))
--- R E C E P T I O N ---

WEDNESDAY 14 JULY 2004 - A MIX OF QUANTUM CRITICALITY AND HIGH T_c (Room:Adriatico Guest House Kastler Lecture Hall)

14 July 2004

09:15 - 10:15 **Markus GARST** / *Universitat Karlsruhe, Germany*
Universally diverging Gruneisen parameter and magnetocaloric effect close to quantum critical points

10:15 - 11:15 **Andrew SCHOFIELD** / *University of Birmingham, U.K.*
Field driven quantum criticality

11:15 - 11:45 (Room: Adriatico Guest House (Lower Level 1))
--- COFFEE BREAK ---

11:45 - 12:45 **Philipp GEGENWART** / *Max-Planck-Institut, Dresden, Germany*
Grunneissen ratio divergence at quantum critical points in CeNi2Ge2, YbRh2Si2 and CeCu6-xAgx

12:45 - 15:30 (Room: Adriatico Guest House Cafeteria)
--- LUNCH BREAK ---

15:30 - 16:30 **Thierry GIAMARCHI** / *University of Geneva, Switzerland*
Tunneling between triplet superconductors

16:30 - 16:30 (Room: Adriatico Guest House (Lower Level 1))
POSTER SESSION (outside Kastler Lecture Hall)

THURSDAY 15 JULY 2004 - HIGH Tc2, OPTICS, etc (Room:Adriatico Guest House Kastler Lecture Hall)

15 July 2004

09:15 - 10:15 **Massimo CAPONE** / *Universita' di Roma "La Sapienza", Italy*
Superconductivity close to Mott insulators: from the Fullerences to the Cuprates

10:15 - 11:15 **Dmitri BASOV** / *University of California at San Diego, La Jolla, U.S.A.*
Electro dynamics of high Tc s/c

11:15 - 11:45 (Room: Adriatico Guest House (Lower Level 1))
--- COFFEE BREAK ---

11:45 - 12:45 **Setsuko TAJIMA** / *ISTEC, Tokyo, Japan*
In-plane charge dynamics and condensation energy in high-Tc superconductors cuprates

12:45 - 15:45 (Room: Adriatico Guest House Cafeteria)
--- LUNCH BREAK ---

15:45 - 16:45 **Bernhard KEIMER** / *Max-Planck-Institut, Stuttgart, Germany*
Spin dynamics of copper oxide superconductors

16:45 - 17:45 **Gabriel AEPPLI** / *N.E.C., Princeton, U.S.A. & University College London, U.K.*
Some reflections on the neutron data in the cuprates

FRIDAY 16 JULY 2004 - 115 AND OTHER (Room:Adriatico Guest House Kastler Lecture Hall)

16 July 2004

09:15 - 10:15 **Ilya VEKHTER** / *Louisiana State University, Baton Rouge, U.S.A.*
Anisotropic properties of nodal superconductors in a magnetic field

10:15 - 11:15 **Joe THOMPSON** / *Los Alamos National Laboratory, U.S.A.*
An overview of Ce115 and Pu115 materials

11:15 - 11:45 (Room: Adriatico Guest House (Lower Level 1))
--- COFFEE BREAK ---

11:45 - 12:45 **Yuji MATSUDA** / *University of Tokyo, Japan*
Multiple superconducting phases in heavy fermion superconductors

12:45 - 15:45 (Room: Adriatico Guest House Cafeteria)
--- LUNCH BREAK ---

15:45 - 16:45 **Christian PFLEIDERER** / *Universitat Karlsruhe, Germany*
MnSi

16:45 - 17:45 **Nai-Phuan ONG** / *Princeton Unversity, U.S.A.*
Life on a triangular lattice: Sodium-doped cobaltate

MONDAY 19 JULY 2004 - CUPRATES (Room:Adriatico Guest House Kastler Lecture Hall)

19 July 2004

09:15 - 10:15 **Kyle McELROY** / *Cornell University, Ithaca, U.S.A.*
Destruction of antinodal state coherence via "checkerboard" charge ordering in strongly underdoped superconducting Bi2Sr2CaCu208-x

10:15 - 11:15 **Hidenori TAKAGI** / *University of Tokyo, Japan*
Physics of lightly doped cuprate revealed from Na doped Ca2CuO2C12

11:15 - 11:45 (Room: Adriatico Guest House (Lower Level 1))
--- COFFEE BREAK ---

11:45 - 12:45 **Bob SCHRIEFFER** / *National High Magnetic Field Laboratory, Tallahassee, U.S.A.*
Gauge theory of pairing and spin fluctuations near the quantum critical point

12:45 - 15:15 (Room: Adriatico Guest House Cafeteria)
--- LUNCH BREAK ---

15:15 - 16:15 **Karine LE HUR** / *Universite de Sherbrooke, Canada & University of Geneva, Switzerland*
New quantum phase transitions in a noisy mesoscopic 1D world

16:15 - 17:30 **Alexei TSVELIK** / *Brookhaven National Laboratory, Upont, U.S.A.*
Confinement of fractional quantum number excitations in the quasi-1D systems

17:30 - 18:30 **Natan ANDREI** / *Rutgers State University, Piscataway, U.S.A.*
Heat transport in chains and ladders

TUESDAY 20 JULY 2004 - MIXED (Room:Adriatico Guest House Kastler Lecture Hall)

20 July 2004

09:15 - 10:15 **Hae-Young KEE** / *University of Toronto, Canada*
Formation of electronic nematic phase in interacting systems

10:15 - 11:15 **Kamran BEHNIA** / *ESPCI, Paris, France*
Thermoelectricity of correlated electrons: sketch of an enigma

11:15 - 11:45 (Room: Adriatico Guest House (Lower Level 1))
--- COFFEE BREAK ---

11:45 - 12:45 **Olivier PARCOLLET** / *CEA-SACLAY, Gif-sur-Yvette, France*
Recent progress in Cluster Dynamical Mean Field Theory

12:45 - 15:45 (Room: Adriatico Guest House Cafeteria)
--- LUNCH BREAK ---

15:45 - 15:45 (Room: Adriatico Guest House (Lower Level 1))
POSTER SESSION

WEDNESDAY 21 JULY 2004 - MnSi, etc (Room:Adriatico Guest House Kastler Lecture Hall)

21 July 2004

09:15 - 10:15 **Achim ROSCH** / *Universitat zu Koln, Germany*
Towards a theory of the physics of the non-Fermi liquid phase of MnSi

10:15 - 11:15 **Mihail TURLAKOV** / *Cambridge University, U.K.*
Quantum phase transitions of magnetic rotons

11:15 - 11:45 (Room: Adriatico Guest House (Lower Level 1))
--- COFFEE BREAK ---

11:45 - 12:45 **Dirk van der MAREL** / *University of Geneva, Switzerland*
MnSi, FeSi and CoSi: The strange world of itinerant electrons and local Hunds rule correlations

12:45 - 16:00 (Room: Adriatico Guest House Cafeteria)
--- LUNCH BREAK ---

16:00 - 16:30 **Alexander BORIS** / *Max-Planck-Institut, Stuttgart, Germany*
SHORT PRESENTATIONS
Keimer Group

16:30 - 17:00 **Andres SANTANDER** / *Universite de Paris XI, France*
Update on sum rules

17:00 - 18:00 **SHORT PRESENTATIONS (15 mins each)**

Spectroscopy of matter near a quantum critical point (D. GIULIANO - Stanford) 15'

Interface phenomena in correlated electron systems (S. OKAMOTO - Columbia University) 15'

Bond criticality in the Anderson Lattice model (Ping SUN - Rutgers) 15'

High frequency optical measurements in the cuprates (Dirk van der MAREL - University of Geneva) 15'

THURSDAY 22 JULY 2004 - QUANTUM CRITICALITY AND MANGENITES (Room:Adriatico Guest House Kastler Lecture Hall)

22 July 2004

09:15 - 10:15 **Victor YAKOVENKO** / *University of Maryland, U.S.A.*
Self energy near a QCP

10:15 - 11:15 **SI Qimiao** / *Rice University, Houston, U.S.A.*
Local quantum criticality and non-Fermi liquid behavior

11:15 - 11:45 (Room: Adriatico Guest House (Lower Level 1))
--- COFFEE BREAK ---

11:45 - 12:45 **Catherine PEPIN** / *CEA-SACLAY, Gif-sur-Yvette, France*
Fractionalization and Fermi surface volume in heavy fermion compounds: the case of YbRh_2Si_2

12:45 - 15:45 (Room: Adriatico Guest House Cafeteria)
--- LUNCH BREAK ---

15:45 - 16:45 **Tsuyoshi KIMURA** / *Los Alamos National Laboratory, U.S.A.*
Magnetically controllable ferroelectricity in perovskite rare-earth manganites

16:45 - 17:45 **Sang-Wook CHEONG** / *Rutgers State University, Piscataway, U.S.A.*
Strain liquid-glass transition in manganites

FRIDAY 23 JULY 2004 (Room:Adriatico Guest House Kastler Lecture Hall)

23 July 2004

09:15 - 10:15 **Michael GERSHENSON** / *Rutgers State University, Piscataway, U.S.A.*
Interaction effects in the conductivity of high mobility Si MOSFETs in the dilute regime

10:15 - 11:15 **Hidenori TAKAGI** / *University of Tokyo, Japan*
Frustrarion in spinel oxides

11:15 - 11:15 **CLOSING SESSION / COFFEE BREAK**