The Abdus Salam International Centre for Theoretical Physics

School and Workshop on Highly Frustrated Magnets and Strongly Correlated Systems: From Non-Perturbative Approaches to Experiments

Cosponsor(s): European Science Foundation
Organizer(s): F. Becca, F. Essler, F. Mila, S. Shastry, A. Tsvelik
Trieste - Italy, 30 July 2007 - 17 August 2007

Venue: Main Building Main Lecture Hall

Final programme

Monday, 30 July 2007 (Room:Main Building Main Lecture Hall)

08:30 - 10:30	(Room: Main Building, Lobby) --- Registration and Administrative formalities ---
10:30 - 11:00	**K.R. Sreenivasan-ICTP Director** / *F. Mila and P. Mendels - School Organizers* **Welcome and Introduction**
11:00 - 11:45	**Claudine Lacroix** / *Laboratoire Louis Neel, France* **Atomic magnetism and exchange**
11:45 - 12:30	**Claudine Lacroix** / *Laboratoire Louis Neel, France* **Atomic magnetism and exchange**
12:30 - 14:30	--- Lunch ---
14:30 - 15:15	**John E. Greedan** / *Dept. of Chemistry McMaster University, Canada* **Synthesis, crystal growth and structural determination**
15:15 - 16:00	**John E. Greedan** / *Dept. of Chemistry McMaster University, Canada* **Synthesis, crystal growth and structural determination**
16:00 - 16:30	--- Coffee break ---

16:30 - 17:15 **Claudine Lacroix** / *Laboratoire Louis Neel, France*
Tutorial

17:15 - 18:00 **Claudine Lacroix** / *Laboratoire Louis Neel, France*
Tutorial

18:00 - 18:45 **John E. Greedan** / *Dept. of Chemistry McMaster University, Canada*
Tutorial

18:45 - 19:30 **John E. Greedan** / *Dept. of Chemistry McMaster University, Canada*
Tutorial

Tuesday, 31 July 2007 (Room:Main Building Main Lecture Hall)

09:00 - 09:45 **Reinhard Kremer** / *MPI fuer Festkoerperforschung Stuttgart*
Thermodynamic measurements

09:45 - 10:30 **Reinhard Kremer** / *MPI fuer Festkoerperforschung Stuttgart*
Thermodynamic measurements

10:30 - 11:00 --- Coffee break ---

11:00 - 11:45 **John T. Chalker** / *Theoretical Physics, Oxford*
Spin-waves and thermal fluctuations

11:45 - 12:30 **John T. Chalker** / *Theoretical Physics, Oxford*
Spin-waves and thermal fluctuations

12:30 - 15:30 --- Lunch ---

15:30 - 16:15 **Reinhard Kremer** / *MPI fuer Festkoerperforschung Stuttgart*
Tutorial

16:15 - 17:00 **Reinhard Kremer** / *MPI fuer Festkoerperforschung Stuttgart*
Tutorial

17:00 - 17:30 --- Coffee break ---

17:30 - 18:15 **John T. Chalker** / *Theoretical Physics, Oxford*
Tutorial

18:15 - 19:00 **John T. Chalker** / *Theoretical Physics, Oxford*
Tutorial

Wednesday, 1 August 2007 (Room:Main Building Main Lecture Hall)

09:00 - 09:45 **Alexei Tsvelik** / *Brookhaven National Laboratory*
Field-theory approaches to magnetic systems

09:45 - 10:30 **Alexei Tsvelik** / *Brookhaven National Laboratory*
Field-theory approaches to magnetic systems

10:30 - 11:00 --- Coffee break ---

11:00 - 11:45	**Wolfram Brenig** / *Technical University Braunschweig* **Linear response theory and dynamical correlations**
11:45 - 12:30	**Wolfram Brenig** / *Technical University Braunschweig* **Linear response theory and dynamical correlations**
12:30 - 15:30	--- Lunch ---
15:30 - 16:15	**Alexei Tsvelik** / *Brookhaven National Laboratory* **Tutorial**
16:15 - 17:00	**Alexei Tsvelik** / *Brookhaven National Laboratory* **Tutorial**
17:00 - 17:30	--- Coffee break ---
17:30 - 18:15	**Wolfram Brenig** / *Technical University Braunschweig* **Tutorial**
18:15 - 19:00	**Wolfram Brenig** / *Technical University Braunschweig* **Tutorial**

Thursday, 2 August 2007 (Room:Main Building Main Lecture Hall)

09:00 - 09:45	**Steven T. Bramwell** / *University College London* **Neutron scattering**
09:45 - 10:30	**Steven T. Bramwell** / *University College London* **Neutron scattering**
10:30 - 11:00	--- Coffee break ---
11:00 - 11:45	**Pietro Carretta** / *Dipartimento di Fisica "A. Volta", Pavia* **Nuclear Magnetic Resonance**
11:45 - 12:30	**Pietro Carretta** / *Dipartimento di Fisica "A. Volta", Pavia* **Nuclear Magnetic Resonance**
12:30 - 15:30	--- Lunch ---
15:30 - 16:15	**Steven T. Bramwell** / *University College London* **Tutorial**
16:15 - 17:00	**Steven T. Bramwell** / *University College London* **Tutorial**
17:00 - 17:30	--- Coffee break ---
17:30 - 18:15	**Pietro Carretta** / *Dipartimento di Fisica "A. Volta", Pavia* **Tutorial**
18:15 - 19:00	**Pietro Carretta** / *Dipartimento di Fisica "A. Volta", Pavia* **Tutorial**

Friday, 3 August 2007 (Room:Main Building Main Lecture Hall)

09:00 - 09:45	**Gregoire Misguich** / *Service de Physique Theorique CEA Saclay* **2D quantum magnetism**
09:45 - 10:30	**Gregoire Misguich** / *Service de Physique Theorique CEA Saclay* **2D quantum magnetism**
10:30 - 11:00	--- Coffee break ---
11:00 - 11:45	**Assa Auerbach** / *Physics Department, Technion, Haifa* **Large-N and Schwinger bosons**
11:45 - 12:30	**Amit Keren** / *Physics Department, Technion, Haifa* **mu-SR**
12:30 - 15:30	--- Lunch ---
15:30 - 16:15	**Gregoire Misguich** / *Service de Physique Theorique CEA Saclay* **Tutorial**
16:15 - 17:00	**Gregoire Misguich** / *Service de Physique Theorique CEA Saclay* **Tutorial**
17:00 - 17:30	--- Coffee break ---
17:30 - 18:15	**Assa Auerbach** / *Physics Department, Technion, Haifa* **Tutorial**
18:15 - 19:00	**Amit Keren** / *Physics Department, Technion, Haifa* **Tutorial**
19:00 - 20:00	**Poster Session and get-together drink**

Saturday, 4 August 2007 (Room:Main Building Main Lecture Hall) (**Saturday**)

09:00 - 09:45	**Joachim Deisenhofer** / *University of Geneva* **Light scattering: infra-red and Raman**
09:45 - 10:30	**Roser Valenti** / *Institut fur Theoretische Physik, University Frankfurt* **Ab-initio calculations**
10:30 - 11:00	--- Coffee break ---
11:00 - 11:45	**Frederic Mila** / *Ecole Polytechnique Federale de Lausanne* **Strong-coupling expansions**
11:45 - 12:30	**Michel Gingras** / *University of Waterloo, Canada* **Spin ice**
12:30 - 15:30	--- Lunch ---
15:30 - 16:15	(Room: Adriatico Guest House Kastler Lecture Hall) **Andreas Laeuchli** / *Ecole Polytechnique Federale de Lausanne* **Numerical simulations**

16:15 - 17:00 (Room: Adriatico Guest House Kastler Lecture Hall)
Andreas Laeuchli / *Ecole Polytechnique Federale de Lausanne*
Numerical simulations

17:00 - 17:30 (Room: Adriatico Guest House Cafeteria)
--- Coffee break ---

17:30 - 18:15 (Room: Adriatico Guest House Informatics Lab.)
Andreas Laeuchli / *Ecole Polytechnique Federale de Lausanne*
Tutorial

18:15 - 19:00 (Room: Adriatico Guest House Informatics Lab.)
Andreas Laeuchli / *Ecole Polytechnique Federale de Lausanne*
Tutorial

Monday, 6 August 2007 (Room:Main Building Main Lecture Hall)

09:00 - 09:45 **Philippe Mendels** / *University Paris-Sud Orsay*
Kagome: experimental aspects

09:45 - 10:30 **Jeroen van der Brink** / *Institute-Lorentz for Theoretical Physics, University Leiden*
Orbital degeneracy in spinels

10:30 - 11:00 --- Coffee break ---

11:00 - 11:45 **Karlo Penc** / *MTA SzFKI, Hungary*
Quadrupolar and nematic order

11:45 - 12:30 **Masashi Takigawa** / *University of Tokyo*
Magnetization plateaux

12:30 - 14:30 --- Lunch ---

14:30 - 15:15 **Joachim Deisenhofer** / *University of Geneva*
Tutorial

15:15 - 16:00 **Roser Valenti** / *Institut fur Theoretische Physik, University Frankfurt*
Tutorial

16:00 - 16:45 **Frederic Mila** / *Ecole Polytechnique Federale de Lausanne*
Tutorial

16:45 - 17:15 --- Coffee break ---

17:15 - 18:00 **Michel Gingras** / *University of Waterloo, Canada*
Tutorial

18:00 - 18:45 **Philippe Mendels** / *University Paris-Sud Orsay*
Tutorial

18:45 - 19:30 **Jeroen van der Brink** / *Institute-Lorentz for Theoretical Physics, University Leiden*
Tutorial

Tuesday, 7 August 2007 (Room:Main Building Main Lecture Hall)

09:00 - 09:45 **Oleg Tchernyshyov** / *Johns Hopkins University*
Spin-lattice coupling in antiferromagnetic spinels

09:45 - 10:30 **Sandro Sorella** / *SISSA, Trieste*
J1-J2 and variational Monte Carlo

10:30 - 11:00 --- Coffee break ---

11:00 - 11:45 **Didier Poilblanc** / *University Paul Sabatier, Toulouse*
Doped frustrated magnets

11:45 - 12:30 **Roderich Moessner** / *Rudolf Peierls Centre for Theoretical Physics, Oxford*
Quantum Dimer Models

12:30 - 14:30 --- Lunch ---

14:30 - 15:15 **Karlo Penc** / *MTA SzFKI, Hungary*
Tutorial

15:15 - 16:00 **Masashi Takigawa** / *University of Tokyo*
Tutorial

16:00 - 16:45 **Oleg Tchernyshyov** / *Johns Hopkins University*
Tutorial

16:45 - 17:15 --- Coffee break ---

17:15 - 18:00 **Sandro Sorella** / *SISSA, Trieste*
Tutorial

18:00 - 18:45 **Didier Poilblanc** / *University Paul Sabatier, Toulouse*
Tutorial

18:45 - 19:30 **Roderich Moessner** / *Rudolf Peierls Centre for Theoretical Physics, Oxford*
Tutorial

Wednesday, 8 August 2007 (Room:Main Building Main Lecture Hall)

08:30 - 09:30 (Room: Main Building, Lobby)
--- REGISTRATION AND ADMINISTRATIVE FORMALITIES (ONLY FOR NEWLY ARRIVED) ---

09:45 - 10:00 **F. Becca, F. Essler, F. Mila, A. Tsvelik**
Welcome and Introduction

One-dimensional systems (I)
Chairperson: Fabian Essler

8 August 2007

10:00 - 10:40 **Bella Lake** / *Hahn-Meitner-Institut Berlin*
Magnetic excitation spectrum of doped and undoped spin ladders

10:40 - 11:20 **Jean-Sebastien Caux** / *Universiteit van Amsterdam*
The dynamics of Heisenberg spin chains

11:20 - 12:00 **Radu Coldea** / *University of Bristol*
Bound states in an Ising magnet in applied field

12:00 - 12:20 **Michael Pustilnik** / *Georgia Institute of Technology*
1D fermions beyond the Luttinger liquid paradigm

12:20 - 16:00 --- Lunch ---

Triangular and triangle based lattices (I)
Chairperson: Gregoire Misguich

8 August 2007

16:00 - 16:40 **Kazushi Kanoda** / *The University of Tokyo*
Strongly correlated electrons on triangular lattice in organics

16:40 - 17:20 **Michael Zhitomirsky** / *Commissariat a l'Energie Atomique, Grenoble*
Unusual dynamics of noncollinear quantum antiferromagnets

17:20 - 17:40 **Chisa Hotta** / *Aoyama Gakuin University*
Geometrically frustrated charges on the anisotropic triangular lattices

17:40 - 18:00 **Ana Akrap** / *Ecole Polytechnique Federale de Lausanne*
Competing orders in a quasi one-dimensional two-band conductor

Thursday, 9 August 2007 (Room:Main Building Main Lecture Hall)

Classical and semiclassical approaches
Chairperson: John T. Chalker

9 August 2007

10:00 - 10:40 **M. Joseph Bhaseen** / *University of Oxford*
Path Integral Approach to Frustrated Antiferromagnets

10:40 - 11:00 **Timothy Saunders** / *University of Oxford*
Spin Freezing in Geometrically Frustrated Antiferromagnets with Weak Bond Disorder

Triangular and triangle based lattices (II)
Chairperson: Michael Zhitomirsky

9 August 2007

12:20 - 12:40 **Alexander Chernyshev** / *University of California, Irvine*
Finite-size scaling of the Neel order parameter

12:40 - 13:00 **Areta Olariu** / *University Paris-Sud Orsay*
Unconventional dynamics in a canonical triangular antiferromagnet

13:00 - 16:00 --- Lunch ---

Spin ice
Chairperson: Roderich Moessner

9 August 2007

16:00 - 16:40 **Peter Schiffer** / *Pennsylvania State University*
Freezing in Spin Ice: Stuffed, Diluted, and Artificial

16:40 - 17:00 **Ludovic Jaubert** / *Ecole Normale Superieure de Lyon*
A three dimensional Kasteleyn transition; spin ice in a [100] field

Frustration and Quantum Information
Chairperson: Roderich Moessner

9 August 2007

17:00 - 17:20 **Fabien Alet** / *University Paul Sabatier, Toulouse*
Valence Bond Entanglement Entropy

17:20 - 17:40 **Claudio Castelnovo** / *University of Oxford*
Spin ice beyond the ice rules

17:40 - 18:00 **Adolfo Avella** / *University of Salerno*
Frustration-driven QPT in the ferromagnetic 1D extended anisotropic Heisenberg model

18:00 - 18:20 **Martin Greiter** / *University of Karlsruhe*
Non-abelian statistics in a quantum antiferromagnet

18:30 - 20:30 --- Reception ---

Friday, 10 August 2007 (Room:Main Building Main Lecture Hall)

Spin-1/2 Kagome (I)
Chairperson: Philippe Mendels

10 August 2007

09:00 - 09:40 **Andrew Harrison** / *Institut Laue-Langevin, Grenoble*
Classical and non-classical behaviour in real kagome antiferromagnets

09:40 - 10:20 **Young Lee** / *Massachusetts Institute of Technology*
Neutron scattering studies of frustrated kagome antiferromagnets

Spin-1/2 Kagome (II)
Chairperson: Philippe Mendels

10 August 2007

10:40 - 11:00 **Fabrice Bert** / *University Paris-Sud Orsay*
Frustrated magnetism in the S=1/2 kagome ZnCu3(OH)6Cl2 compound

11:00 - 11:20 **Oren Ofer** / *Israel Institute of Technology, Haifa*
Ground State and excitation properties of the hebertsmithite studied by local probs

11:20 - 11:40 **Ioannis Rousochatzakis** / *Ecole Polytechnique Federale de Lausanne*
Highly Frustrated Antiferromagnetic Heisenberg polytopes

11:40 - 15:00 --- Lunch ---

Spinels

10 August 2007

15:00 - 15:40 **Hidenori Takagi** / *University of Tokyo*
New and old spinel oxides with geometrical frustration

15:40 - 16:20 **Leon Balents** / *University of California, Santa Barbara*
Frustration and fluctuations in various spinel antiferromagnets

Mott transition
Chairperson: Claudine Lacroix

10 August 2007

16:40 - 17:20 **Hirokazu Tsunetsugu** / *University of Tokyo*
Mott transition and magnetic properties on frustrated lattices

Neutrons and frustrated magnets: A review
Chairperson: Claudine Lacroix

10 August 2007

17:20 - 18:00 **Collin L. Broholm** / *Johns Hopkins University*
Neutron scattering from frustrated magnets

Monday, 13 August 2007 (Room:Main Building Main Lecture Hall)

Magnetization plateaux
Chairperson: Hidenori Takagi

13 August 2007

09:00 - 09:40 **J. Andreas Honecker** / *University of Gottingen*
Magnetization process of two-dimensional highly frustrated spin-1/2 quantum antiferromagnets

09:40 - 10:20 **Timothy Ziman** / *Institut Laue Langevin and CNRS*
Magnetization plateaux of triangular molecular magnets in and out of equilibrium

10:20 - 10:40 **Shin Miyahara** / *University of Tokyo*
Magnetization plateaux in frustrated two-dimensional systems

10:40 - 16:00 --- Lunch ---

Supersolids and bosonic models
Chairperson: Frederic Mila

13 August 2007

16:00 - 16:40 **Kedar Suresh Damle** / *Tata Institute of Fundamental Research, Mumbai*
Variational wavefunction study of triangular lattice supersolid at half-filling

16:40 - 17:00 **Kai Phillip Schmidt** / *Ecole Polytechnique Federale de Lausanne*
Looking for Supersolids in Frustrated Quantum Magnets

Dimer Models
Chairperson: Frederic Mila

13 August 2007

17:00 - 17:20 **Arnaud Ralko** / *University Paul Sabatier, Toulouse*
Phase separation and flux quantization in the doped quantum dimer model

17:20 - 17:40 **Frank Pollman** / *Max Planck Institute for Physics of Complex Systems, Dresden*
Strongly correlated fermions on frustrated lattices

17:40 - 18:00 **Matthieu Mambrini** / *University Paul Sabatier, Toulouse*
Characterizing singlet states with SU(2) dimers

Tuesday, 14 August 2007 (Room:Main Building Main Lecture Hall)

One-dimensional systems (II)
Chairperson: Alexei Tsvelik

14 August 2007

10:00 - 10:40 **Philippe Lecheminant** / *University of Cergy-Pontoise, CNRS*
Competing orders in two-leg spin ladder with four-spin exchange interactions

10:40 - 11:20 **Patrick Azaria** / *University Pierre et Marie Curie, CNRS*
Confinement and Superfluidity in 1D Fermionic Cold Atoms

11:20 - 12:00 **Igor Zaliznyak** / *Brookhaven National Laboratory*
Spinons in strongly correlated chain cuprates

12:00 - 12:20 **Ariel O. Dobry** / *Universidad Nacional de Rosario*
The Spin Peierls transition beyond the adiabatic approximation

12:20 - 16:00 --- Lunch ---

Tetrahedra based and other complex structures
Chairperson: Andrzej M. Oles

14 August 2007

16:00 - 16:20 **Oksana Zaharko** / *ETH Zurich & Paul Scherrer Institute*
Isolated tetrahedra system Cu4OCl6daca4: the magnetic exchange picture

16:20 - 16:40 **Ana Smontara** / *Institute of Physics, Zagreb*
Probing the spin-gap in the HFM systems by thermal conductivity

16:40 - 17:00 **Michel Gingras** / *University of Waterloo, Canada*
Are frustrated antiferromagnets with Gd on corner-shared triangles and tetrahedra complex or not?

Hubbard Model
Chairperson: Andrzej M. Oles

14 August 2007

17:20 - 17:40 **Peter C.W. Holdsworth** / *Ecole Normale Superieure de Lyon*
Magnetic properties of La2CuO4. The Hubbard model and the dilution problem

17:40 - 18:00 **Federico Becca** / *SISSA, Trieste*
Variational description of Mott insulators with charge fluctuations

18:00 - 20:00 **Poster Session and get-together drink**

Wednesday, 15 August 2007 (Room:Main Building Main Lecture Hall)

Pyrochlores
Chairperson: Michel Gingras

15 August 2007

10:00 - 10:40 **Isabelle Mirebeau** / *CNRS, Gif Sur Yvette*
Magnetic ground state and spin excitations in Terbium pyrochlores

10:40 - 11:20 **Bruce D. Gaulin** / *McMaster University , Canada*
Fluctuations and Order of the Pyrochlore Antiferromagnet Tb2Ti2O7

11:20 - 12:00 **Alois Loidl** / *University Augsburg, Germany*
Frustrated Lattices in Spinel Compounds

12:00 - 12:20 **George Jackeli** / *Ecole Polytechnique Federale de Lausanne*
Dimer phases of orbitally degenerate quantum antiferromagnets

12:20 - 16:00 --- Lunch ---

Orbital degeneracy
Chairperson: Karlo Penc

15 August 2007

16:00 - 16:40 **Daniil I. Khomskii** / *University of Cologne*
Charge ordering as an alternative to Jahn-Teller distortion: A novel feature close to Mott transition

16:40 - 17:20 **Andrzej M. Oles** / *Max Planck Institute, Stuttgart*
Frustration and entanglement in spin-orbital superexchange models

17:20 - 17:40 **Francois H. Vernay** / *University of Waterloo, Canada*
Cu K-edge Resonant Inelastic X-Ray Scattering in edge-sharing cuprates

17:40 - 18:00 **Michael Sing** / *University of Wurzburg, Germany*
Unusual spin-Peierls physics of oxyhalides

18:00 - 18:20 **Stefan-Ludwig Drechsler** / *IFW-Dresden*
Theoretical aspects of helimagnetism and related properties in frustrated edge-shared CuO2 chain compounds

Thursday, 16 August 2007 (Room:Main Building Main Lecture Hall)

Nematic order
Chairperson: Federico Becca

16 August 2007

10:00 - 10:40 **Nicholas S.P. Shannon** / *University of Bristol*
How to have fun with frustrated ferromagnets

10:40 - 11:00 **Tsutomu Momoi** / *The Institute of Physical and Chemical Research (RIKEN), Japan*
Octupolar order in the multiple spin exchange model on a triangular lattice

11:00 - 11:20 **Karlo Penc** / *MTA SzFKI, Hungary*
Quadrupolar phases of S=1 models on the triangular lattice

11:20 - 11:40 **Sylvain Capponi** / *University Paul Sabatier, Toulouse*
Spin nematic phases in an itinerant correlated electronic system

11:40 - 12:00 **Gia-Wei Chern** / *Johns Hopkins University*
Spin nematic in a classical pyrochlore antiferromagnet

12:00 - 16:00 --- Lunch ---

One-dimensional systems (III)
Chairperson: Bella Lake

16 August 2007

16:00 - 16:40 **Fabian Essler** / *University of Oxford*
Temperature effects on spin correlations in integer spin Heisenberg chains

16:40 - 17:20 **Robert Konik** / *Brookhaven National Laboratory*
Numerical and DMRG for Coupled Continuum One Dimensional Systems

17:20 - 18:00 **Alexei Tsvelik** / *Brookhaven National Laboratory*
1D models of non-Abelian excitations

Friday, 17 August 2007 (Room:Main Building Main Lecture Hall)

Free discussions