PROGRAMME

Sunday 15 July 2007

18:00–20:00 Welcome & Registration
(*Aula Master, Campus Nord, UPC*)

Monday 16 July 2007

9:00–9:25 *Opening remarks*
F. Xavier Gil (Vice–Rector of Research of the Technical University of Catalonia)
Jordi Boronat (Chairman)

Session L1: Cold Bose and Fermi Gases
Chair: Stefano Giorgini (University of Trento, Italy)

9:25–10:15 Gordon Baym (University of Illinois, USA)
New States of Quantum Matter

10:15–10:40 Pierbiagio Pieri (University of Camerino, Italy)
The Josephson Effect Through the BCS–BEC Crossover

10:40–11:10 *Coffee Break*

11:10–12:00 Maciej Lewenstein (ICFO, Spain)
Ultracold Dipolar Gases

12:00–12:50 Gora Shlyapnikov (LPTMS–CNRS, France)
Novel Phases in Strongly Interacting Fermi Mixtures

12:50–13:15 Tommaso Roscilde (MPQO, Germany)
Metastability of Bosonic Mixtures in Optical Lattices

13:15–15:00 LUNCH

15:00–15:25 Pablo Capuzzi (Universidad de Buenos Aires, Argentina)
Scattering of a Sound Wave on a Vortex in Bose–Einstein Condensates

Session S1: Strongly Correlated Electrons
Chair: Mikko Saarela (University of Oulu, Finland)

15:25–16:15	Feodor Kusmartsev (Loughborough University, UK) *Nucleation of Vortices and Antivortices in Mesoscopic Superconducting Disks*
16:15–16:45	*Coffee Break*
16:45–17:10	Klaus Morawetz (Chemnitz University of Technology, Germany) *The Correlated Density and its Application to Superconductors*
17:10–18:00	Enrico Arrigoni (Graz University of Technology, Austria) *Electron Correlations in Solids: From High–Temperature Superconductivity to Half–Metallic Ferromagnetism*

Tuesday 17 July 2007

Session L2: Nuclear and Subnuclear Physics
Chair: Artur Polls (University of Barcelona, Spain)

9:00–9:50	Angels Ramos (University of Barcelona, Spain) *Strangeness Nuclear Physics*
9:50–10:40	Armen Sedrakian (University of Tuebingen, Germany) *Pairing and Bound State in Fermionic Systems*
10:40–11:10	*Coffee Break*
11:10–11:35	Willem Dickhoff (Washington University St. Louis, USA) *Proton Correlations as a Function of Nucleon Asymmetry*
11:35–12:00	Fernando Arias de Saavedra (University of Granada, Spain) *Fermi Hypernetted Chain Description of Doubly Closed Shell Nuclei*
12:00–12:50	Gabriel Martínez–Pinedo (GSI Darmstadt, Germany) *Many–body Challenges in Nuclear Astrophysics*
12:50–13:15	Morten Hjorth–Jensen (University of Oslo, Norway) *Complex Coupled–cluster Approach to an Ab–initio Description of Open Quantum Systems*
13:15–15:00	LUNCH

Session S2: Atoms and Molecules
Chair: Manuel Barranco (University of Barcelona, Spain)

15:00–15:50 Michel Caffarel (University Paul Sabatier, France)
Quantum Monte Carlo for Molecules

15:50–16:20 *Coffee Break*

16:20–17:10 Antonio Sarsa (University of Cordoba, Spain)
Quantum Monte Carlo for the Electronic Structure of Atomic Systems

17:10–17:35 Eric Suraud (University Paul Sabatier, France)
Hierarchical Method for the Dynamics of Clusters and Molecules in contact with an Environment

17:35–18:00 Valentin Nesterenko (Joint Institute for Nuclear Research, Russia)
Population Transfer Processes: From Atoms to Clusters and Bose–Einstein Condensate

Session L3: Computational Quantum Many–Body (I)
Chair: Gordon Baym (University of Illinois, USA)

18:00–18:25 Lubos Mitas (North Carolina State University, USA)
Topology of Fermion Nodes and Pfaffian Pairing Wavefunctions

18:25–18:50 Siu A. Chin (Texas A&M University, USA)
A New Class of Fourth–Order Algorithms for Solving the Imaginary Time Gross–Pitaevskii Equation in a Rotating Anisotropic Trap

18:50–19:15 Leonardo Colletti (INFN, Italy)
Polarizability in Quantum Dots via Correlated Quantum Monte Carlo

Wednesday 18 July 2007

Session L3: Computational Quantum Many–Body (II)
Chair: Gordon Baym (University of Illinois, USA)

9:00–9:50 Carlo Pierleoni (University of L'Aquila, Italy)
High Pressure Hydrogen: New Predictions by Coupled

Electron–Ion Monte Carlo

9:50–10:40 Nikolay Prokofev (University of Massachusetts, USA)
Worm Algorithm for Many–Body Systems

10:40–11:10 *Coffee Break*

Session FK: Feenberg & Kuemmel Awards (I)
Chair: Jesus Navarro (IFIC– CSIC, Spain)

11:10–12:00 Stefano Fantoni (SISSA, Italy)
Quantum Monte Carlo Calculations for Nuclei and Nuclear Matter

12:00–12:50 Eckhard Krotscheck (JK University of Linz, Austria)
Static and Dynamic Many–Body Correlations: Overview and Prospects

12:50–13:15 Frank Verstraete (Vienna University, Austria)
Strongly Correlated Quantum Systems from the Point of View of Quantum Information Theory

13:15–15:00 LUNCH

15:50–18:00 *Visit to the Science Museum CosmoCaixa*

Session FK: Feenberg & Kuemmel Awards (II)
Chair: Jesus Navarro (IFIC– CSIC, Spain)
Conference Room– CosmoCaixa

18:00–19:50 *Awards Session*

Susana Hernández and Hermann Kuemmel
The Kuemmel Award
Honorable mentions: **Gregory Astrakharchik** and **Robert Zillich**
G. Ortiz
Verstraete's laudatio
Kuemmel award: **Frank Verstraete**

Jordi Boronat and Siu A. Chin
The Feenberg Medal
John W. Clark
In the Feenberg Centennial
Artur Polls
Fantoni's laudatio
Mikko Saarela

Krotscheck's laudatio
Feenberg Medals: **Stefano Fantoni** and
Eckhard Krotscheck

Siu A. Chin
Closing words

20:30–23:00 *Banquet in the CosmoCaixa Restaurant*

Thursday 19 July 2007

Session L4: Phase Transitions
Chair: Luciano Reatto (University of Milan, Italy)

9:00–9:50 Thomas Vojta (University of Missouri–Rolla, USA)
Quantum Phase Transitions on Percolating Lattices

9:50–10:40 Andrew Parry (Imperial College London, UK)
Non–Locality and the Saga of Short–Ranged Wetting Transitions

10:40–11:10 *Coffee Break*

11:10–11:35 Gregory Astrakharchik (Technical University of Catalonia, Spain)
Ground State Properties of a Homogeneous 2D System of Bosons with Dipolar Interactions

11:35–12:00 Ettore Vitali (University of Milan, Italy)
Liquid–solid Transition in ^{4}He at T=0 K: Analytical Results about the Ground State Wave Function

12:00–12:50 Niels Walet (University of Manchester, UK)
Pairing in Many–fermion Systems: An Exact Renormalisation Group Treatment

12:50–13:15 Arnau Rios (Michigan State University, USA)
Entropy of a Correlated System of Nucleons

13:15–15:00 LUNCH

Session S3: Quantum Computation
Chair: Gerardo Ortiz (Indiana University, USA)

15:00–15:50 Michael Wolf (MPQO, Germany)
Area laws

15:50–16:20 *Coffee Break*

16:20–17:10 Lorenza Viola (Dartmouth College, USA)
Generalized Entanglement in Static and Dynamic Quantum Phase Transitions

17:10–17:35 Raymond Bishop (University of Manchester, UK)
Thermal and more General Coherent States for Open Systems and Quantum Information Theory

Poster Session

17:35–18:50 Poster Exhibition
(*Beer & Snacks*)

Friday 20 July 2007

Session L5: Quantum Liquids and Solids
Chair: Henry Glyde (University of Delaware, USA)

9:00–9:50 Francesco Ancilotto (University of Padova, Italy)
Highly Inhomogeneous ^{4}He Systems from Density Functional Calculations

9:50–10:40 Rafael Guardiola (University of Valencia, Spain)
Small Clusters of Para–Hydrogen

10:40–11:10 *Coffee Break*

11:10–11:35 Susana Hernández (University of Buenos Aires, Argentina)
Adsorption Potentials for Nonplanar Geometries

11:35–12:00 Robert E. Zillich (JK University of Linz, Austria)
Rotational Spectra in Helium Clusters and Droplets: Size Dependence and Rotational Linewidth

12:00–12:50 Davide Galli (University of Milan, Italy)
Microscopic Studies of the Ground State of Solid ^{4}He with Path Integral Projector Monte Carlo

12:50–13:15 Alex Kamenev (University of Minnesota, USA)
One–dimensional Fermi–Luttinger Liquid

13:15–15:00 LUNCH

Session S4: New Frontiers
Chair: Charles Campbell (University of Minnesota, USA)

15:00–15:50	Henry Glyde (University of Delaware, USA) *Phonon–roton Excitations and Quantum Phase*
15:50–16:20	*Coffee Break*
16:20–17:10	Antonio Acín (ICFO, Spain) *Entanglement Percolation in Quantum Networks*
17:10–17:35	Oriol Bohigas (LPTMS–CNRS, France) *Coexistence of Regular and Chaotic Motion in the Nuclear Ground State*
17:35–18:00	Gerardo Ortiz (Indiana University, USA) *A Symmetry Principle for Topological Quantum Order*
18:00–18:25	*Closing Remarks* Charles Campbell (University of Minnesota, USA) Siu Chin (IAC Chair)