



The Abdus Salam
**International Centre
for Theoretical Physics**



Workshop on Quantum Simulations with Ultracold Atoms

Organizer(s): I. Bloch, M. Inguscio, M. Lewenstein, A. Trombettoni, G. Mussardo (Local Organiser)
Trieste - Italy, 16 - 20 July 2012

Programme

Monday 16 July 2012 (Room:Adriatico Guest House Kastler Lecture Hall)

16 July 2012

- 08:30 - 09:30** (Room: Adriatico Guest House - Kastler Lecture Hall Area (Lower Level 1))
Registration and Administrative Matters
- 09:30 - 09:40** **Directors of Workshop**
Welcoming Address
- 09:40 - 10:20** **M. Koehl / Univ. of Cambridge, UK**
Two-dimensional Fermi gases
- 10:20 - 11:00** **S. Kuhr / Univ. of Strathclyde, UK**
Probing the dynamics of strongly correlated quantum systems with single-atom resolution
- 11:00 - 11:30** (Room: Adriatico Guest House (Terrace))
--- Coffee Break ---
- 11:30 - 12:10** **F. Ferlaino / Univ. Innsbruck, Austria**
Bose-Einstein Condensation of Erbium
- 12:10 - 15:00** (Room: Adriatico Guest House Cafeteria)
--- Lunch Break ---
- 15:00 - 15:40** **G. Modugno / Univ. de Firenze, Italy**
Experiments with disordered, interacting Bose gases

- 15:40 - 16:20** **T. Giamarchi** / *Univ. of Geneva, Switzerland*
Dirty bosons in one dimension
- 16:20 - 16:50** (Room: Adriatico Guest House (Terrace))
--- Coffee Break ---
- 16:50 - 17:30** **C. Sa De Melo** / *Georgia Inst. of Technology, Atlanta, USA*
Who is the Lord of the Rings in the Zeeman-spin-orbit Saga: Majorana, Dirac or Lifshitz?
- 17:30 - 18:10** **N. Cooper** / *Univ. of Cambridge, UK*
Mapping the Berry Curvature of Optical Lattices
- 18:10 - 18:50** **N. Goldman** / *Univ. Libre de Bruxelles, Belgium*
Identifying Topological Edge States in 2D Optical Lattices using Light Scattering

Tuesday, 17 July 2012 (Room:Adriatico Guest House Kastler Lecture Hall)

17 July 2012

- 09:00 - 09:40** **C. Salomon** / *Ecole Normale Superieure, Paris, France*
Thermodynamics of Bose and Fermi Quantum Gases
- 09:40 - 10:20** **C. Chin** / *Univ. of Chicago, USA*
Exploring Universal Quantum Physics in few- and many-body atomic systems
- 10:20 - 11:00** **M. Ueda** / *Univ. of Tokyo, Japan*
Three Universal Trimers in Ultracold Atoms
- 11:00 - 11:30** (Room: Adriatico Guest House (Terrace))
--- Coffee Break ---
- 11:30 - 12:10** **S. Stringari** / *Univ. degli Studi di Trento, Italy*
Spin-orbit coupled Bose-Einstein condensates
- 12:10 - 12:50** **G. Bruun** / *Univ. of Aarhus, Denmark*
Repulsive polarons in a strongly interacting Fermi gas
- 12:50 - 15:00** (Room: Adriatico Guest House Cafeteria)
--- Lunch Break ---
- 15:00 - 15:40** **S. Hofferberth** / *Univ. of Stuttgart, Germany*
Rydberg-Rydberg interactions in ultracold atomic gases
- 15:40 - 16:20** **T. Pohl** / *Max Planck Inst. for Physics of Complex Systems, Dresden, Germany*
Quantum Simulations of and with Rydberg Atoms
- 16:20 - 16:50** (Room: Adriatico Guest House (Terrace))
--- Coffee Break ---
- 16:50 - 17:30** **I. Lesanovsky** / *Univ. of Nottingham, UK*
Simulation of interacting spins and anyons with Rydberg lattice gases
- 17:30 - 18:10** **G. Pupillo** / *IQOQI Innsbruck, Austria*
Rydberg-dressed atoms: from many-body phases to molecular cooling

Wednesday, 18 July 2012

18 July 2012

- 09:00 - 09:40 **C. Weitenberg** / *Ecole Normale Supérieure, Paris, France*
Superfluid behaviour of a two-dimensional Bose gas
- 09:40 - 10:20 **N. Prokofiev** / *Univ. of Massachusetts, Amherst, USA*
Higgs amplitude mode in a 2D superfluid
- 10:20 - 11:00 **A. Polkovnikov** / *Boston Univ. Boston, USA*
Phase transitions in real time following a quantum quench
- 11:00 - 11:30 (Room: Adriatico Guest House (Terrace))
--- Coffee Break ---
- 11:30 - 12:10 **G. Sierra** / *Inst. de Matematicas y Fisica Fundamental, Madrid, Spain*
Quantum spin analogues of Fractional Quantum Hall wave functions
- 12:10 - 12:50 **R. Konik** / *Brookhaven National Lab. Upton, USA*
Non-Equilibrium Behavior and Thermalization in 1D Bose Gases
- 12:50 - 12:50 --- AFTERNOON FREE ---
- 20:00 - 20:00 (Room: Adriatico Guest House (Terrace))
--- SOCIAL DINNER ---

Thursday, 19 July 2012 (Room: Adriatico Guest House Kastler Lecture Hall)

19 July 2012

- 09:00 - 09:40 **A. Sommer** / *Massachusetts Inst. of Technology, USA*
Spin-Orbit Coupled Fermi Gases and the Evolution of Fermion Pairs from 3D to 2D
- 09:40 - 10:20 **R. A. Williams** / *NIST Univ. of Maryland, USA*
Synthetic gauge fields for ultracold atoms
- 10:20 - 11:00 **L. Tarruell** / *ETH Zurich, Switzerland*
Engineering Dirac points with ultracold fermions in optical lattices
- 11:00 - 11:30 (Room: Adriatico Guest House (Terrace))
--- Coffee Break ---
- 11:30 - 12:10 **W. Zwerger** / *Technische Univ. Munchen, Germany*
The unitary Fermi gas: a benchmark case for many-body physics
- 12:10 - 12:50 **E. Demler** / *Harvard Univ. Cambridge, USA*
Exploring topology with synthetic matter
- 12:50 - 15:00 (Room: Adriatico Guest House (Terrace))
--- Lunch Break ---
- 15:00 - 15:40 **B. Laburthe-Tolra** / *Universite Paris XIII, Paris, France*
Dipolar Chromium BECs and Magnetism
- 15:40 - 16:20 **T. Takekoshi** / *Inst. fur Experimentalphysik, Innsbruck, Austria*
Ultracold dipolar bosonic molecules

- 16:20 - 16:50** (Room: Adriatico Guest House (Terrace))
--- Coffee Break ---
- 16:50 - 17:30** **L. Santos / Leibniz Univ. Hannover, Germany**
Novel scenarios in ultra-cold lattice gases: Zig-zag optical lattices and gases with periodically modulated interactions
- 17:30 - 18:10** **G. Ortiz / Indiana Univ. Bloomington, USA**
Duality as a Tool for Quantum Simulation of Topological Matter
- 18:30 - 20:00** (Room: Adriatico Guest House - Kastler Lecture Hall Area (Lower Level 1))
POSTER SESSION

Friday, 20 July 2012 (Room:Adriatico Guest House Kastler Lecture Hall)

20 July 2012

- 09:00 - 09:40** **M. K. Oberthaler / Ruprecht Karls Univ. Heidelberg, Germany**
Bifurcation - in the classical and quantum regime
- 09:40 - 10:20** **P. Windpassinger / Univ. Hamburg, Germany**
Simulating classical magnetism and artificial gauge fields in optical lattices
- 10:20 - 11:00** **M. Rizzi / Max Planck Inst. fuer Quantenoptik, Garching, Germany**
An optical-lattice-based quantum simulator for relativistic field theories and topological insulators
- 11:00 - 11:30** (Room: Adriatico Guest House (Terrace))
--- Coffee Break ---
- 11:30 - 12:10** **A. Celi / Inst. of Photonic Sciences, Barcelona, Spain**
Quantum simulation of an Extra Dimension
- 12:10 - 12:50** **A. Smerzi / Inst. Nazionale di Ottica Applicata, Firenze, Italy**
Entanglement, Distinguishability and Sub Shot-Noise Interferometry
- 12:50 - 13:00** **Closing Remarks**