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ESF Research Conferences

A Programme of the European Science Foundation

Bose-Einstein Condensation EuroConference on Ultracold Gases and their Applications

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Sant Feliu de Guixols (Costa Brava), Spain, 10 – 15 September 2005

Chair: **Gora Shlyapnikov** (RU, Université Paris-Sud, LPTMS, Orsay, F)

Vice-Chair: **Massimo Inguscio** (I, Università di Firenze, LENS, I)

Scientific Committee:

Rob Ballagh (Otago U., NZ); Eric Cornell (JILA Boulder, US); Jean Dalibard (ENS Paris, F);
Klaasjan van Druten (Amsterdam U., NL); Wolfgang Ertmer (Hannover U., D); Rudi Grimm (Innsbruck U., A);
Ed Hinds (Imperial College London, UK); Wolfgang Ketterle (MIT Cambridge, US); Sandro Stringari (Trento U., I);
Masahito Ueda (Tokyo Inst. of Technology, J)

With support from

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Final Programme

On line at: <http://www.esf.org/conferences/pc05095>

Saturday 10 September

Late afternoon / early evening	Registration at the hotel reception and ESF desk
19.30	Dinner
20.00	Get-together-drinks

Sunday 11 September

Session 1 - Chair: Claude Cohen-Tannoudji (ENS, Paris, F)

08.30	Conference Opening
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- 08.45 **Bill Phillips** (NIST, Gaithersburg, US)
Tutorial on coherent atom optics with Bose-Einstein condensates with some recent results
- 09.35 Discussion
- 09.50 **Alain Aspect** (Institut d'Optique, Orsay, F)
Atomic Hanbury-Brown and Twiss effect
- 10.25 Discussion
- 10.35 Coffee break
- 11.05 **Ed Hinds** (Imperial College London, UK)
Atom chips and cold quantum gas
- 11.40 Discussion
- 11.50 **Vladan Vuletic** (MIT, Cambridge, US)
Atomic samples entangled by cavity interaction: single photons, single atoms, and squeezed clocks
- 12.25 Discussion
- 12.35 Short talk
- 12.50 Discussion
- 13.00 Lunch

Session 2 - Chair: Allan Griffin (University of Toronto, CA)

- 16.00 Coffee break
- 16.30 **Jean Dalibard** (ENS, Paris, F)
Interference between low-dimensional condensates: the emergence of vortices
- 17.05 Discussion
- 17.15 **Ignacio Cirac** (MPQ Garching, D)
Simulating quantum many-body systems
- 17.50 Discussion
- 18.00 Short talk
- 18.15 Discussion
- 18.25 Short talk
- 18.40 Discussion
- 18.50 Short talk
- 19.05 Discussion
- 19.30 Dinner
- 21.00 Poster session 1

Monday 12 September

Session 3 - Chair: Dan Kleppner (MIT, Cambridge, US)

- 08.45 **Wolfgang Ketterle** (MIT, Cambridge, US)
Bose-Einstein condensation of atoms, molecules, and fermion pairs
- 09.35 Discussion
- 09.50 **Tin-Lun Ho** (Ohio State University, US)
Strongly Interacting Fermi Gases: Fundamental issues, Solutions, and Looking Forward
- 10.25 Discussion
- 10.35 Coffee break
- 11.05 **Debby Jin** (JILA, Boulder, US)
Exploring the BCS-BEC crossover regime with a Fermi gas of atoms
- 11.55 Discussion
- 12.10 **Rudi Grimm** (University of Innsbruck, A)
Pairing gap and collective oscillations in the BEC-BCS crossover
- 12.45 Discussion
- 13.00 Lunch

Session 4 - Chair: Jook Walraven (University of Amsterdam, NL)

- 16.00 Coffee break
- 16.30 **Christophe Salomon** (ENS, Paris, F)
Experiments in the BEC-BCS crossover with lithium atoms
- 17.05 Discussion
- 17.15 **Stefano Giorgini** (University of Trento, I)
Quantum Monte Carlo study of fermions in the BCS-BEC crossover
- 17.50 Discussion
- 18.00 **John Thomas** (Duke University, Durham, US)
Thermodynamics and superfluidity of a strongly interacting Fermi gas
- 18.35 Discussion
- 18.45 **Randy Hulet** (Rice University, Houston, US)
Molecular probe of pairing in the BEC-BCS crossover
- 19.20 Discussion
- 19.30 Dinner
- 21.00 Poster session 2

Tuesday 13 September

Session 5 - Chair: Mike Gunn (University of Birmingham, UK)

- 08.45 **Eric Cornell** (JILA, Boulder, US)
Experiments at JILA: Rotating Lattices and Casimir Forces
- 09.35 Discussion
- 09.50 **Sandro Stringari** (University of Trento, I)
Test of the Casimir-Polder force with ultracold atomic gases

- 10.40 Discussion
- 10.55 Coffee break
- 11.25 **Nigel Cooper** (Cambridge University, UK)
Vortex lattices in rotating atomic Bose gases with dipolar interactions
- 12.00 Discussion
- 12.10 **Jim Eisenstein** (Caltech., Pasadena, US)
Bose condensation of excitons and the Quantum Hall effect
- 12.45 Discussion
- 13.00 Lunch
- 14.00 Excursion
- 20.00 Conference Dinner

Wednesday 14 September

Session 6 - Chair: Lev Pitaevskii (University of Trento, I)

- 8.45 **Peter Zoller** (University of Innsbruck, A)
Quantum information and strongly correlated systems with cold atoms in optical lattices
- 09.35 Discussion
- 09.50 **Immanuel Bloch** (University of Mainz, D)
Mott insulators, quantum noise correlations, and spin dynamics in optical lattices
- 10.25 Discussion
- 10.35 Coffee break
- 11.05 **Eugene Demler** (Harvard University, Cambridge, US)
Non-equilibrium dynamics of atoms in an optical lattice
- 11.40 Discussion
- 11.50 **Tilman Esslinger** (ETH Zürich, CH)
Fermions in optical lattices and counting bosons
- 12.25 Discussion
- 12.35 Short talk
- 12.50 Discussion
- 13.00 Lunch

Session 7 - Chair: Yuri Kagan (RRC Kurchatov Institute, Moscow, RU)

- 16.00 Coffee break
- 16.30 **Yuri Kivshar** (Australian National University, Canberra, AU)
Matter-wave gap solitons and vortices in optical lattices
- 17.05 Discussion
- 17.15 **Giovanni Modugno** (University of Florence, I)
Experiments with Fermi-Bose mixtures in optical lattices

17.50	Discussion
18.00	Maciej Lewenstein (ICFO Barcelona, E) <i>Ultracold lattice gases: from quantum frustrated antiferromagnets to lattice gauge theory</i>
18.35	Discussion
18.45	Marcus Oberthaler (University of Heidelberg, D) <i>Localization of matter waves due to atom-atom interactions</i>
19.20	Discussion
19.30	Dinner
21.00	Special discussion about the future of the conference series

Thursday 15 September

Session 8 - Chair: Massimo Inguscio (University of Florence, I)

08.45	Leonid Butov (University of San Diego, US) <i>Condensation, ordering, and coherence in cold exciton gases</i>
09.20	Discussion
09.30	Short talk
09.45	Discussion
09.55	Short talk
10.10	Discussion
10.20	Short talk
10.35	Discussion
10.45	Coffee break
11.15	Yoshiro Takahashi (University of Kyoto, J) <i>Quantum degenerate gas of ytterbium atoms</i>
11.50	Discussion
12.00	Tilman Pfau (University of Stuttgart, D) <i>Ultracold Chromium: a dipolar quantum gas</i>
12.35	Discussion
13.00	Lunch and departure