

First Circular



ICREA Workshop on Quantum Gauge Theories and Ultracold Atoms

The *Workshop on Quantum Gauge Theories and Ultracold Atoms* concerns four areas of physics: **physics of ultracold atoms and molecules** and **quantum information** on one side, and quantum field theories used in **high energy** and **condensed matter physics** on the other. Ultracold atoms are in the center of interest in

atomic, molecular and optical physics and quantum optics since more than 20 years. In the recent years the physics of ultracold atoms has proven to be the perfect playground of quantum engineering (i.e. preparation, manipulation and detection) of macro-, meso- and microscopic states of quantum matter with an unprecedented precision and control.

In particular, ultracold gases in optical lattices can serve as “special purpose quantum computers” – **quantum simulators** of various condensed matter systems. Only few researchers so far (including the authors the present proposal) have dared to go even further and to consider possible connections and maybe applications of **ultracold atoms** for problems relevant to **high energy physics** and **quantum gauge theories**, in particular non-Abelian ones. The challenges and hard-to-simulate problems of high energy and condensed matter physics provide main motivation for organizing this workshop.

Programme:

The workshop will take place in September 2009 in a beautiful monastery complex of Sant Benet (see <http://www.monstbenet.com/ca/> in catalan to prepare yourself!) and will last two and a half days (from Wednesday 2th till Friday 4th just before the start of the BEC2009 conference on the evening of Saturday 5th). We plan 6 sessions, each consisting of 1 keynote lectures (45 min. plus 15 min. discussion) and 2 invited lectures (25 min. plus 5 min. discussion). Final session will include a panel discussion. The posters will be displayed, but there will be no special poster session. The Workshop is financed by Institució Catalana de Recerca i Estudis Avançats (ICREA), Institut de Ciències Fotoniques (ICFO) and Caixa Manresa. The number of participants is limited to 75, and the (painful) choice will be made by the organisers.

Please send your pre-application (pre-registration in case of invited participants) to Laura.Grau@icfo.es until 31.12.08.

Confirmed (at least quasi-confirmed) keynote speakers and panel leaders:

W.D. Phillips * (NIST, Gaithesburg)
J. Dalibard * (ENS)
Y. Hatsugai * (University of Tsukuba)
I. Bloch * (Universität Mainz)
S. Das Sarma * (Maryland)
M.A. Martin Delgado * (Madrid)
I. Spielman * (NIST)
M.P.A. Fisher * (Microsoft Q)
I. Cirac * (MPI, Garching)
E. Cornell * (NIST),
Ch. Clark * (NIST),
C. Lhuillier * (Paris)
P. Zoller * (Innsbruck)

Scientific or Programme Committee:

W. Phillips * (NIST, Gaithesburg)
E. Cornell * (JILA, Boulder)
F. Wilczek (MIT, Cambridge) – not confirmed
R.J. Glauber * (Harvard, Cambridge)
M. Lewenstein * (ICREA/ICFO)
P. Zoller * (Innsbruck)
A. Sanpera * (ICREA/UAB)
M. Guilleumas * (UB)
J. Boronat * (UPC)
I. Satija * (GMU)
C. Lhuillier * (Paris)
I. Cirac * (MPI, Garching)
M.A. Martin-Delgado * (Madrid)
Ch. Clark * (NIST, Gaithesburg)
J.-I. Latorre * (UB)
J. Walraven * (Amsterdam)

Organizing Committee:

Chair: Maciej Lewenstein * (ICREA and ICFO)

Anna Sanpera * (ICREA and UAB)

Antonio Acín * (ICREA and ICFO)

Veronica Ahufinger * (ICREA and UAB)

Monserrat Guilleumas * (UB)

Jose Ignacio Latorre * (UB)

Laura Grau * (ICFO)

Roy J. Glauber * (Harvard and Visiting Distinguished Professor ICFO)