

FOREWORD

The Fourteenth International Conference on *Recent Progress in Many-Body Theories* (RPMBT-14) was held at the Technical University of Catalonia (UPC), Barcelona, Spain, 16-20 July 2007. The present volume contains most of the invited talks plus a selection of excellent poster presentations.

This conference series is now firmly established as one of the premier series of international meetings in the field of Many-Body physics. The first official RPMBT meeting was held in Trieste in 1978, in response to several precursor meetings that accentuated the need for a continuing series. The most important of these, which can be regarded as RPMBT-0, is the 1972 conference on *The Nuclear Many-Body Problem* organized by F. Calogero and C. Cioffi degli Atti in Rome. Additionally, there were two very significant workshops held in 1975 and 1977 at the University of Illinois, Urbana, with Vijay Pandharipande as the chief organizer. Later conferences in the series have been the 1981 RPMBT-2 meeting in Oaxtepec, Mexico; the 1983 RMPBT-3 meeting in Altenberg, Germany; the 1985 RPMBT-4 meeting in San Francisco, USA; the 1987 RPMBT-5 meeting in Oulu, Finland; the 1989 RPMBT-6 meeting in Arad, Israel; the 1991 RPMBT-7 meeting in Minneapolis, USA; the 1994 RPMBT-8 meeting in Schloss Seggau, Styria, Austria; the 1997 RPMBT-9 meeting in Sydney, Australia; the 1999 RPMBT-10 meeting in Seattle, USA; the 2001 RPMBT-11 meeting in Manchester, UK; the 2004 RPMBT-12 meeting in Santa Fe, USA; the 2005 RPMBT-13 meeting at Buenos Aires, Argentina, and the present 2007 meeting in Barcelona, Spain. Highlights and a more detailed history of past meetings can be found in earlier volumes of this series.

This conference series is also responsible for awarding the prestigious Eugene Feenberg Memorial Medal in Many-Body Physics. This Medal, first presented in 1985, is designated for work that is firmly established and that can be demonstrated to have significantly advanced the field of many-body physics. The work considered can be accumulative contributions sustained over time, or a single important contribution. In appropriate cases, the award can be shared by as many as three people for a single body of work. More details on the Feenberg Medal and its nomination process can be found in the Conference Series official website <http://www.qmbt.org/Feenberg/index.php?doc=Feenberg>.

Past recipients have included David Pines (1985), John W. Clark (1987), Malvin H. Kalos (1989), Walter Kohn (1991), David M. Ceperley (1994), Lev P. Pitaevskii (1997), Anthony J. Leggett (1999), Philippe Nozières (2001), Spartak T. Belyaev and Lev P. Gor'kov (2004), and Raymond F. Bishop and Hermann G. Kümmerl

(2005). Professors Kohn and Leggett received the Nobel Prize in 1998 and 2003 respectively.

We are pleased that the Feenberg Medal was awarded at this conference to Professors Stefano Fantoni and Eckhard Krotscheck, “for their leading role in the development and extensive applications of the correlated basis function method, including the advance of Fermi hypernetted chain theory, thereby providing an accurate, quantitative, microscopic description of strongly-interacting quantum many-body systems, especially for finite atomic nuclei and inhomogeneous quantum fluids”. In addition to their outstanding research achievements, both have been inspirational models for a generation of many-body theorists. The presentation was made by Jordi Boronat, Chair of the Feenberg Medal Selection Committee in a special Award Session held in Barcelona’s world famous Science Museum CosmoCaixa. The text of the tribute, as well as the responses of the Medal recipients are included in this volume.

Another highlight of this conference is the presentation of the inaugural Hermann Kümmel Early Achievement Award in Many-Body Physics to Dr. Frank Verstraete of Universit Wien, Austria, in recognition of his pioneering work on quantum information and entanglement. This award was established by the International Advisory Committee of the Conference Series to recognize outstanding published work done within six years of receiving the doctorate degree. The award honors Prof. Kümmel’s long and distinguished career as a leader in the field of many-body physics and as a mentor of younger generations of many-body physicists. More details on the Kümmel award can again be found at

<http://www.qmbt.org/Kuemmel/index.php?doc=KuemmelAward>.

The quality of nominees for this award was so outstanding that the Selection Committee recommended that Honorable Mentions be given to Dr. Gregory E. Astrakharchik of the Technical University of Catalonia, Barcelona, Spain, for his calculation of the BEC-BCS crossover in dilute Fermi gases, and to Dr. Robert Zillich of Johannes Kepler Universität, Linz, Austria, for his quantum Monte Carlo simulation of strongly correlated quantum fluids. The presentation was made by Susana Hernandez, Chair of the Kümmel Award Selection Committee, in the special Award Session.

The current conference maintains the tradition of covering the entire spectrum of theoretical tools developed to tackle important and current quantum many-body problems, with the aim of fostering the exchange of ideas and techniques among physicists working in diverse subfields of physics. The highlights of the conference included state-of-the-art contributions on the dynamics and rotation of ultra-cold quantum gases, BEC-BCS cross-over, quantum liquid and solids, correlated electron systems and superconductivity, correlated nuclear systems and nuclear astrophysics, quantum computations and quantum Monte Carlo simulations. The conference continues to demonstrate the vitality and the fundamental importance of many-body theories, techniques, and applications in understanding diverse and novel phenomena at the cutting-edge of physics.

We thank the Program Advisory Committee for recommending excellent topics and great speakers for the Conference. We are very much indebted to each member of the Local Organizing Committee: Jordi Boronat, Artur Polls, Jesús Navarro, Joaquim Casulleras, Ferran Mazzanti, Muntsa Guilleumas and Gregory Astrakharchik, for their tireless labor and attention to details, which made this meeting productive and memorable. Above all, we are all in awe of Jordi's singular devotion and energy, which made this conference possible.

Siu A. Chin

Chair, International Advisory Committee
for the Series of International Conferences on
Recent Progress in Many-Body Theories
College Station, U.S.A.