

## PREFACE

The Thirteenth International Conference on *Recent Progress in Many-Body Theories* (RPMBT-13) was held at the University of Buenos Aires, Buenos Aires, Argentina, 5-9 December 2005. 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. The quantum many-body community suffered a profound loss with Pandharipande's untimely death in early 2006. 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, and the present 2005 meeting in Buenos Aires. Highlights 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. 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), and Spartak T. Belyaev and Lev P. Gor'kov (2004). Professors Kohn and Leggett received the Nobel Prize in 1998 and 2003 respectively. We are pleased that the Tenth Feenberg Medal was awarded at this conference to Professors Hermann Kümmel and Raymond Bishop for their development and application of the Coupled-Cluster Method to diverse physical problems. During the past half century, the application of this quantum many-body physics approach has contributed substantially to our understanding of challenging problems in condensed matter physics (including electrons in solids, nuclear matter, quantum liquids and gases, and quantum magnetism), atomic and molecular physics, nuclear physics, and subnuclear physics/quantum field theory (see R.F. Bishop and H. G. Kümmel, "The Coupled-Cluster Method," *Physics Today*, March 1987). The Coupled-Cluster Method is one of very few *ab initio* methods that has an enduring impact in quantum chemistry. The presentation was made by Charles

E. Campbell, Chair of the Feenberg Medal Selection Committee. The text of the tribute as well as the responses of the Medal recipients are included in this volume.

The conference also hosted a special session to celebrate the 70th birthdays of John Clark and Manfred Ristig, whose very substantial contributions to many-body physics were warmly recalled by Charles Campbell and Leszek Szybisz. These reminiscences, as well as Clark's and Ristig's lectures, are collected in this volume.

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 such as nuclear and sub-nuclear physics, astrophysics, atomic and molecular physics, quantum chemistry, complex systems, quantum field theory, strongly correlated electronic systems, magnetism, quantum fluids and condensed matter physics. The highlights of the conference included state-of-the-art contributions to the understanding of supersolid Helium, BEC-BCS crossover, fermionic BEC, quantum phase-transition, computing, simulations, as well as the latest results on more traditional topics of liquid helium, droplets, nuclear and electronic systems. 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.

The Local Organizing and Program Committees deserve great thanks in creating a well-run and productive meeting, with an exciting program of talks and poster presentations. We also thank the speakers and participants for making the meeting a lively mutual learning experience. It is a special pleasure to thank the local organizers, Susana Hernández, Leszek Szybisz, Guillermo Dussel, Ana María Llois and Horacio Cataldo, for their tireless efforts in making the conference not only a success, but a memorable occasion. We are all indebted to Susana's resourcefulness, the hospitality and charm of Buenos Aires, and the resilience of the Argentinian economy.

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