

18th International Conference on Recent Progress in Many-Body Theories (MBT18)

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The 18th International Conference on Recent Progress in Many-Body Theories (MBT18) was held at the Conference Event Center, Niagara Falls, NY USA, in August 16-21, 2015. The conference continued the approximately biennial series initiated in Trieste in 1978 and was devoted to new developments in the field of many-body theories, including the emergent areas of quantum information and ultracold atom physics. The conference series encourages the exchange of ideas between physicists working in such diverse areas as nuclear and condensed matter physics, quantum chemistry, lattice Hamiltonians or quantum fluids. This volume includes the proceedings of the conference.

The MBT18 meeting was held back-to-back with the International Symposium on Quantum Fluids and Solids which was convened August 9-15, 2015 at the same location; between the two conferences a series of tutorial lectures intended for graduate students and young postdocs was organized. Lectures at these series were given by Frank Gasparini (Buffalo), Jordi Boronat (Barcelona), Erkki Thuneberg (Oulu) and Gerardo Ortiz (Indiana); the lecture notes are available at the conference website <http://www.physics.buffalo.edu/MBT18/tutorials.html>.

Many-body theories are an integral part in different fields of theoretical physics such as condensed matter, nuclear matter and field theory. Phase transitions and macroscopic quantum effects such as magnetism, Bose-Einstein condensation, superfluidity or superconductivity have been investigated within ultra-cold gases, finite systems or various nanomaterials. The conference series on Recent Progress in Many-Body Theories (RPMBT) is devoted to foster interaction and cross-fertilization between different fields, and also to discuss future lines of research.

The main conference program was split into eight sections:

- Many-Body Problems in Condensed Matter Physics
- Quantum Fluids and Solids
- Nuclear Many-Body and Relativistic Theories
- Cluster Physics and Intense Lasers
- Many-Body Aspects of Cold Gasses
- High Energy Density Matter



- New Developments in Computational Many-Body Techniques
- Quantum Phase Transitions and non-equilibrium Many-Body Theory

Almost ninety participants from nineteen countries participated. Sixty six contributions were presented, and thirty seven of them were invited talks. We were fortunate to have outstanding speakers which were able to convey the excitement of these fields, and would like to thank all them for making this conference so lively. As a particular highlight of the conference, the Eugene Feenberg Memorial Medal for outstanding results in the field of many-body theory, and the Hermann Kümmel Early Achievement Award in Many-Body Physics for young scientists in that field were awarded.

The Eugene Feenberg Medal was awarded to Christopher J. Pethick. The citation reads as follows: *For pioneering contributions and profound insights into many-body physics across diverse physical systems, ranging from ultracold atoms and quantum liquids to dense nuclear matter in neutron stars and stellar collapse.*

The Hermann Kümmel Early Achievement Award in Many-Body Physics was awarded to Lianyi He: *For pioneering work in the many-body theory of QCD at high isospin density and in the simulations of gauge fields in cold atoms.*

We were fortunate to have Christopher J. Pethick and Lianyi He present at the conference. We are particularly grateful to David Neilson and Joe Carlson for introducing Christopher Pethick and Lianyi He, respectively, and reviewing the history and outstanding accomplishments in their careers.

Further highlights of the conference were two special sessions to honor two esteemed members of our community, Gordon Baym and John W. Clark, at the occasion of their 80th Birthday.

The Conference continues the series of conferences held before in Trieste, Italy (1978); Oaxtapec, Mexico (1981); Odenthal-Altenberg, Germany (1983); San Francisco, USA (1985); Oulu, Finland (1987); Arad, Israel (1989); Minneapolis, USA (1991); Schlo Segau, Austria (1994); Sydney, Australia (1997); Seattle, USA (1999); Manchester, UK (2001); Santa Fe, USA (2004); Buenos Aires, Argentina (2005); Barcelona, Spain (2007); Columbus, USA (2009), Bariloche, Argentina (2011) and Rostock, Germany (2013).

We thank the International Advisory Committee, the International Programme Committee, and the Local Organizing Committee for their great support and advice. The next RPMBT meeting will take place in Korea in 2017.

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Guest editors

