Workshop on Quantum Monte Carlo Methods at Work for Describing Novel States of Matter

10 - 14 July 2023
An ICTP Meeting
Trieste, Italy

Further information:
http://indico.ictp.it/event/10187/
smr3853@ictp.it

Quantum Monte Carlo methods represent a family of numerical techniques that have been applied in a wide variety of problems in Physics, Chemistry, Materials Science and even Biology. They are among the most successful approaches for computing the properties of interacting quantum many-body systems. Here, the principal problem, which manifests itself in different forms, is that of describing electron correlation, in either molecules, materials or effective low-energy models (e.g., Hubbard or Heisenberg), beyond mean-field-based theories. In the last 20 years, variational approaches have been dramatically improved, by devising very efficient optimization procedures; projection techniques have been also developed, allowing us to improve the accuracy by several order of magnitude with respect to what was possible only a few years ago.

Description:

The main goal of this event will be to gather together researchers working on different subjects with quantum Monte Carlo techniques to nurture new collaborations and exchange of knowledge.

A couple of sessions will be devoted to honor the memory of Sandro Sorella, who pioneered key developments in the optimization of various quantum Monte Carlo algorithms.

Topics:

- Recent developments in quantum Monte Carlo techniques
- Neural-network approaches within quantum Monte Carlo
- Magnetism and superconductivity in lattice and continuum systems
- Low-dimensional fermionic and bosonic models
- Emergent exotic phases in strongly-correlated systems

Directors:

F. BECCA, University of Trieste, Italy
M. CASULA, CNRS and Sorbonne University, France
F. MA, Beijing Normal University, China
S. YUNOKI, RIKEN, Japan
S. ZHANG, Flatiron Institute, USA

Local Organiser:

S. SCANDOLO, ICTP

Speakers:

A. ALAVI, Cambridge University
D. ALFE', University of Naples
F. ASSAAD, University of Wurzburg
N. COSTA, University of Rio de Janeiro
C. FENG, Flatiron Institute
M. FOULKES, Imperial College London
E. GULL, University of Michigan
M. HOLZMANN, LPTMC Grenoble
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E. TOSATTI, SISSA
C. UMRIGAR, Cornell University
L. WAGNER, University of Illinois
A. ZEN, University of Naples

How to apply:

Online application:
http://indico.ictp.it/event/10187/

Female scientists are encouraged to apply.

Grants:

A limited number of grants are available to support the attendance of selected participants, with priority given to participants from developing countries.
There is no registration fee.

Deadline:

7 May 2023

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