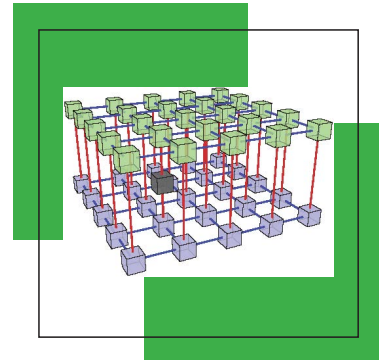


Tensor Network States and Applications

April 19 - 23, 2021



Scientific Overview

Due to their high complexity, our understanding of strongly correlated quantum many-body systems is still limited. This concerns, for example, both static and dynamical equilibrium properties of fermionic systems and quantum magnets in condensed matter physics, as well as complex molecules with strong entanglement in quantum chemistry. Other big challenges are the analysis of non-equilibrium dynamics of closed systems, systems interacting with an environment, and transport problems. Tensor network states such as MPS, TTN, PEPS, and MERA are designed to capture the structure of entanglement in quantum systems in compressed representations. They are also particularly well-suited for the study of topological ordered phases of matter which cannot be described within the framework of spontaneous symmetry breaking.

Long Program Schedule

This workshop is part of the long program on “Tensor Methods and Emerging Applications to the Physical and Data Sciences.”

- Opening Day: March 8, 2021.
- Tensor Methods and Emerging Applications to the Physical and Data Sciences Tutorials. March 9-12, 2021.
- Workshop I: Tensor Methods and their Applications in the Physical and Data Sciences. March 29 - April 2, 2021.
- **Workshop II: Tensor Network States and Applications. April 19-23, 2021.**
- Workshop III: Mathematical Foundations and Algorithms for Tensor Computations. May 3-7, 2021.
- Workshop IV: Efficient Tensor Representations for Learning and Computational Complexity. May 17-21, 2021.
- Culminating Workshop at Lake Arrowhead. June 6-11, 2021.

Participation

Additional information about this workshop including links to register and to apply for funding, can be found on the webpage listed below. Encouraging the careers of women and minority mathematicians and scientists is an important component of IPAM's mission, and we welcome their applications.

Organizers

Thomas Barthel (Duke University), Victor Batista (Yale University), Gero Friesecke (Technische Universität München), Karen Hallberg (Bariloche Atomic Centre), and Didier Poilblanc (CNRS, Toulouse).

Speakers

Sylvain Capponi (Université Toulouse III - Paul Sabatier), Garnet Chan (Caltech), Caterina De Bacco (MPI for Intelligent Systems), Mi-Song Dupuy (TU München), Glen Evenbly (Georgia Tech), Zhengcheng Gu (CUHK), Anna Keselman (KITP), Simen Kvaal (Univ. of Oslo), Joseph Landsberg (Clay Scholar, Texas A&M Univ.), Ors Legeza (Wigner RCP), Wei Li (Beihang Univ.), Ian McCulloch (Univ. of Queensland), Yurriel Nunez Fernandez (Instituto Balseiro and Centro Atomico Bariloche), Roman Orus (DIPC), Ivan Oseledets (Skoltech), Tomaz Prosen (Univ. of Ljubljana), Shi-Ju Ran (CNU), Cecile Repellin (CNRS), Reinhold Schneider (TU Berlin), Norbert Schuch (Univ. of Vienna), German Sierra (Autonomous University of Madrid), Frank Verstraete (Ghent Univ.), Ling Wang (Zhejiang Univ.), Xiao-Gang Wen (MIT), Steve White (UCI), and Lexing Ying (Stanford University).

