Workshop II: Tensor Network States and Applications

Monday April 19, 2021

7:55 *SESSION CHAIRS: Thomas Barthel (Duke University) and Karen Hallberg (Bariloche Atomic Centre)*

7:55–8:00 *Welcome & Opening Remarks: Dean Miguel García-Garibay (Dean of Physical Sciences, UCLA) and Dima Shlyakhtenko (Director, IPAM)*

8:00–8:30 **Ling Wang** (Zhejiang University)
Deconfined quantum criticality in the spin-1/2 Shastry-Sutherland model in two dimension

8:40–9:10 **Caterina De Bacco** (Max Planck Institute for Intelligent Systems)
Matrix product states for modeling dynamical processes on networks

9:20–9:50 **Simen Kvaal** (University of Oslo)
Multireference coupled-cluster methods based on the bivariational principle and why the tensor-network people should care

10:00–10:20 *Break*

10:20–10:50 **Steve White** (University of California, Irvine (UCI))
Phase diagram of the 2D t-t'-J model

11:00–11:30 **Reinhold Schneider** (Technische Universität Berlin)
Tree Based Tensor Networks (HT/TT) for the numerical solution of Hamilton Jacobi Bellmann (HJB) equations

Tuesday April 20, 2021

8:00 *SESSION CHAIRS: Cecile Repellin (CNRS) and Sylvain Capponi (Université de Toulouse III (Paul Sabatier))*

8:00–8:30 **Mi-Song Dupuy** (Technische Universtitat München)
A new ordering scheme for QC-DMRG based on a symmetry of the higher-order singular values

8:40–9:10 **Anna Keselman** (Kavli Institute for Theoretical Physics)
Spectral Signatures of Quasiparticle Interactions in Antiferromagnets

9:20–9:50 **Joseph Landsberg** (Texas A&M University - College Station)
Geometry associated to tensor network states

10:00–10:20 *Break*

10:20–10:50 **Shi-Ju Ran** (Capital Normal University)
Deep learning quantum states for Hamiltonian predictions

11:00–11:30 **Xiao-Gang Wen** (Massachusetts Institute of Technology)
Exactly soluble tensor network model in 2+1D with U(1) symmetry and quantize Hall conductance

Wednesday April 21, 2021

8:00 *SESSION CHAIRS: Anna Keselman (Kavli Institute for Theoretical Physics) and Gero Friesecke (TU Munich)*

8:00–8:30 **Zhengcheng Gu** (The Chinese University of Hong Kong)
The emergence of gapless quantum spin liquid near deconfined quantum critical point

8:40–9:10 **Ian McCulloch** (University of Queensland)
Finite-entanglement scaling functions at quantum critical points

9:20–9:50 **Frank Verstraete** (Ghent University)
Algorithms for continuous matrix product states

10:00–10:20 *Break*

10:20–10:50 **Ivan Oseledets** (Skolkovo Institute of Science and Technology)
Tensor-train decomposition and its applications in machine learning

11:00–11:30 **Glen Evenbly** (Georgia Institute of Technology)
Using tensor networks to design improved wavelets for image compression

11:40–12:10 **Garnet Chan** (California Institute of Technology)
Tensor networks for real materials

Thursday April 22, 2021

8:00 *SESSION CHAIRS: Didier Poilblanc (CNRS, Toulouse) and Joseph Landsberg (Clay Scholar, Texas A&M Univ.)*

8:00–8:30 **Wei Li** (Beihang University)
Decoding Quantum Magnetism Genome by Thermal Tensor Networks

8:40–9:10 **Cecile Repellin** (Centre National de la Recherche Scientifique (CNRS))
Detecting fractional Chern insulators in few-boson systems

9:20–9:50 **German Sierra** (Consejo Superior de Investigaciones Científicas (CSIC))
Tensor Network Renormalization of Bosonic Fields

10:00–10:20 *Break*

10:20–10:50 **Ors Legeza** (Wigner Research Centre for Physics)
Tensor network state methods in material science and ab initio quantum chemistry

11:00–11:30 **Yuriel Nunez Fernandez** (Commissariat à l'Énergie Atomique (CEA))
Half-filled quantum Hall problem on the cylinder, DMRG and composite fermions

Friday April 23, 2021

8:00	*SESSION CHAIRS: Ettore Teixeira Turatti (Università di Firenze) and Thomas Barthel (Duke University)*
8:00–8:30	**Sylvain Capponi** (Université de Toulouse III (Paul Sabatier)) *Chiral spin liquid phases in SU(N) quantum magnets*
8:40–9:10	**Roman Orus** (Donostia International Physics Center) *News on tensor network simulations for quantum matter and beyond*
9:20–9:50	**Norbert Schuch** (University of Vienna) *Matrix product state algorithms for Gaussian fermionic states*
10:00–10:20	*Break*
10:20–10:50	**Tomaz Prosen** (University of Ljubljana) *Exactly solved models of chaotic many-body dynamics*
11:00–11:30	**Lexing Ying** (Stanford University) *Strictly-correlated Electron Functional and Multimarginal Optimal Transport*