HARRISON—MACRAE FAMILY LECTURE

The Harrison – MacRae Family Lecture Series was established through the generosity of the estate of the late John H. Harrison (Queen's B. Comm., 1949) and Elizabeth (Betty) Harrison (nee MacRae, Queen's B.A., 1949). For over a century the Harrison - MacRae family has attended Queen's University and has shown a distinct enthusiasm for the arts and sciences. Elizabeth Harrison is the daughter of Queen's graduates Alex E. MacRae (B.Sc. Chem. Eng., 1914) and Irene McAllister (B.Sc. Math & Physics, 1914), and sister to Queen's graduates Jean C. Doherty (B.A. 1939), Donalda I. Beattie (B.A. 1939), Marion E. Bradley (B.A. 1946), and brother Robert A. MacRae (B.Sc. Chem. Eng., 1954). Their son Ian Harrison (Queen's B.Sc. Chem. Phys., 1981) is a Professor of Chemistry at the University of Virginia. Numerous children, grandchildren and great grandchildren have likewise attended Queen's University. In recognition of their long affinity for Queen's, this lecture series will feature seminars by distinguished scientists on topics within the fields of chemical physics or physical chemistry.

PREVIOUS HARRISON-MACRAE LECTURERS

2019 • I. Harrison

2019 • P. Willis

2019 • C. Adachi

2018 • B. Bayram

2018 • V. Batista

2016 • A. Aspuru-Guzik

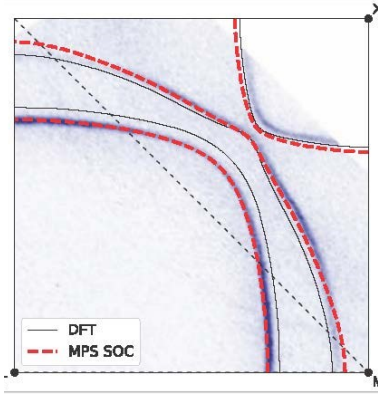
Queen's Chemistry

Department of Chemistry
Queen's University

is honoured to host the 2020 Harrison—MacRae Lecturer:

Dr. Ulrich Schollwöck

Ludwig-Maximilians-Universität München



"TENSOR NETWORKS: A USEFUL METHOD FOR QUANTUM CHEMISTRY?"

Friday, January 10, 2020
11:30 AM
Room 117, Chernoff Hall

PROF. ULRICH SCHOLLWÖCK

Ulrich Schollwöck
Ludwig-Maximilians-Universität München

Uli Schollwoeck is Professor of Theoretical Physics at the Ludwig-Maximilian University of Munich. He has a MSc from Balliol College, University of Oxford, a Diploma in Physics from the University of Munich, and a PhD from the Theoretical Physics Division of the French Atomic Energy Commission in Saclay (Paris). After early work on near-field optics beyond the diffraction limit, his key interests have been strongly correlated quantum systems: one-dimensional quantum spin chains, frustrated quantum magnets in one and two dimensions, electronic properties of solids, ultracold atom gases in optical lattices, and topological effects in interacting quantum systems.

A main focus of his work has been the development of new computer algorithms for large-scale simulations of such systems, in particular when they are driven far from their natural equilibrium states. The key challenge is to bridge the fundamental gap between the capabilities of classical computers and the complexity of quantum systems, which requires astute approximation schemes. He is one of the leading experts for the density-matrix renormalization group, one of the most successful methods in the field, and was a pioneer in applying it to quantum systems far from equilibrium. His current interest is to extend the scope of these simulation methods from simplified models of quantum behavior to real materials and applications in chemistry.

He is a Fellow of the American Physical Society (since 2006) and Academy of Science member in Germany (since 2007). He has received the Gerhard Hess prize of the German Research Foundation (2000) and has been Fellow of the Institute of Advanced Study in Berlin (2009/2010). He is engaged in science policy, funding and outreach as the vice-president of the German Association of University Professors and Lecturers (since 2008), as scientific advisory board member of the Krupp foundation (since 2010) and of the Alexander von Humboldt foundation (since 2015), and as a trustee of the German Museum of Science and Technology (since 2018).

SELECTED RECENT PUBLICATIONS

- N.-O. Linden, M. Zingl, C. Hubig, O. Parcollet, U. Schollwöck, **Imaginary-time matrix product state impurity solver in a real material calculation: Spin-orbit coupling in Sr2RuO4 (arXiv: 1909.02503)**
- I. Hagymasi, C. Hubig, O. Legeza, U. Schollwöck, **Dynamical topological quantum phase transitions in nonintegrable models** Phys. Rev. Lett. 122, 250601 (2019)
- F. A. Wolf, A. Go, I. P. McCulloch, A. J. Millis and U. Schollwöck, **Imaginary-time matrix product state impurity solver for dynamical mean-field theory** Phys. Rev. X 5, 041032 (2015)
- S. Depenbrock, I. P. McCulloch and U. Schollwöck, **Nature of the spin liquid ground state of the S=1/2 Heisenberg model on the kagome lattice** Phys. Rev. Lett. 109, 067201 (2012)
- S. Trotzky, Y.-A. Chen, A. Flesch, I. P. McCulloch, U. Schollwöck, J. Eisert and I. Bloch, **Probing the relaxation towards equilibrium in an isolated strongly correlated 1D Bose gas** Nature Physics 8, 325 (2012)