



Quantum Computing Materials Challenges

August 27–29, 2018

ORGANIZING COMMITTEE: **Motoko Kotani** (Tohoku University), **Mitchell Luskin** (University of Minnesota, Twin Cities), **Noa Marom** (Carnegie Mellon University), **Matthias Troyer** (ETH Zürich), **Zhengan Wang** (Microsoft Research)

Scientific Overview

Materials that behave as quantum bits (qubits) will be the quantum chips that underlie a future quantum economy. Currently, a variety of materials have been proposed as qubit materials ranging from topological phases of matter to nitrogen-vacancy centers in diamond. Advancing the understanding and prediction of qubit materials is essential to the second quantum revolution centering on quantum computing. This three-day workshop will explore the mathematical modeling of materials for quantum computing by bringing together people from the materials modeling and simulation and quantum computing communities. The goal is to identify the grand challenges and propose possible solutions in the modeling and simulation of qubit materials and quantum devices for the engineering of a large-scale useful quantum computer.

The meeting will bring together mathematicians and scientists working on a wide spectrum of topics related to materials modeling and simulation of qubit materials. Speakers will present the fundamental concepts underlying the particular mathematical/scientific focus of the talk to stimulate active discussion and possible collaboration.

Confirmed Speakers

Bela Bauer (Microsoft Research), **Eric Cances** (École Nationale des Ponts-et-Chaussées), **Garnet Chan** (California Institute of Technology), **Susan Coppersmith** (University of Wisconsin-Madison), **Efthimios (Tim) Kaxiras** (Harvard University), **Motoko Kotani** (Tohoku University), **Mitchell Luskin** (University of Minnesota, Twin Cities), **Roman Lutchyn** (Microsoft Research), **Rick Muller** (Sandia National Laboratories), **Hidetoshi Nishimori** (Tokyo Institute of Technology), **Markus Reiher** (ETH Zürich), **Matthias Troyer** (Microsoft Research), **Xavier Waintal** (Commissariat à l'Énergie Atomique), **Michael Weinstein** (Columbia University), **Yoshihisa Yamamoto** (Stanford University)

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.

www.ipam.ucla.edu/qcm2018

