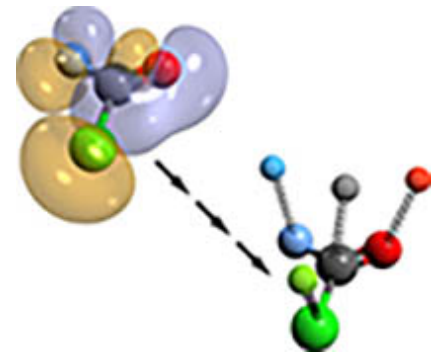


Workshop II: Model Reduction in Quantum Mechanics

APRIL 11 - 15, 2022



Scientific Overview

This workshop will focus on three fundamental aspects: 1) The rigorous mathematical derivation of reduced models from reference quantum models in some regimes such as the semiclassical limit, adiabatic limit, thermodynamic limit, and high/low density limit. 2) The understanding and systematization of interactions between composite objects provides a pathway to better understand quantum mechanics itself and constitutes the basis for developing coarse-grained approaches to describe interactions in large quantum systems. 3) Simplified quasiparticle or collective mode descriptions of complicated quantum states, using one-particle spin-orbitals, plasmons, phonons, polarons, or excitons. Such objects are embedded in finite or infinite dimensional Hilbert spaces defined by the basis set utilized to expand the many-body wavefunction.

This workshop will include a poster session; a request for posters will be sent to registered participants in advance of the workshop.

Long Program Schedule

This workshop is part of the long program on “Quantum Mechanics with Mathematics and Statistics”

- Opening Day : March 7, 2022
- Advancing Quantum Mechanics with Mathematics and Statistics Tutorials : March 8-11, 2022
- Workshop I: Multiscale Approaches in Quantum Mechanics : March 28 - April 1, 2022
- **Workshop II: Model Reduction in Quantum Mechanics : April 11-15, 2022**
- Workshop III: Large-Scale Certified Numerical Methods in Quantum Mechanics : May 2-6, 2022
- Workshop IV: Monte Carlo and Machine Learning Approaches in Quantum Mechanics : May 23-27, 2022
- Culminating Workshop at Lake Arrowhead : June 5-10, 2022

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

Eric Cancès (École Nationale des Ponts-et-Chaussées), Garnet Chan (Caltech), Robert DiStasio (Cornell), and Maria J. Esteban (CNRS and Paris-Dauphine)

Speakers

Roi Baer (Hebrew U.); Eun-Ah Kim (Cornell); Nandini Ananth (Cornell); Anil Damle (Cornell); Volker Bach (TU Braunschweig); Claudia Draxl (HU Berlin); Clotilde Fermanian (U. Créteil); Feliciano Giustino (U. Texas); Christian Hainzl (LMU München); Caroline Lasser (TU München); Mathieu Lewin (CNRS and Dauphine); Lucia Rieining (Ecole Polytechnique); Andreas Savin (Sorbonne); Benjamin Schlein (U. Zürich); Robert Seiringer (IST Austria); Eric Séré (U. Paris-Dauphine); Jan-Philp Solovej (U. Copenhagen); Stefan Teufel (U. Tübingen); Giovanni Vignale (U. Missouri); Marco Bernardi (Caltech); and Francesco Evangelist (Emory).



For more information, visit the program web page:

www.ipam.ucla.edu/QMMWS2