Max-Planck-Institut für Physik komplexer Systeme Dresden, Germany

mpipks

International Focus Workshop on

Flat Bands: Design, Topology, and Correlations

06 - 09 March 2013

Scientific coordination

Marcel Franz
University of British Columbia
Vancouver, Canada

Roderich Moessner
MPIPKS
Dresden, Germany

Sid Parameswaran
University of California
Berkeley, USA

Organisation

Claudia Pönisch

Emergence of strongly correlated phases of matter is particularly probable in systems that exhibit an extensive degeneracy in the absence of inter-particle interactions. The resulting quenching of kinetic energy, colloquially termed 'flat bands', enhances the efficacy of interactions and leads to interesting phases with both conventional broken symmetries, such as ferromagnets, as well as topologically ordered phases such as lattice versions of fractional quantum Hall states and fractional topological insulators. A flurry of recent numerical observations of fractionalized phases in lattice models with 'topological' flat bands, has renewed interest in the study of flat bands of electronic insulators. There have also been various proposals to realize and study flat bands in experimental systems, ranging from oxide heterostructures to optical lattices of ultracold fermions with an artificial gauge field. In a different vein, the realization of various frustrated hopping models of ultracold bosons in optical lattices has motivated interest in the rather less well-studied problem of bosons in flat bands. In all these cases, the fundamental role played by correlations simultaneously leads to novel behavior while complicating the understanding of these phases from numerical and analytical approaches.

This focused workshop aims to bring together researchers working on diverse aspects of flat band physics, covering questions such as: Is there a reliable route to designing flat bands in experimentally relevant systems, be they electronic or cold atomic systems? What correlated phases and new physical phenomena can occur (generically or as a result of careful fine-tuning)? Is there a systematic understanding and/or classification of (topological) phases in flat bands, and how does one characterise them?

Invited participants

Dario Bercioux (Freiburg)
Emil Bergholtz (Berlin)
John Chalker (Oxford)
Claudio Chamon (Boston)
Nigel Cooper (Cambridge)
Maria Daghofer (Dresden)
Benoît Douçot (Paris)
Zsolt Gulácsi (Debrecen)
Igor Herbut (Vancouver)
Sebastian Huber (Rehovot)
Andreas Läuchli (Innsbruck)
Chris Laumann (Cambridge)
Lindsay J. LeBlanc (Maryland)
Mykola Maksymenko (Dresden)
Hari Manoharan (Stanford)
Andreas Mielke (Heidelberg)
Christopher Mudry (Villigen)
Ganpathy Murthy (Lexington)
Masaki Oshikawa (Tokyo)
Xiaoliang Qi (Stanford)
Nicolas Regnault (Paris)
Rahul Roy (Los Angeles)
Dan M. Stamper-Kurn (Berkeley)
Kai Sun (Ann Arbor)
Ronny Thomale (Lausanne)
Grigori Volovik (Aalto)

Applications for participation and poster contributions are welcome and should be made by using the application form on the event's web page (please see URL below). The number of attendees is limited. The **registration fee** for the event is **120€** and should be paid by all participants. Costs for accommodation and meals will be covered. Limited funding is available to partially cover travel expenses. Please note that childcare is available upon request.

Deadline for registration is 13 January 2013.

MAX PLANCK – UBC centre for quantum materials

Helmholtz Virtual Institute "New states of matter and their excitations"

For further information please contact:
Visitors Program - Claudia Pönisch
Max-Planck-Institut für Physik komplexer Systeme,
Nöthnitzer Str. 38, 01187 Dresden, Germany
Tel.: +49-351-871-2198 / Fax: +49-351-871-2199
flat2013@pks.mpg.de
http://www.pks.mpg.de/~flat2013/