



THE UNIVERSITY OF TOKYO

# Program

## Workshop on QUANTUM MATERIALS

December 9 – 11, 2013 • Lecture Hall 2 D5 • MPI for Solid State Research, Stuttgart

### Information

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University of British Columbia

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### Monday, December 9

8:25 - 8:30 **B. Keimer** Welcome

#### Graphene & topological phenomena

8:30 - 9:00 **J. Folk** Spin-orbit in graphene, and thermodynamics in the fractional quantum Hall regime

9:00 - 9:20 **C. Ast** The effects of disorder and defects on the electronic structure of graphene

9:20 - 9:40 **C. Straßer** Long-range versus short-range scattering in TI-doped epitaxial graphene

9:40 - 10:10 **M. Franz** Towards a 2D topological insulator in graphene with heavy adatoms

10:10 - 10:30 **A. Schnyder** Protected boundary states in topological superconductors

10:30 - 10:50 **J.H. Smet** Even-denominator fractional quantum Hall physics in ZnO

10:50 - 11:10 **coffee**

11:10 - 11:40 **K. von Klitzing** Quantum Hall Systems: Bubbles, Stripes, and Butterflies

11:40 - 12:10 **S. Hasegawa** Spin at Crystal Surfaces

12:10 - 12:30 **M. Etzkorn** Superconducting STM-tips in high magnetic field: A new atomic scale spin detector

12:30 - 13:30 **lunch (MPI)**

#### Competing order

13:30 - 13:50 **E. Benckiser** Resonant elastic scattering of nickel oxide heterostructures

13:50 - 14:10 **M. Haverkort** Dynamical mean field theory for inter-band excitations, resonances and excitonic excitations

14:10 - 14:30 **S. Macke** X-Ray Reflectometry Study of the Magnetic Configuration of  $(\text{LaMnO}_3)_2\text{n}/(\text{SrMnO}_3)_\text{n}$  Superlattices

14:30 - 14:50 **K. Takubo** Resonant x-ray scattering from the ligand state in the stripe-like order of  $\text{IrTe}_2$

14:50 - 15:10 **I. Elfimov** Electronic structure of randomly substituted solids using DFT methods

15:10 - 16:30 **posters & coffee**

16:30 - 17:00 **A. Mackenzie** Novel Apparatus for Application of Strain to Quantum Materials

17:00 - 17:30 **A. Fujimori** Spectroscopies of transition-metal oxide ultra-thin films

17:30 - 18:00 **W. Metzner** Superconductivity and competing order in the 2D Hubbard model

18:00 - 20:00 **dinner (MPI)**

## Tuesday, December 10

### Quantum materials & quantum information

8:30 - 9:00	<b>J. Wrachtrup</b>	Engineering Spin Quantum Systems in Solids
9:00 - 9:20	<b>I. Gerhardt</b>	Single Emitters in the Solid State: From Single Molecules to Atoms
9:20 - 9:50	<b>T. Momose</b>	Coherent control of cold molecules towards quantum information processes
9:50 - 10:20		<b>coffee</b>
10:20 - 10:50	<b>M. Ueda</b>	Information thermodynamics: how the Maxwell 's demon was exorcised
10:50 - 11:20	<b>T. Pfau</b>	Long range interacting quantum gases
11:20 - 11:50	<b>J. Young</b>	Hybrid approaches to integrating single photon sources and detectors on silicon photonic chip
11:50 - 13:00		<b>lunch (MPI)</b>

### Ultrafast dynamics

13:00 - 13:30	<b>M. Gonokami</b>	Bose-Einstein Condensation of Excitons in a bulk semiconductor crystal
13:30 - 14:00	<b>S. Burke</b>	Mapping energy level alignment in molecular nanostructures
14:00 - 14:20	<b>J. Riemensberger</b>	Photoactive Metal-Organic Nanoarchitectures on Surfaces: Probing Ultrafast Intramolecular Charge Dynamics
14.20 - 14:40	<b>A. Schiffrin</b>	Photoactive Metal-Organic Nanoarchitectures on Surfaces: Atomic-Scale Electronic Structure
14:40 - 16:30		<b>posters &amp; coffee</b>

### New materials and devices

16:30 - 17:00	<b>C. Felser</b>	Heusler compounds
17:00 - 17:30	<b>T. Takayama</b>	Novel electronic phases in complex 5d iridium oxides
17:30 - 18:00	<b>J. Mannhart</b>	Thermoelectric Conversion of Heat into Electric Power
18:00 - 20:00		<b>dinner (Relaxa)</b>

## Wednesday, December 11

### Superconductivity

8:30 - 8:50	<b>M. Le Tacon</b>	Lattice Dynamics Anomalies near a CDW Instability in Underdoped YBCO
8:50 - 9:10	<b>R. Comin</b>	Charge ordering driven by Fermi-arc instability in underdoped cuprates
9:10 - 9:30	<b>S. Chi</b>	Local Effects of Transition Metal Impurities in Superconducting LiFeAs
9:30 - 9:50	<b>H. Boschker</b>	Interface superconductor with gap behaviour like a high-temperature superconductor
9:50 - 10:10	<b>A. Rost</b>	Spectroscopic Imaging STM studies of LiFeAs - Superconducting Gap Structure, Inter-Band Scattering and Electron-Boson-Interactions
10:10 - 10:30		<b>coffee</b>

### Low-dimensional systems & topological quantum states

10:30 - 11:00	<b>H. Fukuyama</b>	Novel Phases in Fermionic/Bosonic Quantum Liquids and Solids in Two Dimensions
11:00 - 11:30	<b>M. Berciu</b>	Another look at a hole in a cuprate layer
11:30 - 11:50	<b>P. Horsch</b>	Hidden Quasiparticles and Incoherent Photoemission Spectra in Na <sub>2</sub> IrO <sub>3</sub>
11:50 - 12:10	<b>S. Johnston</b>	Charge disproportionation without charge transfer in the rare-earth nickelates as a possible mechanism for the metal-insulator transition
12:10 - 13:00		<b>lunch (MPI)</b>
13:00 - 13:30	<b>A. Damascelli</b>	From p-wave superconductors to topological insulators via spin-orbit interaction in solids
13:30 - 14:00	<b>H. Tjeng</b>	All in-situ study of MBE grown topological insulators
14:00 - 14:30	<b>O.K. Andersen</b>	Band structure of the purple bronze LiMo <sub>6</sub> O <sub>17</sub> ; a Luttinger-Liquid in spe
14:30 - 15:00	<b>I. Affleck</b>	Topological superconductor - Luttinger liquid junctions
15:00 - 15:30	<b>M. Ogata</b>	Spin Hall effect and large diamagnetism in Dirac electrons in Bismuth
15:30 - 16:00	<b>R. Moessner</b>	Dynamics of a two-dimensional quantum spin liquid
16:00 - 18:00		<b>posters &amp; coffee</b>
18:00 - 20:00		<b>dinner (MPI)</b>