

Quantum Design

Seminar and Workshop

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The seminar and workshop QUDES15 was held at MPIPKS during two weeks in July, from July 13 to July 24, 2015. The scientific program of the workshop week contained 28 invited and contributed talks and the colloquium by Prof. van der Marel from the University of Geneva. The second week was the seminar during which there were 8 longer and more detailed talks by mostly junior participants.

The main focus of seminar and workshop was to bring together theorists and experimentalists working on systems of interacting electrons with the focus of understanding and designing novel quantum materials with specific properties, both in the context of fundamental research and potential applications. The topics covered at the workshop included superconductors with unconventional properties and multiple broken symmetries, like Fe-pnictides, systems with topological order, systems far from equilibrium, strongly correlated systems, e.g., heavy fermions and novel correlated electron materials with tailored properties. During the second week we scheduled longer talks on the physics of cuprate and pnictide superconductors, bi-layer graphene, and on new correlated electron materials.

Many prominent scientists from Europe, US, Japan, Israel, and other countries attended the workshop and gave excellent talks. Well-known scientists among workshop and seminar participants included Y. Matsuda (Kyoto), A. Bernevig (Princeton, US), E. Demler (Harvard, US), J. Schmalian (Karlsruhe), H. Manoharan (Stanford, US), E. Berg (Weizmann, Israel), A. Kampf (Augsburg) and many others. In addition, there were many scientific newcomers – junior scientists from all over the world. Some of them, like O. Cyr-Choiniere (Sherbrooke, Canada) and C. Hicks (Dresden), gave talks at the workshop. Others, like D. Chowdhury (Harvard, US), M. Schütt and P. Orth (both from Karlsruhe/Minnesota, US) and B. Roy (Maryland, US) gave longer talks during the seminar week.

The organizers' primary goal was not to focus on one narrow sub-field of physics but bring people working on similar but non-identical problems (e.g., strongly correlated electron systems, novel unconventional superconductors, topological insulators and topological superconductors, novel materials with tailored properties) and not only have in-depth exchange of ideas, but also try to find common features of different materials and common physics. The responses we received from the participants indicate that this concept was successful.

We would like to thank the MPIPKS for its hospitality and excellent infrastructure provided to us and the participants. We would also like to thank the team of secretaries and, in particular, Mandy Lochar, for their kind assistance as well as friendly and efficient support in organizing the meeting.