

August 1, 2008

To whom it may concern,

This is the report on the Seminar and Workshop on **Unconventional Phases and Phase Transitions in Strongly Correlated Electron Systems**. The Seminar was held June 02-27, 2008; the Workshop was held June 04-07, 2008.

The coordinators are A. Chubukov (Madison, WI, USA), Matthias Vojta (Universität zu Köln, Köln, Germany) and Thomas Vojta (University of Missouri-Rolla, Rolla, USA). Local coordinator, Claudia Poenisch (MPIPKS), did excellent job in coordinating the activities and handling near-infinite number of requests from invited speakers and participants.

The workshop and seminar are in the area of strongly correlated electron systems. At low temperatures, correlated electron systems display complex phase diagrams with unconventional ground state phases. In these phases and at the transitions that separate them, thermodynamic, transport and other properties deviate fundamentally from the properties of normal materials. Over the last years, it has become clear that understanding such unconventional behavior requires approaches beyond the established concepts of condensed matter theory. The purpose of the Seminar and Workshop was to bring together the leading experts in this field to discuss their latest work in an informal format, thereby fostering new and continued collaborations. A second important goal is to involve young scientists at the postdoctoral level in forefront research. To this end, we arranged 24 theory talks by leading theorists and 15 talks by leading experimentalists during the Workshop, and additional 15 talks by theorists during the seminar. We also arranged an informal but intensive and occasionally heated discussions on the interplay between metallic behavior and Mott physics, on the origin of the pseudogap in the cuprates (with short presentations from both experimentalists and theorists), and on recently discovered superconductivity in Fe-pnictides, with talks from researchers from MPIPKS and experimentalists from IFW.

The areas covered by the Seminar and the Workshop include high-temperature superconductivity in the cuprates, heavy-fermion and organic materials, grapheme, frustrated magnets, disorder and non-Fermi liquid physics. We succeeded in attracting the leading experts in these fields to our Workshop and Seminar.

We also had two lively poster sessions with the talks mainly by junior scientists. These sessions went very well, and both times the area around the posters on the second floor remained crowded long after the posted time for the discussions.

The two main results of the Seminar and the Workshop are (i) a focused exchange of ideas on the origin of non-Fermi liquid physics in correlated electron systems and the classification of theories for the pseudogap, and (ii) the involvement of young scientists in the discussions. We deliberately gave a podium to young scientists during our discussion sessions.

A few comments/suggestions.

1. We benefited a lot from having another workshop on strongly correlated electrons immediately after our workshop. A number of people came for both events, and, as a result, we had a larger than usual number of scientists present during the last week of our seminar.
2. the third week of our seminar was also the week of the International workshop on "**Quantum Phases and Excitations in Quantum Hall Systems**". That was a bit unfortunate as it turned out that there was only a small overlap between our seminar and that workshop. As a result, we could only arrange two talks during that week: on Wednesday, during the excursion/dinner for Quantum Hall workshop participants. We believe that it will be better in the future not to schedule a big workshop during an ongoing seminar activities on a similar subject.

Still, we used the third week for discussion and collaborative works. Overall, we believe that the Seminar was a success, and participants got the feeling that the field is moving, and there is a real progress. The local organization was excellent, and we use this opportunity to thank the staff at MPIPKS for their wonderful work.

Sincerely,

Andrey Chubukov

On behalf of the organizers

A. Chubukov, M. Vojta, T. Vojta.