

Emergent Quantum States in Complex Correlated Matter

Workshop

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The workshop took place at the MPIPKS in Dresden on August 23 – August 27, 2010, and focused on a number of important open problems in the field of strongly correlated electronic systems. It brought together cutting edge researchers in the area of emergent quantum states in correlated electron systems. The scope of the workshop spanned a large number of topics including the physics of Fe-pnictides, cuprates, frustrated magnets, and topological insulators. In addition, the physics of the new states of matter such as nematic and/or metamagnetic phases, and the interplay between spin, charge, and orbital degree of freedom have also been addressed. During the workshop a number of phenomenological and microscopic theories of these systems have been discussed in informal but serious manner.

Over 75 participants from Europe, USA, Canada, and Japan took part in the meeting. The program included 40 oral presentations, both invited and contributed, as well as two poster sessions. The interchange of points of view between participants with distinct scientific interests gave rise to a highly stimulating atmosphere. During the workshop, a number of new and exciting results have been presented by, e.g., Louis Taillefer on “Fermi surface reconstruction and quantum criticality in cuprate superconductors”, Subir Sachdev on “The phase diagram of the high temperature superconductors”, Kazuhiro Kuroki “Anion height as a key parameter in the superconductivity of pnictides and cuprates”, Ashvin Vishwanath on “Topological insulators – Correlation effects and topological field theories”, Maurice Rice on “A k -space theory for the cuprate superconductors”, Yong-Baek Kim on “Spin liquid and topological insulator in frustrated magnets”. Many other, especially young, participants presented talks of high quality and showed new and interesting results. The talks, discussions, and posters at EQUAM 10 demonstrated that the field of correlated electrons is developing rapidly and has great prospects.

Two main results of the Workshop are (i) a focused exchange of ideas on the recent experimental and theoretical developments in the field of high-temperature superconductivity and the origin of non-Fermi-liquid physics in strongly correlated electron systems, and (ii) an involvement of young scientists in the discussion which has stimulated new research collaborations.

We would like to thank MPIPKS for its hospitality and excellent infrastructure provided to the participants of the workshop. We also would like to thank the team of secretaries and, in particular, Mandy Lochar for their kind assistance and support of this meeting.