

Physik-Kolloquium

Dienstag, den 24.06.2014, 16.00 Uhr

Dr. Thomas Hermannsdörfer

Stark korrelierte Elektronensysteme, Helmholtz-Zentrum Dresden-Rossendorf

Solids under extreme sample conditions

Understanding the basic properties of solids was one of the great intellectual advances of the 20th century. Making use of complex materials and tailored material structures was a driving force for the rapid technological progress and its revolutionary impacts to our daily life in the same era. Over the decades, it became also clear that the understanding of more and more complex materials requires experimental efforts on a higher level. Sophisticated measurement techniques and the access to extreme sample conditions are indispensable for gaining more insight into the physics of complex materials and their microscopic processes. In the recent years, user facilities for experiments under extreme sample conditions, high magnetic fields in particular, were put into operation. Experiments in high magnetic fields provide a direct access to the microscopic interactions of the electronic and magnetic degrees of freedom and their correlation effects as well. In consequence, novel and unusual material ground states such as the FFLO high-field superconductivity, superconductivity in a ferromagnet, or even magnetism in gold have been observed. Many others of the most important challenges in condensed-matter physics have been addressed, too. In this talk*, besides giving insight into developments and the extension of facilities of the Dresden High Magnetic Field Laboratory (HLD), an investigation on Bi₃Ni nanostructures will be presented. In spherical Bi₃Ni nanoparticles or supercrystals consisting of packed Bi₃Ni nanofibers, a rare case of the coexistence of ferromagnetism and superconductivity is observed. Latest experimental results on magnetic and electronic-transport properties on Bi₃Ni nanostructures measured by means of SQUID magnetometry, pulsed-field susceptometry, high-field transport and element-selective XMCD will be presented.

*In cooperation with: Rico Schönemann¹, Marcel Naumann¹, Richard Skrotzki¹, Martin Kaiser², Martin Heise², Michael Ruck², Kurt Kummer³, David E. Graf⁴, Joachim Wosnitza¹

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Ort: Hörsaal für Theoretische Physik, Linnéstraße 5

Alle Teilnehmer sind ab 15.30 Uhr zu Kaffee vor dem Hörsaal eingeladen.