

Physik: Neue Forschergruppe gegründet - 25 Wissenschaftler von 16 Forschungseinrichtungen in Deutschland, Österreich und der Schweiz sind involviert

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Englischsprachiger Artikel über die Beteiligung der Physiker der Universität Würzburg an einem neuen Forschungsprojekt, das von der Deutschen Forschungsgemeinschaft (DFG) unterstützt wird.

A crucial role in technical progress is being assigned to correlated solids. How can the properties of these materials best be analyzed? This is the focus of a new research group involving Würzburg physicists.

In many chemical elements and their compounds electrons exercise a huge influence over one another. In such cases, physicists talk of electronically correlated solids. Even minor influences, such as temperature, pressure, or magnetic fields, can dramatically alter the properties of these materials. For example, very low temperatures can cause some solids to conduct electricity with no resistance.

Unusual properties of this nature are of interest to basic research and to new technological applications. Correlated materials could well have a big role to play in, say, the development of new sensors, switches, and components.

Correlated solids can be modeled by computer

The properties of correlated solids can be analyzed using computer calculations. A methodological breakthrough has been achieved by researchers in this field with "Dynamic Molecular Field Theory" (DMFT). Over the past ten years, its combination, in particular, with other methods for calculating the electronic properties of solids has produced a completely new process for modeling correlated materials realistically.

"This new approach, however, needs to be developed further so we can also understand and perhaps even predict the properties of complex electronic systems," say Würzburg professors Fakher Assaad and Ralph Claessen. This goal is being pursued by the new research group of which the two Würzburg physicists are members.

DFG research group with an international network

This is the world's first coordinated research project in this very topical field of theoretical solid state physics. 25 scientists at 16 research institutes in Germany, Austria, and Switzerland are involved. They are joined by partners, together with whom the group covers almost the entire international community of researchers working in this field.

The German Research Foundation (DFG) will be providing the group with EUR 2.4 million in funding over the next three years. Its spokesperson is Professor Dieter Vollhardt from the Institute of Physics at the University of Augsburg.

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