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Ab Initio Theories of Magnetism and Many-Electron Effects in Metals

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Message from the Guest Editor

Metallic states in some solids can be well described using a mean-field picture, where the electron–electron interaction is taken into account through a local static one-electron potential. However, this simple description is insufficient for many systems, where more sophisticated theories must be employed to capture many-electron effects. A range of novel first-principles approaches has been developed over the last two decades to describe the highly non-trivial physics of such correlated metals.

The present Special Issue will focus on these exciting development in the field of *ab initio* simulations of metallic systems. We aim to present an overview of recent important advances in the methodology and their applications to various systems. We thus welcome contributions on subjects like the finite-temperature magnetism of transition and rare-earth metals, the electronic structure of heavy-fermion and bad-metal compounds, and the impact of many-electron effects on the structural stability, elasticity and transport.

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Message from the Editorial Board

Metallic materials play a vital role in the economic life of modern societies; contributions are sought on fresh developments that enhance our understanding of the fundamental aspects related to the relationships between processing, properties and microstructure – disciplines in the metallurgical field ranging from processing, mechanical behavior, phase transitions and microstructural evolution, nanostructures, as well as unique metallic properties – inspire general and scholarly interest among the scientific community.

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