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Band-Ferromagnetism

Ground-State and Finite-Temperature Phenomena



Springer

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Preface

The fascinating phenomenon ferromagnetism is far from being fully understood, although it surely belongs to the oldest problems of solid state physics. For any investigation it appears recommendable to distinguish between materials whose spontaneous magnetization stems from localized electrons of a partially filled atomic shell and those in which it is due to itinerant electrons of a partially filled conduction band. In the latter case one speaks of band-ferromagnetism, prototypes of which are the classical ferromagnets Fe, Co, and Ni. The present book is a status report on the remarkable progress that has recently been made towards a microscopic understanding of band-ferromagnetism as an electron correlation effect.

The authors of the various chapters of this book “Band-Ferromagnetism: Ground-State and Finite-Temperature Phenomena” participated as selected experts in the 242nd WE-Heraeus-Seminar (4-6 October 2000) held under almost the same title in Wandlitz near Berlin (Germany). It was the second seminar of this type in Wandlitz. (The first in 1998 dealt with the complementary topic of the physics of local-moment ferromagnets such as Gd). Twenty-six invited speakers from ten different countries together with fifty-five further participants, who presented contributions in form of posters, spent three days together discussing in an enthusiastic and fertile manner the hot topics of band-ferromagnetism.

Generous financial support by the Wilhelm und Else Heraeus-Stiftung, by the Sonderforschungsbereich 290 (Metallische dünne Filme: Struktur, Magnetismus und elektronische Eigenschaften) of the Deutsche Forschungsgemeinschaft, and also by the Wohnungsbaugenossenschaft Hellersdorfer Kiez e. G. made it possible to bring together experimentalists and theoreticians working in different areas and with different techniques in the field of band-ferromagnetism. The idea was to document the present state of affairs, to learn from each other, and to pinpoint important areas for future research. The support of the sponsors is gratefully acknowledged.

Many colleagues have helped to organize the workshop and to prepare the manuscript of the accompanying book. We wish to thank the members of the Lehrstuhl Festkörpertheorie at the Humboldt-Universität zu Berlin for doing an excellent and active job. Special thanks are due to Priv.-Doz. Dr. Michael Potthoff who really worked hard in composing the various contributions to this book. The collaboration with the Springer-Verlag was always effective and delightful.

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Ground-State and Finite-Temperature Phenomena

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