Thermal Convection - Patterns, Stages of Evolution and Stability provides the reader with an ensemble picture of the subject, illustrating the state-of-the-art and providing the researchers from universities and industry with a basis on which they are able to estimate the possible impact of a variety of parameters. Unlike earlier books on the subject, the heavy mathematical background underlying and governing the behaviors illustrated in the text are kept to a minimum.

The text clarifies some still unresolved controversies pertaining to the physical nature of the dominating driving force responsible for asymmetric/oscillatory convection in various natural phenomena and/or technologically important processes and can help researchers in elaborating and validating new, more complex models, in accelerating the current trend towards predictable and reproducible natural phenomena and in establishing an adequate scientific foundation to industrial processes.

Thermal Convection - Patterns, Stages of Evolution and Stability Behavior is intended as a useful reference guide for specialists in disciplines such as the metallurgy and foundry field and researchers and scientists who are now coordinating their efforts to improve the quality of semiconductor or macromolecular crystals. The text may also be of use to organic chemists and materials scientists, atmosphere and planetary physicists, as well as an advanced level text for students taking part in courses on the physics of fluids, fluid mechanics, the behavior and evolution of non-linear systems, environmental phenomena and materials engineering.
Dr. Marcello Lappa is Senior Researcher at the Microgravity Advanced Research and Support Center. He has approximately 100 publications (the majority as a single author) in the fields of fluid motion and stability behavior (thermogravitational, thermocapillary, thermovibrational and magnetic convection), organic and inorganic materials sciences and crystal growth, multiphase flows, solidification, biotechnology and biomechanics, methods of numerical analysis in computational fluid dynamics and heat/mass transfer, high performance computing (parallel machines). He is founder and Editor-in-Chief of the scientific journal Fluid Dynamics and Materials Processing (ISSN 1555-256X). He has worked as a visiting scientist and professor at the Institute for Materials Chemistry and Engineering - Division of Advanced Device Materials in Japan (Kyushu University). Over recent years he has been involved in many industrial projects and, in particular, in the preparation of the ground and flight operations for the Fluid Science Laboratory (FSL) that will operate on-orbit within the Columbus Module of the International Space Station by the half of 2008.

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