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Preface

This textbook is intended as an introduction to surface science for graduate students. It began as a course of lectures that we gave at the University of Paris (Orsay). Its main objectives are twofold: to provide the reader with a comprehensive presentation of the basic principles and concepts of surface physics and to show the usefulness of these concepts in the real world by referring to experiments. It starts at a rather elementary level since it only requires a knowledge of solid state physics, quantum mechanics, thermodynamics and statistical physics which does not exceed the background usually taught to students early in their university courses. However, since it finally reaches an advanced level, we have tried to render it as self-contained as possible so that it remains accessible even to an unexperienced reader. Furthermore, the emphasis has been put on a pedagogical level rather than on a technical level. In this spirit, whenever possible, models which are simplified, but which contain the features that are essential to the appearance of the phenomena, have been set up and solved in a completely analytical way. The logic should be transparent enough for the reader although, most often, a more rigorous solution would need the use of a computer. To conclude, we have tried to give an account of surface physics which should be of use to the theoretician as well as to the experimentalist.

The following comments can be made on the contents of this book. The field of surface physics is too vast to present a complete treatment of all its major aspects. For example, we have omitted surface magnetism, dynamical interactions between an incoming atom or molecule and a surface . . . , which merit a book of their own. We have limited ourselves to fundamental concepts concerning, on the one hand, the macroscopic properties and, on the other hand, the microscopic properties such as atomic, vibrational and electronic structures. These topics will be discussed both for clean and adsorbate covered surfaces. Finally, we have precluded any technical description of experimental methods, focussing ourselves on the presentation of their theoretical background. Two reasons have led to this choice: firstly, the lack of competence of the authors and, secondly, the existence of excellent monographs dealing with this subject.

This book includes many references. However, it should be perfectly clear that we do not necessarily consider these references as the most original or the most important contributions in the field. They have been simply chosen as a convenient source of information to supplement or illustrate those given in the book.

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Saclay, France
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M.-C. Desjonquères
D. Spanjaard

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