PREFACE

Non-contact AFM

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Non-contact AFM

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This special issue is focussed on high resolution non-contact atomic force microscopy (AFM). Non-contact atomic force microscopy was established approximately 15 years ago as a tool to image conducting and insulating surfaces with atomic resolution. Since 1998, an annual international conference has taken place, and although the proceedings of these conferences are a useful source of information, several key developments warrant devoting a special issue to this subject.

In the theoretic field, the possibility of supplementing established techniques such as scanning tunneling microscopy (STM) and Kelvin probe microscopy with atomically resolved force micrsoscopy poses many challenges in the calculation of contrast and contrast reversal.

The surface science of insulators, self-assembled monolayers and adsorbates on insulators is a fruitful field for the application of non-contact AFM: several articles in this issue are devoted to these subjects. Atomic imaging and manipulation have been pioneered using STM, but because AFM allows the measurement of forces, AFM has had a profound impact in this field as well. Three-dimensional force spectroscopy has allowed many important insights into surface science. In this issue a combined 3D tunneling and force microscopy is introduced.

Non-contact AFM typically uses frequency modulation to measure force gradients and was initially used mainly in a vacuum. As can be seen in this issue, frequency modulation is now also used in ambient conditions, allowing better spatial and force resolution.

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