Proceedings of the 13th Workshop on Dynamical Phenomena at Surfaces (Cambridge, UK, July 2008)



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## PREFACE

# Proceedings of the 13th Workshop on Dynamical Phenomena at Surfaces (Cambridge, UK, July 2008)

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The papers collected here arise from the Workshop on Dynamical Phenomena at Surfaces, held in Cambridge, UK, in July 2008. The meeting has grown from the, SURPHON workshops [1], which traditionally had an emphasis on surface lattice dynamics. Over time the range of scientific interest has broadened and the recent meeting covered a wide range of topics including diffusion of adsorbates and clusters, growth, wetting, nanotribology, surface reactions and molecule–surface interactions as well as adsorbate vibrations and phonons. The contributions that appear here offer some sense of the breadth of the meeting. The motion of adsorbates on a surface serves as a particularly sensitive way to study the various interactions that take place on a surface and is therefore of fundamental importance. Theoretical work, of the type presented in the meeting, supplies us with important tools to analyze diffusion studies. For example, theoretical investigations of particularly complex surface dynamics exhibited by clusters [2] or due to internal degrees of freedom [3] are presented in this issue. The use of *ab-initio* calculations [4], to understand the relationship of electron motion to the underlying nuclear motion, is another illustration of the role theoretical methods have in the interpretation of experimental surface dynamics data.

A wide variety of experimental probes, can be used to study complimentary aspects of surface interactions, the contributions in this issue reflect this variety. The helium spin echo technique is used to study gas–surface interactions with a silicone surface [5], metastable de-excitation spectra provides insight into the complex growth dynamics of a self assembled monolayer [6] and the role co-adsorption has on surface bonds is studied using high resolution electron energy loss spectroscopy [7].

The field of nanotechnology has driven a growing interest in atomic scale friction and dissipation mechanisms on a surface. This topic, which provides an interface between tribology and surface science was the subject of various contributions presented in the meeting. Theoretical assessment of the dissipation due to electron-hole excitation [8] and the role of phononic dissipation [9] provide two complimentary examples of studies in this field. Recent experimental data showing a discontinuity in sliding friction near a superconducting transition [10], supplies additional motivation for understanding the interaction of weakly bounded mono-layers, a topic studied in detail by Bruch *et al* [11].

The goal of understanding, and eventually designing surface assisted reactions from first principles has been a strong motivator for studying interactions on surfaces for decades. The increased ability to measure surfaces made possible with modern technology, provides critical tests for validating and developing the predictive capabilities of first principle methods. Combining surface dynamics data with a better understanding of the different dissipation mechanisms which take place on a surface, will provide the much needed perspective for reaction studies of the type presented in this issue [12].

 

Finally, we believe the level of synergy and close interaction between theory and experiment suggests a bright future for the field and for the next meeting in the series, provisionally scheduled for 2010 with a return to Schloss Ringberg.

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