

The 12th International Conference on Vibrations at Surfaces (VAS 12) (Erice, 20–26 July 2007)

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FOREWORD

The 12th International Conference on Vibrations at Surfaces (VAS 12) (Erice, 20–26 July 2007)

Guest Editors

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The 12th International Conference on Vibrations at Surfaces (VAS 12) took place from 20–26 July 2007 as an event of the International School of Solid State Physics at the Ettore Majorana Foundation and Centre for Scientific Culture, Erice (Italy). The format and special environment of the conference have contributed to its transition from a traditional, medium-size conference into a more effective workshop, with a series of lectures reporting the most recent developments in the field, two poster sessions presenting recent results and even works in progress being discussed.

The papers collected in this issue cover the highlights of the conference very thoroughly. Quite a few novel aspects concerning vibrations at surfaces are represented here, for example:

- new aspects in surface phonon spectroscopy, such as the very recent progress in inelastic x-ray scattering, the first observation of the boson peak in disordered surfaces, progress in the theory of atom scattering inelastic resonances, the action spectroscopy, the study of polycrystalline surfaces with electron energy-loss spectroscopy etc;
- parallel developments in experimental vibrational studies of adsorbed phases, either inorganic or organic, with those in *ab initio* theoretical simulations;
- the theory of enhanced electron–phonon interaction in low dimensions (2D and 1D);
- the extension from the traditional realm of surface vibrations and spectroscopy to other aspects of surface dynamics, like friction and various nonlinear effects, and to relevant dynamical phenomena occurring at interfaces.

Other novelties presented at the conference, but already published in recent issues of the *Journal of Physics: Condensed Matter*, are also worth mentioning:

- the spin-echo spectroscopy with ^3He allowing for slow-dynamics spectroscopy at very high, unprecedented resolutions (2007 *J. Phys.: Cond. Matter* **19** 300301 and 305010);
- the first demonstration of dissociative surface trapping of molecules (2007 *J. Phys.: Cond. Matter* **19** 305003);
- the discovery of optical surface phonons in metals, solving a quarter of a century old controversy about surface acoustic resonances (2007 *J. Phys.: Cond. Matter* **19** 305011).

Future development of the VAS conference series could involve extending it to new areas directly involving surface vibrations which have traditionally been covered by other scientific communities. These are nonlinear optics (second-harmonic generation, femtosecond pump and probe experiments), surface acoustic waves (SAW) in THz domains with extension to dispersion effects and optical phonons, THz SAW applications to sensors and other devices, etc. The mature field of surface vibrations has many new branches into a wide range of applicative, mostly nanotechnological areas. The present VAS edition was intended to renew the conference and stimulate its evolution into new challenging directions. We believe that this special issue of the *Journal of Physics: Condensed Matter* will meet with the same large consensus gained at the 12th International Conference on Vibrations at Surfaces, and will foster new progress in the fields of surface dynamical phenomena and their applications. The next International Conference on Vibrations at Surfaces (VAS 13) will take place in the fall of 2009 in Orlando, Florida, and will be chaired by Professor Talat S Rahman, University of Central Florida.

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