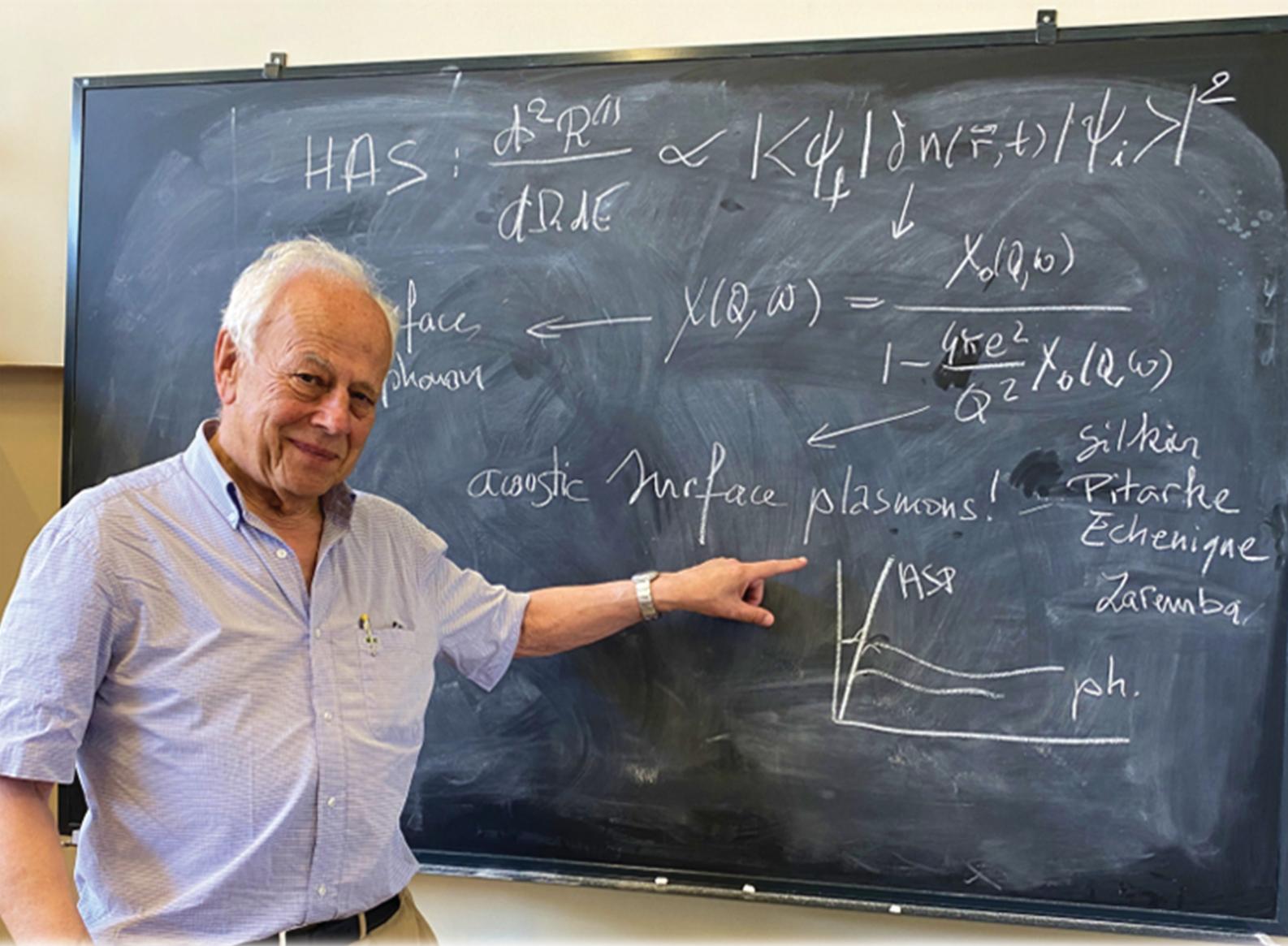


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## EDITORIAL

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## New trends and challenges in surface phenomena, carbon nanostructures and helium droplets – Festschrift for Giorgio Benedek

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This special issue of *Physical Chemistry Chemical Physics* is a themed collection in honor of Professor Giorgio Benedek to celebrate the occasion of his eightieth birthday, and is entitled “New Trends and Challenges in Surface Phenomena, Carbon Nanostructures and Helium Droplets”. This title represents the many research fields pioneered and tackled by Giorgio over his past and present scientific career. More than 40 papers presented here are authored by his former students, postdoctoral associates,

research colleagues and scientific admirers and friends.

Appropriately “surface phenomena” are listed first in the above title. Giorgio’s early prediction of the dispersion curves of surface phonons was instrumental in initiating the field of elementary atomic scale dynamics at surfaces. His many subsequent contributions to the study of surface phenomena, in particular elementary surface vibrational excitations, stimulated the development of new techniques for high-resolution inelastic helium atom scattering (HAS) and electron energy loss spectroscopy (EELS) to measure the dispersion curves of surface phonons in insulators, semiconductors and metals. This special issue features Perspective articles on the theory of atom-surface scattering and on the most recent applications of high resolution EELS to the study of several surface excitations. Also described in this collection is the latest method of  ${}^3\text{He}$  spin-echo

spectroscopy, which has unequalled resolution. Other important surface physics phenomena to which Giorgio made important contributions to which are addressed by articles in this volume, are the dynamics of vicinal (stepped) surfaces and molecular layers grown on metal surfaces. The impressive amount of work and progress carried out in the field of surface phonon theory and spectroscopy is marked by several relevant trends which have emerged during the last decade. Among those addressed by this special issue are the investigation of electron-phonon interactions in ultra-thin metallic films and in topological insulators and semimetals which feature the presence of topologically protected electronic surface states with peculiar transport properties. They have important relevance in many key dynamical and chemical processes at surfaces, including heterogeneous catalysis. The role of surface dynamics in these

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