Eur. Phys. J. Special Topics **226**, 1151–1153

DOI: 10.1140/epjst/e2017-70057-9

THE EUROPEAN PHYSICAL JOURNAL SPECIAL TOPICS

Editorial

IMA8 – Interfacial Fluid Dynamics and Processes

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Received 15 February 2017
Published online 2 May 2017

Founded in 2001 on a conference at Schloss Rauischholzhausen (University of Giessen, Germany), the International Marangoni Association (IMA) acts as a loose organization of international scientists interested in interfacial fluid mechanics and transport phenomena [1]. Name patron Carlo Marangoni, an Italian physicist, experimentally studied surface phenomena in fluids during the 19th century. Therefore the intentions of the International Marangoni Association and its first conferences were mainly focused on the now called 'Marangoni effect', i.e. on fluids where surface tension depends on temperature and local temperature gradients may cause flows along the surface. If the fluid consists of a mixture of two or more components with different surface tensions, the local relative concentration(s) of the mixture may account for additional 'solutal' Marangoni effects. In the course of time, IMA has been opened more and more to a wide palette of surface and interfacial effects. All problems, experimental, theoretical and numerical, where the physics and the chemistry of surfaces or interfaces play a crucial role are now included and discussed.

The conference in Rauischholzhausen organized by Dietrich Schwabe is nowadays considered as a kind of 'kick-off' event for the following series of IMA conferences which attract more and more people from all over the world interested and working in the subject. Until 2016, eight conferences have been held in various places on several continents. IMA2 in Brussels, Belgium in 2004, IMA3 in Gainesville, USA in 2006, IMA4 in Tokyo, Japan in 2008, IMA5 in Florence, Italy in 2010, IMA6 in Haifa, Israel in 2012, IMA7 in Vienna, Austria in 2014, and now IMA8 in Bad Honnef, Germany. The next two places are already determined (IMA9 in China and IMA10 in Romania), IMA9 is in preparation by Qiusheng Liu, University of Guilin.

In 2016, 74 oral contributions as well as 25 posters have been presented during our intensive 4-days meeting. All in all, 98 scientists from 19 countries made up an international, fruitful and highly stimulating atmosphere. According to the principles of IMA (all members are equal), there are no invited or key talks, neither parallel sessions. As an outcome of the recent meeting, a selection of 17 fully double-reviewed papers have been accepted for publication in the present Special Topics issue of the European Physical Journal.

The oral contributions of the conference were grouped into several sessions, from which the reader will get an impression from the articles printed in this issue. For the general session on Marangoni effects where also gravity and buoyancy plays a role, the papers by Goldobin et al. [2], Madruga et al. [3], and Kossov et al. [4] are representative. In the first two, phase transitions are crucial, the latter deals with multicomponent mixtures.

From the experimental side, Seco-Gudiña et al. [5] study water condensation over a prepared surface, Muto et al. [6] describe experiments on photochemical migration of a liquid column.

Effects of an external electric field on the stability and the evolution of an interface between immiscible fluids is examined in the work by Ozan et al. [7].

Surfactants are considered in the paper of Gordeeva et al. [8]. A linear stability analysis of ultra thin films including Van der Waals forces and solutocapillary effects is presented.

The dispersion of finite amplitude capillary waves in Newtonian fluids is examined by direct numerical simulations by Denner et al. [9]. Melnikov et al. [10] analyze numerically coherent structures of small particles swimming in a 3D time periodic flow field.

A rather new development is the revival of Faraday patterns, obtained if a liquid with a free surface is vibrated vertically, and more recently, also parallel to the free surface. This instability with subsequent pattern formation on the surface is in the focus of the paper by Richter et al. [11] where quasi crystalline structures are detected on thin films. Lyubimova [12] considers a Kelvin-Helmholtz unstable two-layer system with an additional external temperature gradient subjected to tangential vibrations. Lyubimova et al. [13] discuss the Rayleigh-Bénard-Marangoni instability of a two-layer system that oscillates vertically. Parametric excitation of an oscillatory Marangoni instability caused by the interplay of a temperature gradient and a concentration gradient due to surfactants is studied by Mikishev et al. [14]. Finally in this section, drops on a vibrating support are numerically examined by Borcia et al. [15], applying the phase field formalism.

Another session was devoted to droplets. Jabal et al. [16] show possible experimental facilities to control shape and flow of droplets. Chen et al. [17] perform direct numerical simulations of an evaporating droplet on a heated support. The paper of Kazuno et al. [18] studies droplet migration caused by a lateral temperature gradient.

According to the IMA rules, the costs of the conferences should be kept low to allow younger researchers to participate. This goal was perfectly reached using the facilities provided by the German Physical Society (DPG) at the Physikzentrum in Bad Honnef, located at the river Rhine. It is a pleasure to thank Victor Gomer and his team creating a relaxed and warm atmosphere during the conference as well as an uncomplicated preparation and final settlement. We acknowledge financial support from the Deutsche Forschungsgemeinschaft (Germain Research Foundation).

I thank the referees for their fast and thorough work, as well as Sabine Lehr from Springer-Verlag for her support during the publication process. Finally I wish to thank the 'local organizing committee' from the physics department of the BTU Cottbus – Senftenberg, Rodica and Ion Borcia, Katrin Gregor, Sebastian Richter, and Sergej Varlamov for their enthusiastic help in practically all aspects before, while and after the conference.

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