Vorträge

Prof. Andreas Boudouvis

National Technical University of Athens

8:30 – 9:30 Uhr Vortrag

"A computational and experimental investigation of limitations of electrowetting on dielectrics"

By applying a voltage between a conducting liquid (e.g. water) micro-drop and an insulated metal electrode covered by a dielectric material, charge accumulates at the dielectric/liquid interface and the capacitive energy stored reduces the corresponding interfacial energy inducing wetting enhancement, i.e. lowering of the apparent contact angle. The electrocapillary effect, commonly called electrowetting, offers a convenient way of fast and reversible altering of the wetting properties of solid surfaces using electric fields.

Associated limiting phenomena, namely contact angle saturation as voltage increases past a threshold, are illuminated by means of computer-aided analysis and experiments. It is proposed that saturation is associated with local dielectric breakdown, due to high values of the electric field strength at the contact line, which causes local switching of the dielectric to a conductor.

9:30 – 9:45 Uhr Pause

9:45 – 10:45 Uhr Vortrag

"Numerical treatment of free boundaries in fluid mechanics problems with the Galerkin/finite element method"

Free boundary problems are efficiently dealt with in the Galerkin/finite element method by simultaneously solving the discretized equations for the field and free boundary shape unknowns. In fluid mechanics, the unknown free boundary shape enters nonlinearly the equations and their boundary conditions typically through capillary and kinematic terms as well as through the integral limits in the weighted residuals. The combination of flexible parametrization of the free boundary shape and the isoparametric mapping of the tessellation subdomains is the key for computing the sensitivities of the residuals on the free boundary shape unknowns; this enables solving the discretized equations set by Newton iteration and, thus, the systematic investigation of the nonlinear solution space structure.

Termin: **24. März 2011, 8:30 Uhr**
Ort: **ZEU 150A**

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