

Deformation of a dielectric drop in water under microsecond current pulses

V. A. Panov, A. S. Saveliev, V. Ya. Pecherkin, L. M. Vasilyak and Yu. M. Kulikov

Joint Institute for High Temperatures of Russian Academy of Sciences
Bd. 2, 13 Izhorskaya st., Moscow, 125412, Russia
E-mail: panovvladislav@gmail.com

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Particle Image Velocimetry (PIV) is used to study the nonstationary flow pattern around a drop of a dielectric liquid of dibutyl phthalate surrounding water of weak conductivity under the action of a microsecond current pulse. It has been found that the time of existence of the induced vortex flow in water significantly exceeds the duration of the current pulse. During the action of the pulse, only small perturbations develop on the surface of the drop, while the final perturbations of the surface develop at much longer times, exceeding the duration of the current pulse by two or more orders of magnitude, and are associated with the evolution of the water flow around the drop. It is shown that the value of the maximum velocity in the induced water flow is affected by the potential of the needle at a constant duration and amplitude of the current.

Keywords: water, liquid dielectric, dibutylphthalate, drop, EHD flows, PIV.

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