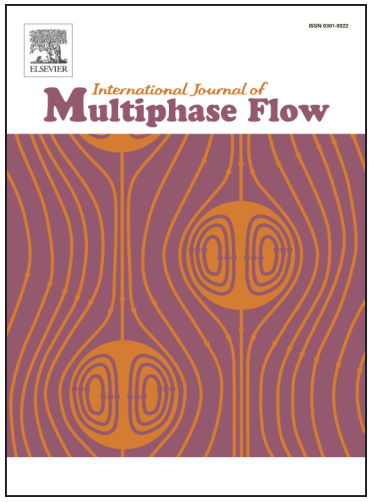

Electric field-assisted manipulation of liquid jet and emanated droplets

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Electric field-assisted manipulation of liquid jet and emanated droplets

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Abstract

Controlling and manipulating liquid jets are of great interest in practical and scientific aspects. In the present work effects of transverse uniform electric field on behaviour of liquid jet, streaming downward due to the gravity, is experimentally investigated in details by performing a precise image processing of the extracted high speed video frames. In the experiments, by altering liquid flow rate and applied electric field strength, authors have tried to study the interplay of electrical and hydrodynamic forces which are indeed the main factors acting on the jet behaviour e.g. deflection, rhythmic motion, breakup mechanism and satellite droplets formation. Major aim of this study is to manipulate liquid jet so as to attain uniformly sized droplets by removing satellite droplets which has potential applications in various industrial and laboratorial units. This procedure was performed by applying dielectrophoretic force to the water jet as a polar liquid. Furthermore the droplets and also satellites behaviour, influenced by transverse electric field, have been investigated thoroughly.

Keywords: Liquid jet manipulation, Electric field, Dielectrophoretic force, Satellite droplets